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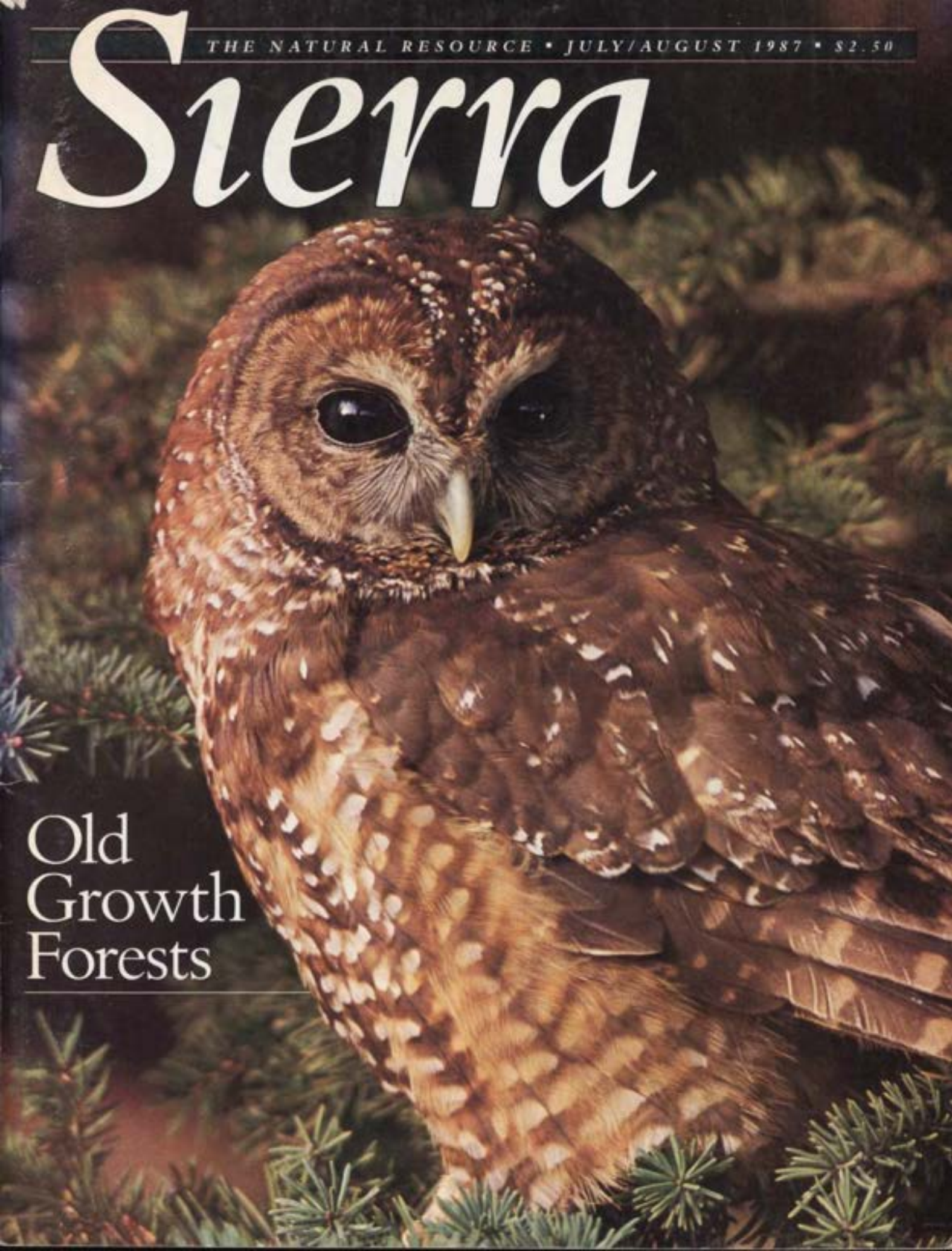
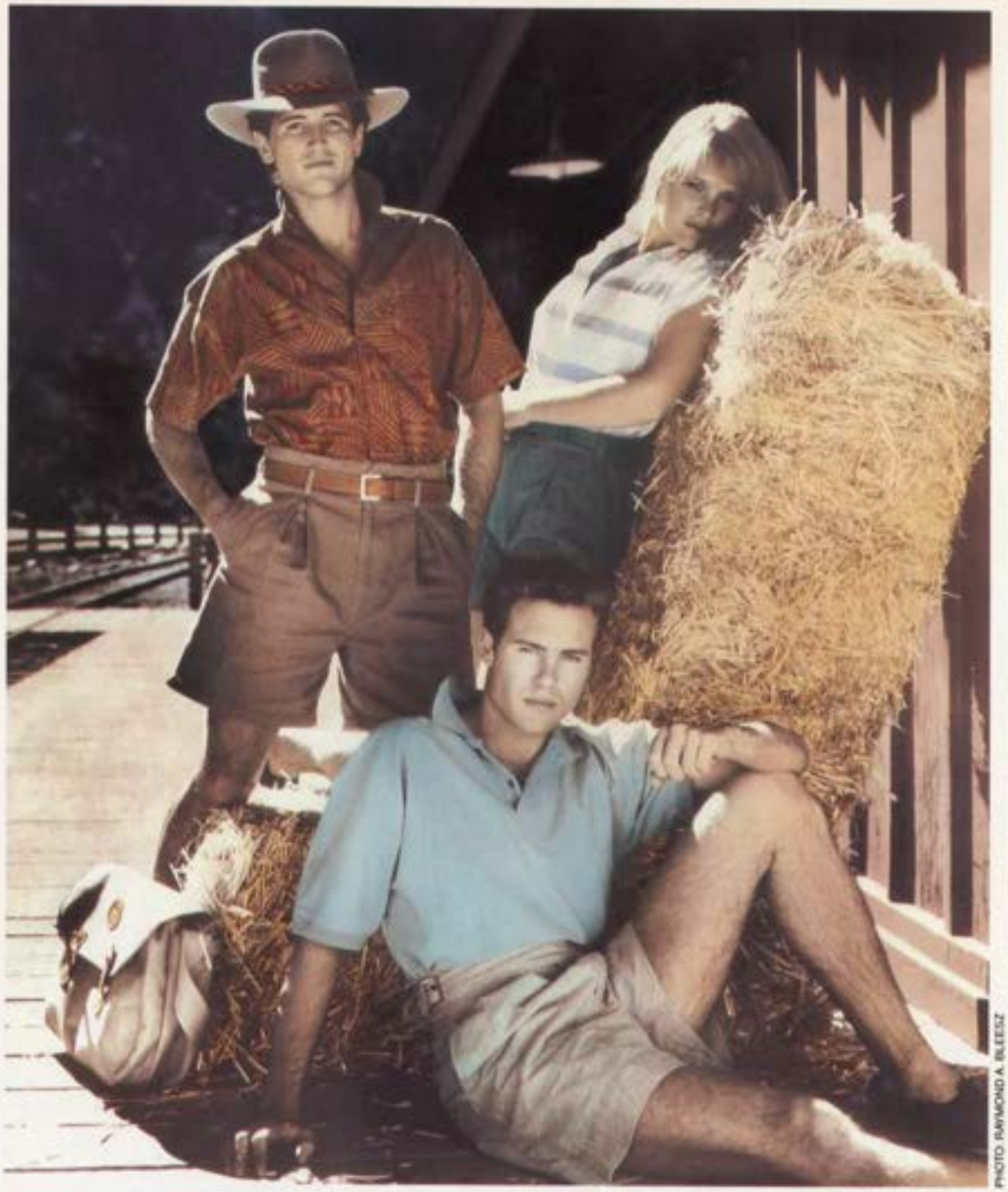


Old Growth Forests



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VOL. 72/No. 4 JULY/AUGUST 1987

Sierra

COVER: The spotted owl is one of many species that depend on old-growth forests for food and shelter. But the chainsaws are closing in on the Pacific Northwest's remaining ancient stands; see page 38. *Photo by Tom and Pat Leeson.*

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The Sierra Club Difference

The Sierra Club's success story is the story of its grassroots volunteers. No other environmental organization owes as much to the collective strength of its individual members. The role of the Sierra Club's extraordinarily competent staff is to realize the goals of the volunteer members—goals determined both directly (to the greatest extent practicable) and indirectly (through the thousands of members who serve a leadership role as volunteers).

For example, the Club's highest priorities—the ones that receive our limited resources of time, money, and political capital—are set only after extensive consultation with the membership. Our current "top three" priorities were decided after a poll of 2,000 Club leaders, each of whom, we expect, touched base with dozens of his or her colleagues. These three priorities—protection of the Arctic National Wildlife Refuge, passage of the California Desert Protection Act, and strengthening and reauthorizing the Clean Air Act—are the focus this year of the Club's power and give only a flavor of the range of its lobbying responsibilities.

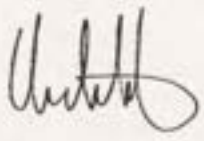
The dangers confronting the Arctic National Wildlife Refuge demonstrate that, even after legislative victories to protect wilderness, we must be constantly vigilant to assure that those protections remain in place. Extraordinary resources will have to be directed toward this effort, because no compromise is possible here. Defense of this incredibly precious and rich wilderness ecosystem will not be possible if even "controlled" industrial development is allowed. Too many people are ready to kill a wilderness, in good conscience, as long as some of the animals are left alive. The Sierra Club will not be a party to any such action.

The California Desert Protection Act—written by our volunteers in close collaboration with Sen. Alan Cranston (D-Calif.) and others—exemplifies the importance of taking the initiative to place into Park Service ownership especially sensitive lands, and of minimizing through congressional designation of wilderness areas the "multiple use" flexibility employed (and often abused) by federal land managers.

Strengthening and reauthorizing the Clean Air Act is so essential to the environmental health of this planet that it is our highest legislative priority of all. Success in this effort will be a bellwether of our nation's ability to reject a consumptive, "me first" business philosophy while embracing, firmly and unequivocally, a set of business principles that recognize the responsibility one community has for another, that one generation has to all those succeeding it.

Sierra Club volunteers are playing, and will continue to play, a vital role in all of these campaigns. Other distinguished national-level environmental organizations will work with us on these and other fronts; all of them have their own style, their own strengths, their own record of impressive accomplishments. The environmental cause is advanced by each of those organizations—but the Sierra Club is different, and we like that difference.

Lawrence Downing
President



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Instead, a handful of extremists in the White House and the Agency for International Development (A.I.D.) have targeted America's international family planning program for destruction. They're trying to eliminate reproductive options for women in developing countries–just as they have tried and failed to do here at home. They want to cut off help to those who are doing the most to help themselves.

If they succeed, all the good we've done will be undone. With less family planning, there will be more abortions. Families–women and children–will suffer and die, needlessly. We're fighting back. And we need your help.

To protest the Administration's attack on international family planning, write M. Peter McPherson, Administrator, A.I.D., Room 5942, 320 21st Street, N.W., Washington, D.C. 20523. Send copies to your Senators and Representative.

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LETTERS

GRATITUDE FOR ASSELSTINE

Your May/June 1987 article about Nuclear Regulatory Commissioner Jim Asselstine ("The Case of the Dissenting Commissioner") concludes that an imminent nuclear accident in the U.S. is not unlikely. Given the self-serving, acquiescent politics of the NRC over the industry they are supposed to watchdog, this opinion is well-founded.

We have proven ourselves to be very fallible, shortsighted stewards of this planet, playing roulette with something infinitely more dangerous than fire. Asselstine's is a lonely voice saying that what we all fear is as inevitable as it is earth-shattering. I strongly suspect that, deep down, the other commissioners and promoters of this poisoning power believe this too but are afraid to admit it.

Mr. Asselstine—please hang in there!

Jackson Gillman
Mt. Desert, Maine

RADIATION PARANOIA?

Anne Witte Garland ("Priorities," May/June 1987) wants us to believe that the only motivation for irradiating food is as justification for government and corporate conglomerates to proceed with reactor operations. Garland ignores the fact that irradiation is an effective method of decontaminating food from microorganisms and macroorganisms.

Californians who endured the Medfly crisis of 1980-81 are keenly aware of the potential for agricultural disaster from imported vermin. For some products radiation offers an alternative to fumigation. By choosing not to market radiation-processed mangoes, the North Miami Beach grocery chains cited as an example by Garland elected, instead, to sell fruit that had been bathed in some very poisonous gas.

Commercial ventures into food irradiation on a large scale will most likely make use of accelerators manufactured by private concerns, as opposed to isotopic sources. Physical properties of cesium 137 make it an inefficient source. Even with increased weapons production, the Pentagon could not supply enough of it for anything larger than pilot plants. Cobalt 60 is likewise in limited supply. Furthermore, accelerator technology does not entail the risks of radioactive-materials handling.

Food processors have a formidable task ahead of them to win acceptance of radiation-processed food, despite the findings of the FDA, the World Health Organization, and health organizations in dozens of other countries that such food is entirely wholesome. The unreasoning public paranoia against anything spawned within the atomic nucleus is overwhelming. If consumers are thoroughly educated as to the costs, benefits, and alternatives, however, the Miami grocery chains may decide that the irradiated Puerto Rican mangoes really aren't so bad.

Stanley Johnsen
Palo Alto, Calif.

BAD TIP ON THE EYEDROPPER

I was dismayed and alarmed by an item in your May/June "Afield" section. You suggest putting white gas in an eyedrop bottle to prime camping stoves. Relabeling the bottle was not even mentioned. This is a potentially dangerous practice.

If you must carry toxic substances in eyedrop bottles, changing or removing the label is not enough—the bottles must be distinguishable by feel as well as sight. Better yet, don't use them at all.

Elise Porter
El Paso, Texas

GLOSSING OVER THE DIFFERENCES

Jonathan F. King's article, "Nature Reserves of the U.S.S.R." (May/June 1987), was very interesting and signals the possibility of a *glasnost* of sorts here in the U.S. concerning the Soviet Union. Still, I was left a little disappointed by King's rather superficial generalizations on Soviet conservation efforts.

For example, he states that "Unbridled industrialization and blind faith in technology are the same forces that have motivated our own society for more than a century, forces that environmentalists here are attempting to defeat." But such a glossy characterization of two radically different economies

overlooks too many particulars to be of any real value. Private profits motivate U.S. corporations in their capitalist search and seizure of natural resources. But is King advocating that environmentalists look at the fundamental aspects of the capitalist economy? Probably not. Neither does he mention the control a planned economy gives the citizens of the U.S.S.R. over their development efforts—a control that fitful and spasmodic legislation here in the U.S. can only attempt to approximate. Questions such as these might be examined at more length for the benefit of all.

Sesshu Foster
Alhambra, Calif.

In the U.S.S.R. there is now new freedom to criticize large-scale resource-management and development projects that may cause severe environmental damage. A prime struggle that was not mentioned in your article was the one over Lake Baikal [in the southeastern Soviet Union near the Mongolian border], the deepest of all lakes. More than a thousand species of plants and animals live nowhere else.

In 1962 the planners in Moscow decided to build a gigantic cellulose and wood-chemical combine of factories on the south shore. In 1963 the building began. *Pravda* and *Izvestia*, having proudly announced the new production complex, were inundated by letters of outrage. "Baikal" became a rallying cry. The plants were closed, but the protests continued. People demanded that fishing be banned until stocks returned to normal, that there be no more seal slaughter, and no more lumbering on Baikal watersheds.

In 1967 the Presidium of the Supreme Soviet voted to make the entire Baikal region a national park. All forms of wildlife from wolves to wildflowers are now under complete protection. The cellulose factories, now with filtration systems, can continue using lumber from south of the Baikal watershed.

A zoologist with the Baikal Limnological Institute told Farley Mowat, author of *The Siberians*, that "the fight to save Baikal woke up the whole of the Soviet Union."

Will Osborn
Sedona, Ariz.

CONSERVANCY'S GOOD WORK

Seth Zuckerman's article "Living There" (March/April 1987) was an excellent introduction to the increasingly important North American bioregional movement. We were pleased with Seth's treatment of our work in restoring the Mattole River watershed. The only thing to add is that another state agency besides the California Department of Fish and Game has offered us broad and timely support. Since 1983 the California Coastal Conservancy has supported a wide variety of restoration projects in our valley. Extensive streambank protection, gully checks, tree planting, road-damage mitigation, and landslide control have been among the many


DAVID CROSS

kinds of work the Conservancy has enabled us to accomplish. As a consequence, salmon spawning habitat, county roads, and prime agricultural lands have been saved. The Coastal Conservancy deserves a great deal of credit for understanding the economic and spiritual importance of the health of our coastal watersheds. So, too, does the Sierra Club.

David Simpson
Mattole Watershed Salmon Support Group
Petrolia, Calif.

SHORT SHRIFT FOR SHALE

The article "Shale Shock on the Western Slope" ("Priorities," May/June 1987) contains some statements that I regard as less than factual.

First, much of the article is devoted to criticizing the 1872 Mining Law, pointing out, rightly, that it has been "a mineral, fiscal, and environmental failure." However, these concepts are relative. The 1872 Mining Law *does* have some very definite requirements for those who would like to establish and patent claims on public lands. The requirements are by no means onerous, but neither are they trivial. To deal with public-land mining problems requires not only a change in the Mining Law, but also in the willingness of the Department of Interior to enforce the law.

Second, Sierra Club lobbyist Brooks Yeager is quoted as saying, "Many oil-shale claims awaiting patents were initiated based on invalid discoveries. . . ." This is much too charitable. There is a long record of Interior Department investigations and contested claims showing, rather clearly, that only a minuscule percentage of pre-1920 claims, *if any*, are valid, for a host of reasons.

Finally, the article suggests that H.R. 1039, which the Interior Department opposes, is a bill that will deal effectively with the oil-shale claims mess. This bill may be better than nothing, but it has at least two flaws. First, it focuses on the lack of annual assessment as the only problem to be addressed in determining a claim's validity. In fact, many other deficiencies exist in oil-shale claims. Second, H.R. 1039 gives Interior the job of determining the validity of remaining claims rather than directing Congress to carry out that investigation itself. Remember, the Department of the Interior's policies with respect to oil-shale claims (stated or de facto) have been the source of the problem! The public thus has little reason to be confident the DOI will do its work honestly and well.

Kirk Cunningham
Conservation Chair
Sierra Club Rocky Mountain Chapter
Denver, Colo.

HIGH COUNTRY PRIDE

Geoff O'Gara's article about Tom Bell ("Grassroots Profile," March/April 1987) did my heart good. Here is a man who has spent most of his life and material possessions protecting a part of the country he loves. He has written much in his newspaper [*High Country News*] about the misuse of land and is trying to protect Wyoming's natural resources against those who would misuse them. His dedication to the natural world and his efforts to keep it as it should be are highly commendable.

Josephine Briggs
Arlington, Texas

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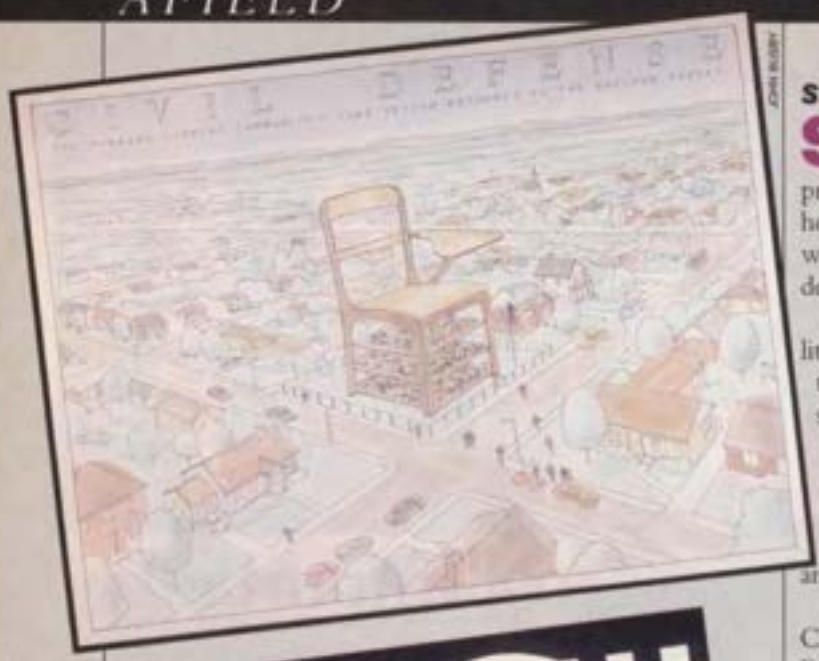

JOHN RUSSEY

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SHELTER FROM THE STORM—FOR SOME

Several years ago a Reagan administration official gained notoriety by suggesting that Americans could best protect themselves during a nuclear attack by digging a hole, covering the hole with a door, and anointing the door with a few shovelsful of dirt. He expressed most confidence in the efficacy of the dirt.

The administration's civil-defense policy has evolved little since then. Its current incarnation is a proposal from the Federal Emergency Management Agency (FEMA) to spend $1.5 billion building 656 fallout shelters for state and local officials, who would require such emergency centers in order to carry on their government functions during a "post-attack" phase. Under FEMA's plan, the general public would be sheltered in existing structures and provided with nuclear-attack self-help literature.

In response to FEMA's proposal, the Northern California Chapter of Architects, Designers, and Planners for Social Responsibility organized a design competition this spring for the structures that will protect our leaders when the bombs begin to fall. The intent of the contest, which was titled "Give Them Shelter . . . It's Not for Everyone," was to "elicit thought-provoking images on the paradox of nuclear blast and survival."

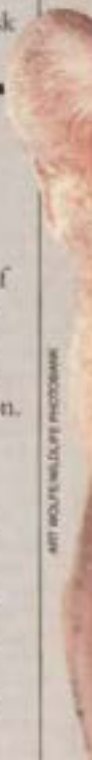
The three designs at left were among the 80 contest entries, which ranged from technical blueprints to a blank drafting board labeled "The Emperor's New Clothes Model." Elegant though they may be, most of the designs would offer our elected officials little physical comfort. But as those Americans who spent some memorable (if not their finest) public-school moments crouched under a desk will attest, it really isn't for everyone.—*Annie Stine*

LIONS—MOUNTAIN OR MOUNTED?

The mountain lion is a shy and elusive cat, and unlikely to be killed by its own curiosity. But after 15 years of protected status, the California cougar will soon be looking down the barrel of a gun once more.

Of the 12 western states that have substantial numbers of mountain lions, only California has ever prohibited sport hunting. However, in 1985 Gov. George Deukmejian (R) vetoed the extension of a moratorium on hunting enacted by the state legislature to protect a declining lion population. In April, after a year-long study, the California Fish and Game Commission decided by a 3-2 vote to allow lion hunters to pursue, tree, and shoot their favorite game.

According to California Department of Fish and Game estimates, the mountain-lion population has increased to 5,100 animals since hunting was banned. But the cougar is a secretive animal, virtually impossible to track—and that official figure is disputed. "We don't see sound research to support this number," says Sharon Negri of the Mountain Lion Preservation Foundation in Sacramento. "No one



ART WOLFE/WILDLIFE PHOTOGRAPHY

SHOWER SHUDDERS

Some people submit to cold showers to promote strong character and wholesome thoughts, but now scientists have supplied another motivation: In re-

gions with contaminated water, a chilly dousing may help avoid the inhalation of toxic chemicals.

Chloroform and trichloroethylene (TCE) are two highly volatile chemicals that have been found in drinking-water supplies across the nation. According to the National Academy of Sciences, their ingestion is suspected of causing the cancer deaths of up to one thousand people in the U.S. each year. Now research by Julian Andelman and his colleagues at the University of Pittsburgh indicates that breathing toxins can possibly be as dangerous as drinking them.

Andelman's work shows that a hot shower (110 degrees Fahrenheit) releases into the air 50 percent of the chloroform and 80 percent of the TCE dissolved in the water. Benzine and other volatile chemicals found in contaminated drinking supplies can also be released. The vaporized toxins are readily absorbed into the bloodstream through the lungs.

Andelman did not focus on the specific health effects of inhaling the toxins. "What

UP IN SMOKE: TOBACCO'S TOLL

Cigarettes consumed in the U.S. in 1984:	**600 billion**
Percentage of all deaths in the U.S. attributable to smoking:	17.2
To alcohol abuse:	4.9
To motor-vehicle accidents:	2.3
To illicit drugs:	0.2
Number of lung cancer deaths in 1986:	130,000
Percentage attributable to smoking:	85
Percentage of smokers who do not know that smoking causes most lung cancer:	40
Who don't know smoking causes cancer at all:	20
Current annual budget of the federally funded National Cancer Institute:	**$1 billion**
Amount of the federal subsidy of the tobacco industry:	**$3.5 billion**
Amount the National Cancer Institute spends to reduce tobacco use:	**$20 million**
Amount the tobacco industry spends on advertising:	**$2 billion**
Cost of smoking in absenteeism, lost productivity, and health care in 1984:	**$53.7 billion**
Cost of these factors per pack of cigarettes sold:	**$1.79**

really knows just how many mountain lions there are, nor are we certain of the impact on the lions' habitat of other factors such as development and heavy recreational use of wilderness."

Hunting proponents seized upon the recent maulings of two children in a Southern California wilderness park as proof that the cougars need "management." Pro-hunt ranchers also cited threatened livestock. But anti-hunt activists point out that existing laws allow authorities to kill animals that threaten public safety and permit ranchers to kill nuisance lions.

Terry Mansfield of Fish and Game stands by the department's research, but admits that the limited take of 190 lions will have a negligible effect on predation or public safety. However, he notes that "state policy provides for diversified use of wildlife, including sport hunting of a healthy population."

Although the controversy is rooted in the philosophical differences between hunters and non-hunters, the statistics and research methods used to justify the hunt can be challenged legally. A coalition of groups that includes the Sierra Club has filed suit against the Fish and Game Department and is hoping for an injunction against the hunt. "If the department were truly interested in management," says Negri, "it would address all pertinent questions through a five-year study we are willing to fund. Since California is the only state to have protected mountain lions, we are letting a unique research opportunity slip through our hands."—***Kathy Glass***

we intended to show, and what we did show," he says, "is that when it comes to exposure, the air route is just as significant as the drinking route."

The long-term solution, of course, is to clean up contaminated water supplies and regulate more carefully the disposal of hazardous wastes. Until then, Andelman has a few tips for those whose water is contaminated. He suggests bathing instead of showering (a faucet's single stream of water emits about half the volatile chemicals of a shower), closing the bathroom door to limit the spread of gases through the house, and opening bathroom windows to vent the air outdoors.

And of course, for the strong of character and wholesome of thought, there's always the short, cold shower. —*Gil Woolley*

CHARLENE CHARLES

THE OMINOUS COLOR OF TOXIC DUMPING

Blacks and Hispanics are more likely than whites to live near toxic-waste sites, according to a report released in April by the United Church of Christ's Commission on Racial Justice.

The 18-month study found that three of the five largest toxic-waste landfills in the U.S. are located in southeastern communities that are more than 75-percent black. Nationally, communities with one hazardous-waste facility have twice the percentage of minorities as those with none; the percentage triples in communities with two or more waste sites. The commission also found that three out of five blacks and Hispanics live in communities that have illegal or abandoned dumps.

The report suggests that more attention be given to the possible connection between recently documented health problems among minorities and the presence of toxic-waste sites in their communities.

Minority community activists, the commission reports, often find the government unresponsive, if not downright obstructionist, when they attempt to obtain information on the toxics in their backyards. The report charges that the environmental movement, which it characterizes as historically a middle- and upper-class phenomenon, has been unresponsive to environmental issues affecting minorities.

The commission urged action at all levels, from the creation of an EPA office of racial and ethnic affairs to grassroots organizing around environmental issues by churches and neighborhood groups.

—*Susan Zakin*

SCORECARD

■ *The World Bank* will establish a new environment division, bank president Barber Conable announced on May 5, and increase its environmental staff from 17 to 100 people worldwide. Conable also acknowledged that the bank's involvement in the Polonoroeste road project in Brazil was a mistake, a "sobering example" of an effort gone wrong.

■ *Clean air legislation* addressing ozone, smog, and other issues is being considered by various committees in Congress.

FLASHBACK

WILLIAM COLBY REGIONAL LIBRARY COLLECTION

Miss Cadwallader's camp, 1908. Members of the Sierra Club's eighth outing take an afternoon rest in the Kern River Canyon. This trip is chronicled in Volume 7 of the *Sierra Club Bulletin*.

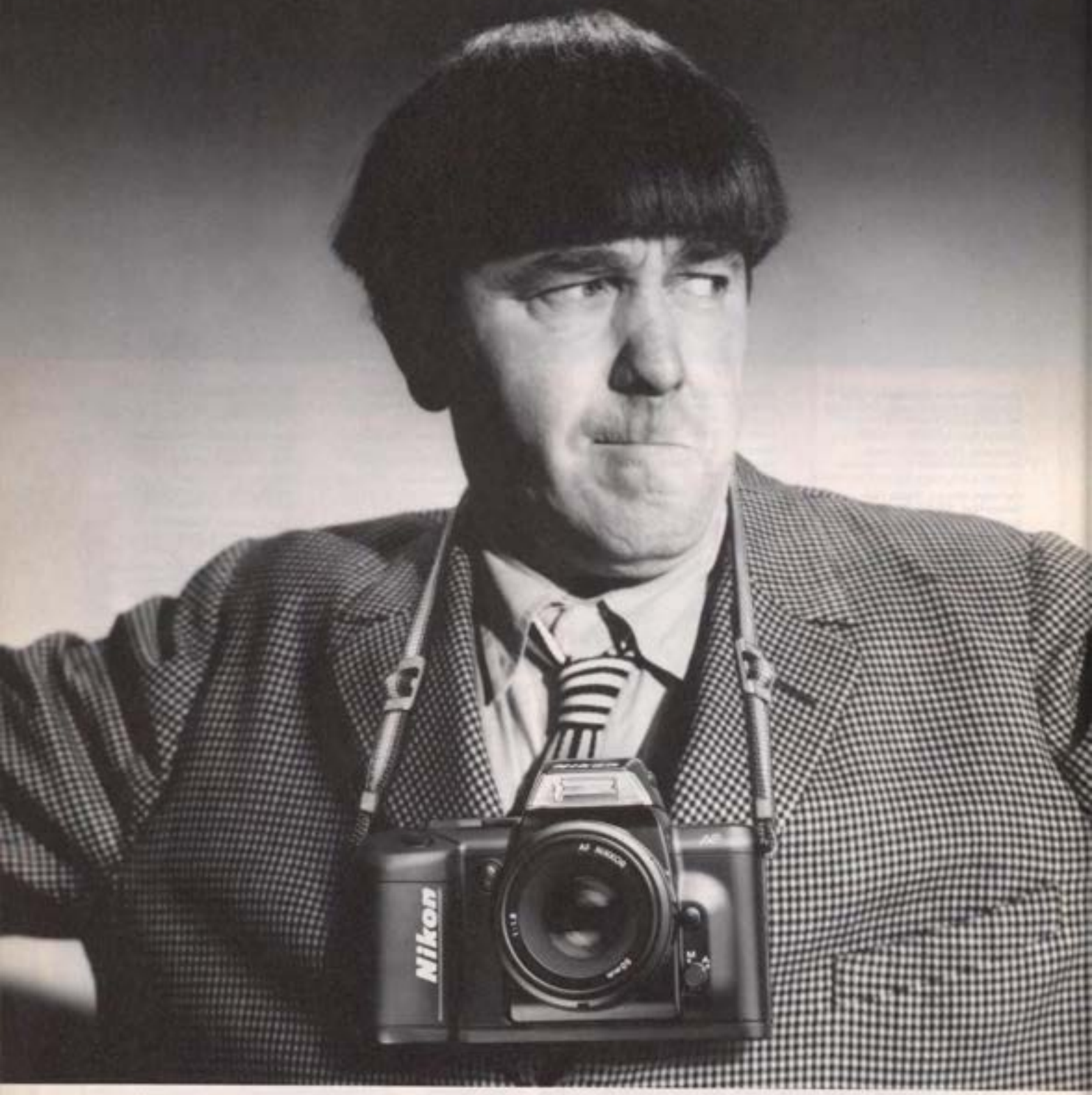
FARMWORKERS OUT ON THE LINE AGAIN

In 1975, 17 million people in the United States voluntarily lived without grapes, Gallo wine, and head lettuce. Now Cesar Chavez and the United Farm Workers (UFW) are asking Americans, who consume more than a billion pounds of California table grapes a year, to kick the grape habit once again.

While the earlier protest focused on farmworkers' general working and living conditions, this boycott underscores the threat to farmworkers and consumers posed by "the reckless use of deadly poisons in agriculture."

Approximately 8 million pounds of more than 130 different pesticides are used annually in grape production in California, and most of them have not been adequately tested. According to Marion Moses, a physician with the National

Nikon introduces the p



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Even if your photographic IQ is near zero, this is one 35 mm SLR you can take out of the box and begin using right away. Because it does everything for you.

It incorporates a remarkable Nikon innovation called the Decision Master System, which controls all camera, lens and flash functions automatically, even in difficult lighting situations.

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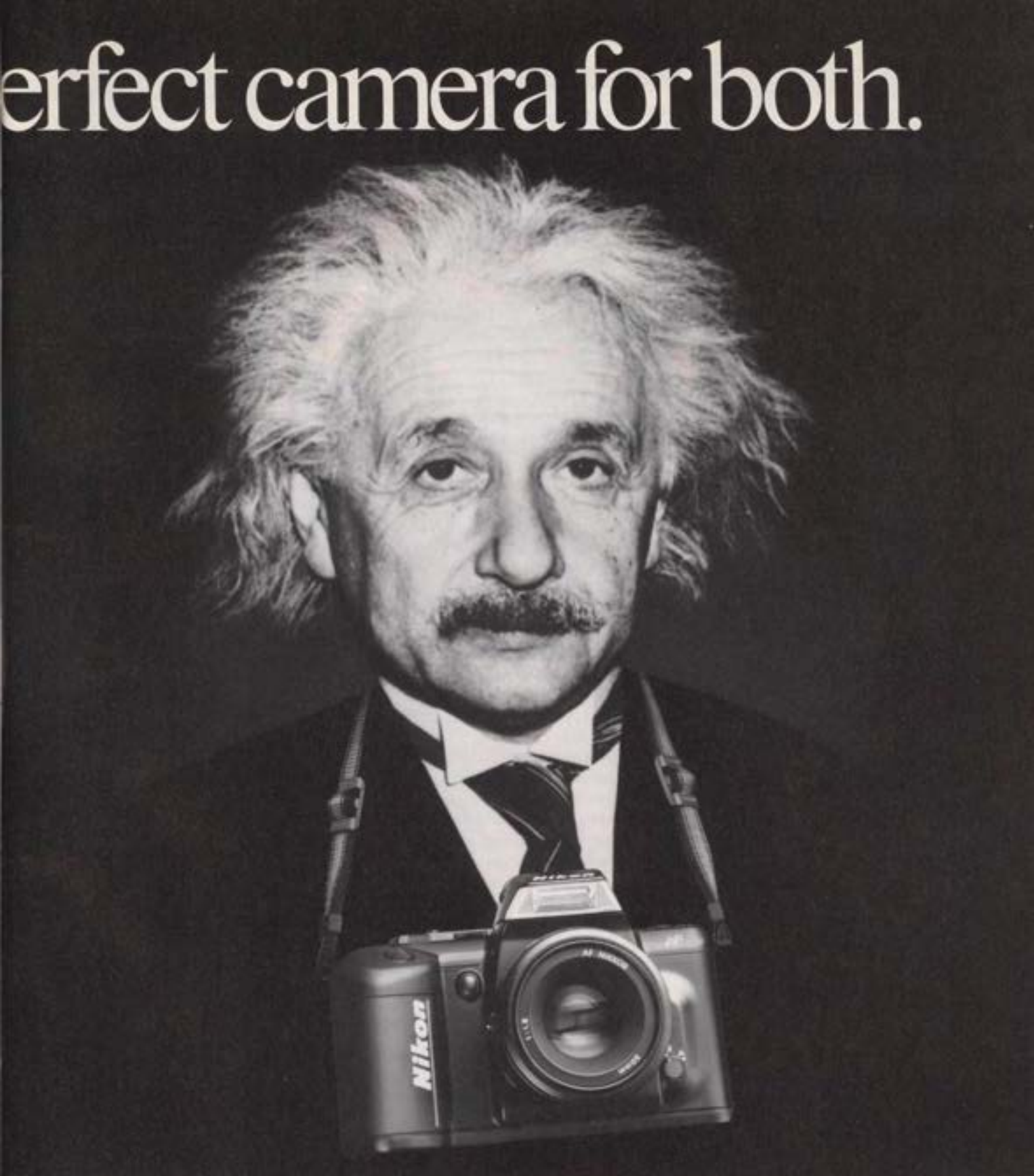

When you need a flash, the N4004 will recommend that you use one. And you'll always have one, since the flash is built in.

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The Nikon N4004 is incredibly easy-to-use. At the same time, it's incredibly sophisticated.

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Farm Workers Health Group, 1,512 work-related pesticide poisonings were reported in 1985. "Since it is estimated that only one percent of pesticide poisonings in farmworkers is reported by doctors," she says, "the actual extent of work-related illness is far greater."

The UFW boycott has as one of its goals a ban on five pesticides it considers particularly perilous. The union is also asking that grapes be tested for poisonous residues, with test results to be made public.

Grape growers have called the UFW's warnings about pesticide residues on grapes "a hoax" and have refused to participate in the testing projects. "If, as they say, the grapes are free of pesticide

JOHN HERSEY

residues," says Chavez, "I don't know what they're afraid of."

One thing growers may fear is a boycott as successful as the one Chavez led 12 years ago. Perhaps in anticipation, the California Table Grape Commission boosted its 1987 ad and promotion budget to $7.3 million, an increase of 83 percent over last year. —*A.S.*

FIELD NOTES

"Oppose with all your strength and power all proposals to penetrate your wilderness regions with motorways and other symbols of modern mechanization. Keep large sections of primitive country free from the influence of destructive civilization. Keep these bits of primitive America for those who seek peace and rest in the silent places; keep them for the hard climbers of the crags and peaks; keep them for the horseman and the pack train; keep them for the scientist and student of nature; keep them for all who would use their minds and hearts to know what God had created. Remember, once opened, they can never be wholly restored to primeval charm and grandeur."

Horace Albright, in a letter to his colleagues upon his resignation as director of the National Park Service in 1933.

RICHARD FREAR, COURTESY NATIONAL PARK SERVICE

TO HORACE, WITH THANKS

In 1913, when he was a 23-year-old student at the University of California, Horace Albright came to a Sierra Club meeting in San Francisco. "John Muir was there, I shook hands with him," Albright would recall many years later. "He was friendly, a nice old fellow."

Albright spent the next 74 years dedicated to America's wild places. He died on March 28 at the age of 97, one year after the Sierra Club bestowed upon him its highest honor, the John Muir Award.

Albright was one of the founders of the National Park Service in 1916 and served as its director from 1929 to 1933. Thanks to his political expertise, the park system flourished, and a generation of Americans grew to love, and learned to defend, the wilderness. —*A.S.*

CLOUDS CLEAR SLOWLY OVER YOSEMITE

When Rockwell International ads such as the one at right began appearing in military trade journals earlier this year, it didn't take long for the storm clouds to burst over the Ansel Adams Publishing Rights Trust. Letters of outrage demanding an explanation poured in from Adams' devotees, including his daughter Anne.

The decision to grant Rockwell permission to reproduce Adams' "Clearing Winter Storm, Yosemite National Park" was made by the three members of the Trust, which controls all authorized uses of the late photographer's work. In a letter of apology to Adams' daughter, Trustee David Vena explained that Rockwell led the trustees to believe the ad copy would feature the defense contractor's space shuttle and non-weapons research. "It was in that context, one I believe Ansel would have wholeheartedly endorsed, that we approved the campaign," Vena wrote. "Unfortunately, we did not retain advertising copy control, and the campaign has swung toward Rockwell's tactical weapons and other military support products."

Denying any charge of deception, a Rockwell spokesman said that the company had "lived up to the terms of the agreement that was signed by our advertising agency and the Trust." He declined, however, to state what those terms were.

What they knew and when they knew it aside, Vena says that the trustees will think "long and hard" before approving such a campaign again. —*Jonathan F. King*

JOHN HERSEY

A STATE'S SCHEME TO RIG THE REEFS

Three thousand six hundred oil rigs rise out of the Gulf of Mexico off the Louisiana shore, something that heretofore has thrilled few observers beyond those in the petroleum industry. But under a unique recycling program, 1,600 nonproducing rigs will soon be transformed into reefs.

As stipulated in the original oil-lease contracts with the Department of the Interior, the inoperative rigs must be taken down and moved back to shore. Oil concerns were facing demolition and transportation costs of $2 million per rig. But in a project informally called Rigs-to-Reefs, the oil companies and the state of Louisiana have agreed to float the rigs to predetermined sites and sink them for use as reefs.

In their present location, the oil rigs support algae and barnacle growth that, in turn, supports a great variety of fish. Literally at the top of the food chain are the fishermen who tie their boats to the legs of the rigs and drop their lines.

"When you fish a rig now, you're fishing over about one acre of sea-bottom habitat," says Gerald Adkins of the Louisiana Department of Wildlife and Fisheries. "Some of the artificial reefs will have as many as 60 sunken rigs. The potential for marine research alone is enormous."

The reefs, which will be positioned just offshore from coastal cities and marinas as well as out in deeper water, will be buoyed and maintained by the state. Maintenance of the reefs will be funded through an arrangement between the oil companies and the Louisiana Artificial Reef Initiative, which will oversee the project. Half the money a company saves by hauling a rig to the reef site rather than to shore goes to the state. Virginia Van Sickle, co-chair of the Reef Initiative, says it's probable that Louisiana will get about $25,000 per rig. "And the habitat gain is tremendous," she says. "Japan spends millions of dollars every year to build the type of reefs that Louisiana will be paid to take."

While environmentalists are generally supportive of Rigs-to-Reefs, they do take issue with one aspect of the plan: The rigs will be removed from the Gulf floor with dynamite. "That's rough on the existing habitat," says Darryl Maleck-Wiley, chair of the Sierra Club's Delta Chapter, who hopes to organize support for a more benign uprooting. —*C. Richard Cotton*

CLEAN AIR

Canada's View on Acid Rain

The U.S. and its northern neighbor agree on much about the acid rain problem—except when it comes to the need for action.

GREG STOTT MAGENTA

Ontario's Algonquin Provincial Park, in an area of Canada where lakes and the life they sustain are particularly vulnerable to acid rain unwillingly imported from the United States.

Mark Mardon

In Ottawa last March, after a tour of Canadian areas affected by acid rain, several American journalists sat down to lunch at the Canadian House of Commons with the members of that body's Special Committee on Acid Rain. Stan Darling, the committee chair, asked the journalists, one by one, to tell the members of Parliament what they had learned. He had not gotten very far around the table before he came to Herb Denton, a veteran *Washington Post* reporter. "With all due respect," Denton said, "I'm much more interested in learning what your committee thinks than in telling what I think."

That was all the prompting the members needed. "Do you continue to be positive about a neighbor," demanded Bill Blaikie, a member from Manitoba, "who continues to dump over the fence so that your children have to live with the garbage?" His question underscored the dilemma Canadians face: How to get the U.S. to clean up the air pollution that's pouring across the border.

Canada has vowed to reduce its own contribution to air pollution by 50 percent by 1994 (though some doubts persist about how effective its methods will be in meeting that goal). Still, nearly 50 percent of the acid rain affecting eastern Canada originates in the United States. Sulfur dioxide (SO_2) from smelters and coal-fired power plants and nitrogen oxides (NO_X) from automobiles and electric utilities are the principal contributors. In the Ohio River Valley and other industrial areas, the compounds spew from smokestacks and exhaust pipes and disperse on winds over a thousand-mile expanse. Mixing with water vapor, they form mild sulfuric or nitric acids that fall across Canada's highly vulnerable Precambrian Shield region, where glaciers long ago removed the ground's natural limestone buffer.

Acid rain is causing serious economic, social, and environmental problems in eastern Canada, endangering fisheries, tourism, agriculture, and forests. More than 300,000 Canadian lakes are vulnerable to acidification; aquatic life is already depleted in some 14,000 of them. Streams and shallow groundwater are becoming increasingly acidic. Acid rain is also the chief cause of a spreading forest decline that, among its many impacts, is severely affecting the maple sugar industry.

As the result of a February 1985 agreement among Canada's federal and provincial environment ministers, each province has adopted a specific program

to control domestic pollution. In Ontario the "big four" corporate sources, including the Inco Sudbury smelter (the largest single SO_2 emitter in North America), have been ordered to cut SO_2 emissions 67 percent overall by 1994. Quebec's air polluters face an ultimatum to cut SO_2 emissions by 45 percent by 1990. Together the two provincial programs will account for more than 75 percent of the emission reductions now mandated under Canada's national acid rain abatement program.

Canada allows its industries to select any means they choose for reducing emissions. So far, in the case of Inco's Sudbury smelter, that has entailed the capture of SO_2 as marketable sulfuric acid or liquid SO_2 (though the demand for these products is limited) as well as cutting back on production. Ontario Hydro, a public utility operating three coal-fired plants in southern Ontario, has been granted considerable leeway in meeting its scheduled reductions of SO_2 emissions from a 1984 level of 444 kilotons per year to 175 kilotons by 1994. The company, a powerful, semi-autonomous entity, can draw from a "bank" of emission credits (kilotons of SO_2 and NO_X emissions over and above the legal limit) if the demand for electricity from coal-fired generators in any period is exceptionally high.

The point, however, is not that industry is getting away with something; it is that, for the first time ever, polluters are required to cut emissions or show cause why they should be given leeway. Canada is adamant about enforcing this rule. Environmentalists and politicians there agree it is up to the U.S. to take equal measures.

"Canada will not be able to solve the acid rain problem alone," says an official of Environment Canada, the federal ministry overseeing pollution issues. "The U.S. has to be a part of the solution. It is in the U.S.'s interest to respect treaties with and obligations to a sovereign, neighboring nation. Acid rain is the litmus test of bilateral issues."

Public recognition of the acid rain issue in Canada gained momentum in November 1979, when the Sierra Club and the Federation of Ontario Naturalists conducted a major seminar on acid precipitation. That led to the formation in 1981 of the Canadian Coalition on Acid Rain, whose 55 member groups represent the environmental concerns of more than 2 million people.

In March 1986, with public pressure mounting in both countries, Prime Minister Brian Mulroney and President Ronald Reagan met in Quebec City and endorsed specific actions aimed at controlling acid rain, including a U.S. commitment to share with industry the cost of a five-year, $5-billion program for research into clean-coal technology.

But the 1988 budget Reagan submitted to Congress in January of this year significantly undercut funds for the program. Canadians were outraged. Mulroney, who was faring poorly in public-opinion polls, made it clear he expected the President to uphold their agreement. Reagan rushed to mollify the Prime Minister prior to meeting with him in April by assuring him that the U.S. would spend the $2.5 billion for research it had agreed to, matched by industry funds.

Many Canadians, however, were unimpressed. "A year late and inadequate,"

says David Oved, press secretary to Ontario's Minister of Environment. "No more research is necessary. What we need now is a commitment to cut emissions. The U.S. is out of step with other Western industrialized countries, almost all of which have targets to reduce emissions by 40 to 60 percent by the middle of the next decade." The United States has set no such target—which comes as no surprise to Canadian environmentalists, who feel the U.S. has no intention of doing anything substantial to curb emissions.

In an April 1987 publication, *Clean Air: Ending a Public Health Crisis*, the Sierra Club in the U.S. concurred, saying the administration's clean-coal research "is nothing more than a smokescreen to hide its opposition to acid rain controls." The Club is pressing Congress to act to reduce SO_2 emissions by 12 million tons (50 percent) and NO_X by 4 million tons annually. It is seeking passage of two Senate bills, S. 300 and S. 321, that embrace a "polluter pays" philosophy requiring polluters to meet emission standards by whatever cost-effective means they choose.

Polls show that Canadians put their environmental concerns ahead of any other national issue, including trade relations with the U.S. They feel their land and livelihood are threatened.

At the Dorset Research Centre in Ontario, lakes within a 40-mile radius are being monitored for acid rain damage. In some, where crustaceans, mollusks, insects, amphibians, and fish are disappearing, certain other living things are beginning to thrive: a kind of filamentous algae that forms into giant, slimy balls, and an algae that creates a noxious, lakewide stench. The effect is reminiscent of a low-budget science-fiction movie. The situation, though, is real, and Canadians are not just alarmed—they are fighting mad.

MARK MARDON *is* Sierra*'s editorial assistant.*

RESOURCE MANAGEMENT

The Salish-Kootenai Comeback

As these two Montana tribes gain control of their natural resources, they are taking strong stands for conservation.

James Bruggers

THE 3,800 MEMBERS of the Confederated Salish and Kootenai Tribes have lost much in the 132 years since their forefathers made peace with the white men by signing the Treaty of Hell Gate.

Their lands once encompassed most of western Montana. What remains—1.2 million acres in the lower Flathead River valley—is only half in Indian ownership, a result of federal policies in the early 1900s that opened the reservation to white settlement.

But the Salish and Kootenai are making a comeback by gaining control of

DIANE ENSIGN

Montana's bountiful Flathead River valley, home of the Salish and Kootenai tribes.

key resources on the land they have left and managing them with care. Guided by tribal leaders such as Ron Therriault and Thomas "Bearhead" Swaney, the tribes hope to keep the reservation, with its unscarred mountains and clean water and air, much the same well into the next century.

Swaney, the tribal water-quality director, says bluntly, "I'm a no-growth advocate." To those on the reservation who call for progress, he says, "Progress is your death."

Therriault, last year's tribal chairman and this year's vice-chairman, takes a more moderate position: Growth is okay, as long as it involves clean industry, recreation, or tourism—and is carried out on Indian terms.

Evidence abounds of the tribes' serious environmental concerns:

- In 1979 the tribes established the 89,500-acre Mission Mountain Tribal Wilderness, a preserve for a host of wildlife species, including deer, elk, grizzly bears, black bears, and bald eagles.
- Each summer, from early July through September, the tribes close a 10,000-acre portion of the wilderness to people so that a congregation of about a dozen grizzlies can feed peacefully on the area's numerous clusters of ladybugs and army cutworms, both ursine delicacies. Protecting grizzly bears is a tribal priority, according to Herschel Mays, who directs the tribal Wildlands Recreation Department.
- In 1982 the tribes adopted the nation's most stringent air standards, Class I, which permit minimal additional air pollution on the reservation.
- In 1984 they declared the reservation a nuclear-free zone, meaning that no radioactive materials are allowed within its borders.

Many in the tribes see this environmental ethic as a spiritual necessity: an overriding moral obligation to the next generation as well as to the land itself. Beyond that, the ethic is helping the tribes gain autonomy. Experience from other reservations has taught Indians that if they don't start managing their lands, a state, federal, or county agency will do it for them—and not necessarily with Indian interests in mind, says John Carter, a Salish and Kootenai tribal attorney.

University of Montana wildlife biologist Charles Jonkel, who has worked with Native Americans and Canadians for almost two decades, considers the Salish and Kootenai an environmental role model for other tribes. Jonkel says that theirs was the first Indian government in Montana, if not in the United States, to hire a full-time biologist. That was in 1977. The Bureau of Indian Affairs (BIA) subsequently hired two biologists of its own. Today the tribes and the BIA, along with other state and federal agencies, cooperate on a number of environmental projects, including grizzly management.

Some of the tribes' resource initiatives have been highly controversial. A recently adopted tribal ordinance attempts to establish control over fish and wildlife by setting reservationwide hunting and fishing codes. Another regulates the manipulation of streambeds, riverbanks, and wetlands on the reservation.

Both moves have drawn criticism because they apply to all reservation lands, including about 600,000 acres owned or controlled by whites. The state of Mon-

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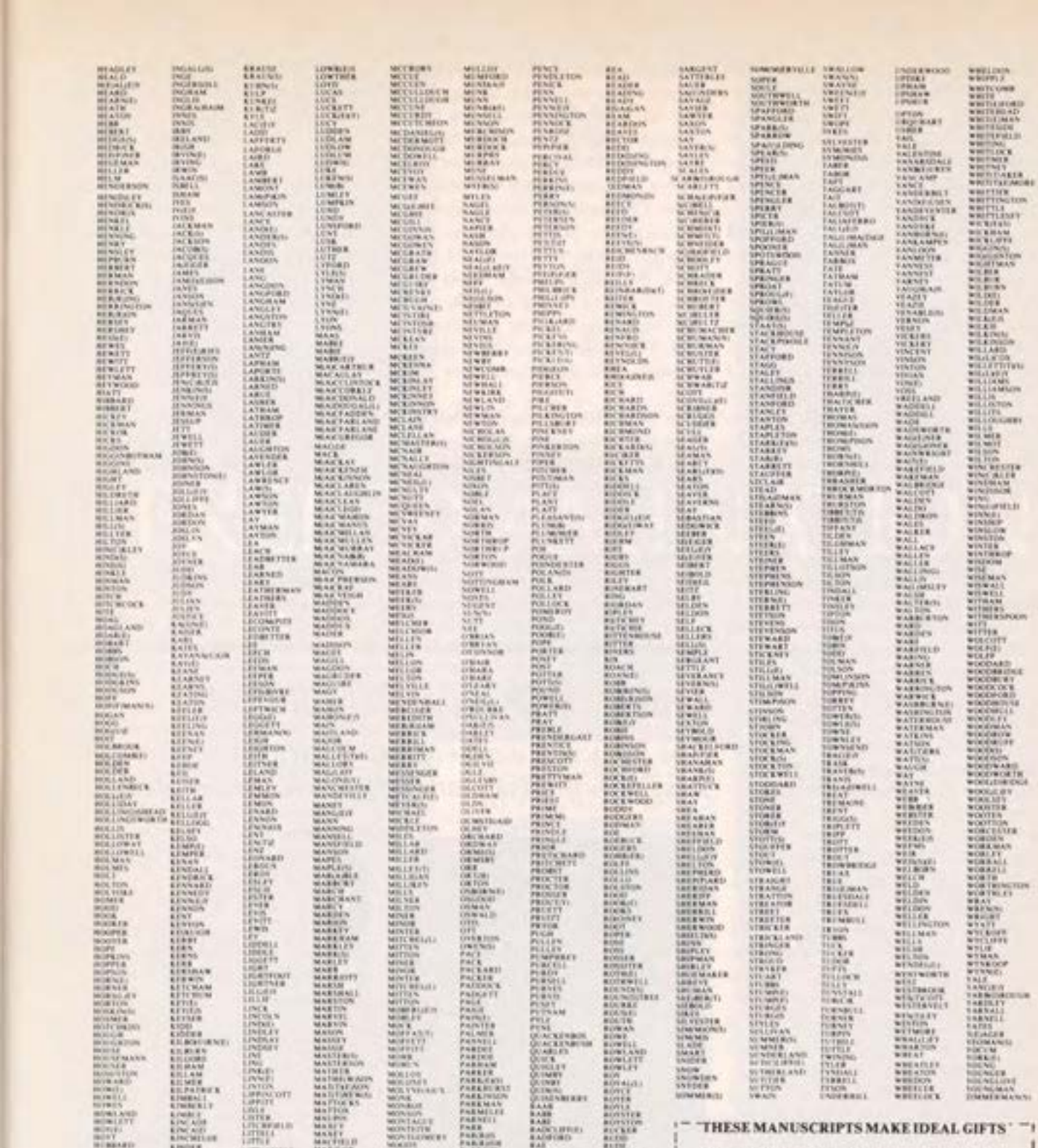


tana maintains that the Salish and Kootenai have jurisdiction over only Indian lands, not reservation lands that have passed out of Indian ownership. At stake are such issues as which government will set regulations, sell licenses, or issue permits; which government will be charged with enforcement; and in which court system violators will face prosecution.

The Salish and Kootenai have won two court cases over related clashes with the state and federal governments. In 1973 a U.S. District Court reaffirmed the tribes' exclusive right to the reservation's fish and wildlife and upheld a tribal ordinance requiring all nonmembers to purchase and carry a recreation permit when on Indian lands. In 1982 the U.S. Supreme Court upheld a lower-court decision granting tribal control over the portion of Flathead Lake that lies within the reservation's boundaries, a total of 108 miles of waterfront.

Today the tribal Shoreline Protection Office regulates the size and location of docks and boathouses and restricts shoreline manipulation. Once controversial, these rules are now respected by 98 percent of the lakefront's 1,300 property owners, most of whom are white, says Shoreline Protection Director Lloyd Jackson.

While holding to their environmental convictions, the Salish and Kootenai have become one of the more prosperous tribes in the state. Unemployment on the reservation is about 25 percent, as compared to 40 to 85 percent on other Montana reservations. The tribal government raised more than $12.6 million in 1986—a figure that nearly equals the combined tribal revenues of all six of Montana's other reservations.

The Salish and Kootenai admit that their economic success has come primarily from their diverse, renewable natural resources and from their location. The reservation lies between two regional centers, Missoula and Kalispell, and is on a major route between Yellowstone and Glacier national parks.

Historically, tribal forests have been the big money-maker. Timber sales totaled about $50 million from 1970 through 1984, but dropped to less than $2 million in 1985 and 1986, when timber production was de-emphasized.

In light of the tribes' environmentalist leanings, it is ironic that a 50-year-old dam on the Flathead River now brings in most of their revenue. In 1984 the Salish and Kootenai negotiated a lucrative agreement with the Montana Power Company over the operation of a 180-megawatt power plant on tribal property. Under the terms of the agreement, the utility pays the tribes more than $9 million in rent annually, about four times the amount it previously paid. The tribes will have the option of managing the dam themselves in 30 years.

The tribes plan to strengthen their hold on their resources in the future. Tribal attorney Dan Decker and others say that reservationwide zoning is needed, as are stronger air- and water-quality regulations. Smoke from wood stoves and dust stirred up by automobiles on dirt roads present some serious threats to reservation air quality, and an algal bloom fed in part by sewage, detergents, and fertilizers is clouding Flathead Lake.

Each of these issues presents enormous political and environmental challenges for the tribes—challenges that could make today's battles over shoreline and recreation permits seem trivial by comparison. The tribes nevertheless remain determined to conduct reservation business on their own terms, in a way that does the least possible damage to resources. In the process, they are writing their own definition of economic growth.

"People say that if you protect the environment, you can't grow," says Tribal Vice-Chair Therriault. "Well, maybe you can't grow as an industrial power—but we don't *want* to grow as an industrial power."

JAMES BRUGGERS *is a Missoula, Mont., freelancer who has written for* The Progressive *and the* New York Times.

TOXICS

Doing the Nerve Gas Shuffle

The Army must dispose of thousands of tons of old chemical weapons before it can start stockpiling the next generation.

NANCY JORDAN

Environmentalists and peace activists at the Blue Grass (Ky.) Army Depot's open house proclaim their concern over the tons of nerve-gas weapons stockpiled there.

Susan Zakin

ONE DAY IN AUGUST 1979 a mysterious cloud inched its way across Interstate 75 near Richmond, Ky., bringing traffic to a standstill. Forty-five people were rushed to the hospital, choking, coughing, and complaining of nausea. For the source of the cloud, many looked toward the nearby Blue Grass Army Depot, where the U.S. Army stores part of its aging and obsolete stockpile of nerve gas.

The Army denied any responsibility until several weeks later, when local officials determined that the depot had indeed been to blame. The cloud had been caused by overzealous incineration of ancient smoke pots like those used for making battlefield smoke screens in World War II. Far more pots were burned at the time than regulations permitted, and the copious smoke was then caught in a temperature inversion, exacerbating the problem. Fortunately, the cloud was merely irritating, not toxic.

But the community of 30,000 was riled up by the incident. Confidence eroded further when the Army bungled subsequent endeavors—such as a 1982 wood giveaway that included lumber tainted by pentachlorophenol, which produces cancer-causing dioxin when burned. That's why, when the Army proposed building an incinerator to burn the Blue Grass Depot's stockpile of obsolete chemical weapons, which includes 69,512 badly designed and dangerously leaking M-55 rockets, local people became truly alarmed. "We're sitting on another Bhopal," says Betty Cox, a member of Concerned Citizens of Madison County, the group working to counter the Army's plan.

It's even worse than that, says risk-analysis consultant D. Warner North, who served on a blue-ribbon panel appointed to study the problem of disposing of the Army's stockpile of chemical weapons —some 30,000 tons of them by the best estimate of informed outsiders. The weapons, banned since 1968, are stored in bulk containers, rockets, and artillery shells at eight Army depots around the country. The nerve agents include several forms of mustard gas, which blisters skin and is toxic when inhaled. The arsenal also includes M-55 rockets loaded with GB and VX, two liquids 50 to 100 times as toxic as the methyl isocyanate that leaked in Bhopal.

"A chain-reaction explosion of the M-55 rockets could threaten the lives of people 27 miles downwind," North asserts. "In terms of the immediate potential for loss of life, we're talking about something at least equal to a nuclear accident."

North's panel discovered nerve-gas leakage at all eight sites and urged that the stockpile be destroyed as soon as possible. Its recommendations focused on the M-55 rockets in particular, which have been responsible for the vast majority of leaks since 1969. These rockets are stored at five of the eight sites: Anniston, Ala., Lexington–Blue Grass, Ky., Pine Bluff, Ark., Umatilla, Ore., and Tooele, Utah.

The Army, already agitated by the panel's findings, felt pressured even more in 1985, when Congress mandated destruction of the old nerve-gas arsenal by 1994. It made meeting this deadline a

prerequisite to production of new "binary" chemical weapons, which contain two relatively safe chemicals that become toxic only when the weapons are fired. In response, the Army went to work with a will. On July 1, 1986, it issued a draft environmental impact statement (EIS) that leaned heavily toward construction of giant incinerators at all eight sites, at a cost of $2 billion.

Within months, the Concerned Citizens of Madison County grew from three couples to more than a thousand people. The group took issue with the EIS' focus on the incineration program as a whole, pointing out that it failed to mention site-specific considerations at each of the eight depots. (For instance, Maryland's Edgewood Arsenal is located on a peninsula with 30,000 residents. Should an accident occur there, escape would be nearly impossible.) Furthermore, according to Doug Hindman of the Concerned Citizens, the EIS contained no safety procedures to govern transfer of the weapons from their storage igloos to the incinerators. And the local activists also noticed that the Army's worst-case scenario included isolated equipment malfunction, but not the kind of chain-reaction breakdown that is to blame for 80 percent of industrial accidents, and which would have much more serious consequences.

In August the Sierra Club's Cumberland Chapter endorsed the alternative of shipping the nerve gas from the Army depots located in populated areas to a regional or national disposal site. That option had been considered in the Army's EIS, but activists like Hindman felt the Army did not give this alternative equal weight in its search for a solution.

Transportation of the weapons, however, poses another set of problems. On July 15, 1986, 17 members of Congress signed a letter to the Pentagon protesting any proposal to transport chemical munitions through their states, because of the dangers involved. "Everybody involved is on the horns of a dilemma," says Rep. Helen Bentley (R-Md.). "We just need more breathing room. The EIS was not accurate; it was prepared in too much of a hurry against the 1994 deadline [for destroying the weapons]."

Major Philip Soucy, an Army spokesman, denies that the Army failed to produce an adequate plan. "We are engaged in a programmatic study from the point of view of a federal agency," he says. "Folks want to go all the way to the final answer without the steps. And I tire of the Army being characterized as less than forthcoming. That's straight bull by-product."

Others feel that it's the Army, not the public, that wants to get the final answer without doing the footwork. Army officials admit the pressure is on to meet the 1994 deadline set by Congress. Military officials submitted alternate plans to Congress this spring that would give them additional time to fine-tune the operation, but Congress will not act on the issue until next session.

In the meantime, the Army has agreed to consider several new options, which include air transport out of the Kentucky depot and barging munitions from Edgewood Arsenal in Maryland through the Chesapeake Bay and eventually to Johnston Atoll in the South Pacific. U.S. chemical munitions now stored in West Germany are already set

to be transported to the atoll, one of the United States' ten most polluted wildlife refuges. Marine-protection groups such as Greenpeace have registered their disapproval of the plan.

And while the process drags on, Congress is considering extending the Army's deadline for destroying the nerve gas to 1997, giving the Army an extra three years to fine-tune its plan. Although many people on each side of the issue support this move, it would mean that the United States, which has been negotiating a treaty with the Soviet Union to ban chemical weapons altogether, would end up with a dual stockpile. That's exactly the situation Congress intended to prevent when it approved the 1985 law allowing new nerve-gas production only on the condition that the old arsenal be destroyed.

One irony seems to have escaped the Army's notice: Even though the new weapons are not as dangerous to handle as the old ones, they too will eventually have to be disposed of. But the Army plans to tear down its incinerators when the current destruction program is complete, according to spokeswoman Marilyn Tischbin. What will the Army do in 2020 or 2030 when faced with the task of liquidating its no-longer-new binary weapons?

"Yes," Tischbin says, "there is a possibility we might have to build these incinerators all over again."

SUSAN ZAKIN is a freelance writer based in San Francisco.

MINING

Of Gold Fever and Brown Rivers

The search for gold is muddying Alaska's streams, devastating its rich fisheries, and sullying some spectacular landscapes.

Tom Turner

IN 1975, when the Interior Department studied Alaska's Birch Creek for inclusion in the National Wild and Scenic Rivers System, it found a pristine stream: "one of the very few clearwater rivers in the state with road access at two points on an otherwise undisturbed river segment." Birch Creek, according to Interior reports, was "one of the most popular float rivers in Alaska," with "excellent" grayling fishing.

A decade later, all 130 miles of Birch Creek National Wild and Scenic River are opaque, unfit to drink, unpopular for rafting, and bereft of grayling. At high water the tainted stream spreads

NATIONAL PARK SERVICE

Placer mining's wake in Denali National Park. Mining in the park stopped last summer pending further environmental study, but the scars will remain visible for years to come.

out to the riverine marshes that border it, inflicting further damage. Downstream, the Yukon Flats National Wildlife Refuge has suffered also from the infusion of polluted water. All this is due to placer mining conducted at 62 sites on tributaries just outside the wild-river corridor.

Despite ostensible federal protection, the health of streams like Birch Creek depends largely on the fluctuating gold market. In the late 1970s, when the price of gold began its meteoric climb, there were fewer than a hundred placer mines on Alaska's federal lands, and those did little environmental harm. By January 1980, when the price of gold topped $850 an ounce (in the spring of 1987, gold hovered around $450), more than 500 mines were operating, and most were far bigger than the mines had been a few years before. Huge profits made it possible for miners to invest in bigger bulldozers, suction pumps, and sluice boxes, and even airplanes to fly into and out of their camps. The attendant environmental damage skyrocketed: 80 percent of Alaska's water pollution is now caused by placer mining.

In most placer operations, a stream is diverted from its bed. The exposed sand and gravel is then scooped up by bulldozers and dumped into sluice boxes. At a well-run mine, once the gold is recovered the muddy water runs through at least two, and ideally three, settling ponds before returning to the streambed; the water is as clean going out of the mine as it is coming in. At the end of the mining season, the stream is recontoured, and its banks are revegetated. Few Alaskan placer mines fit this description, however.

Although land-reclamation and water-pollution laws are on the books, they are poorly enforced, says Philip Barnett of the Sierra Club Legal Defense Fund. "Miners are required to make 'reasonable efforts' to meet environmental standards," Barnett says. "But because of inadequate enforcement, water-quality laws are regularly violated, and reclamation, if performed at all, is usually inadequate."

Mines operating along the Fortymile National Wild and Scenic River, for example, spew tens of tons of dirt into the river system each day, reducing visibility in some spots to less than two inches. Downstream miners, according to the Bureau of Land Management (BLM) and the state of Alaska, complain that the water is too dirty even for mining. (Instead of bulldozing, the downstream miners use suction pumps to vacuum sand and gravel from streambeds. They must be able to see the stream bottom to mine.)

At Beaver Creek Wild and Scenic River, the BLM reports that "the existing mining operations . . . periodically cause great increases in the sediment load. Highly turbid water has been observed as far as 50 miles downstream."

Increased turbidity has damaged more than recreational and ecological values. Native communities trying to preserve their traditions have also suffered. "If we don't have clean water, our culture cannot survive," says Susan James, chief of Birch Creek Village, an Athabascan Indian settlement downstream from the wild river segment. "We haven't seen a grayling for two years, and that was a very important source of food for us. I have nothing against miners. But I'm a subsistence

advocate. Clean water is number one."

Indeed, not even Alaska's national parks have been spared. Until a year ago, 150 miles of clearwater streams around Wonder Lake in the heart of Denali National Park were polluted each summer by mines that regularly violated water-quality standards for turbidity, sediment, and heavy metals. The Park Service had issued permits for the Denali mines, and for mines in Wrangell–St. Elias National Park and Yukon–Charley Rivers National Preserve, without conducting any environmental assessments beforehand.

In response to a lawsuit brought by the Northern Alaska Environmental Center, the Sierra Club, and the Denali Citizens Council, the Park Service suspended all mining in Alaska's national parks at the end of the 1985 season pending an agency study of environmental impacts. A few operations have resumed (after thorough environmental review), but most will remain shut at least until an environmental impact statement is released. The report is expected around the end of 1988.

Alaskan miners, as one would expect, have their own view of the situation. "I don't think the environmentalists recognize the advancements in technology we've seen in the past year or two," says Curtis McVee, former state director of the BLM who now serves as executive director of the Alaska Miners Association. "Mined areas, like logged areas in forests, do recover. Right after the activity ends it looks pretty bad, but wait 20 to 40 years and it will recover."

Miner Joe Bailey also pleads for time: "Just give us ten good years to mine this country by any means we want, and we could get out most of the gold. Then you could make it a park or preserve without a complaint from us miners. Just give us ten good years."

Unconvinced by miners' reassurances and spurred by victory in the Park Service suit, the Sierra Club and seven other groups, represented by the Sierra Club Legal Defense Fund, decided to tackle the Bureau of Land Management, which oversees some 300 mines, the majority of Alaska's placer operations. In its suit the Club argued that the BLM should be required to conduct environmental assessments of all existing and proposed placer mining operations, and should force miners to recycle water using closed systems or else build enough settling ponds to enable waters to cleanse themselves before they are returned to a stream. The Club also wants the BLM to ensure that miners recontour and revegetate the land before moving on.

Before a decision could be issued, the BLM agreed in April 1986 to do the plaintiffs' bidding on approximately one fifth of the mines under its jurisdiction: those that disturb more than five acres a year. The BLM insisted, however, that smaller mines were exempt since they are not "approved" or "regulated," key terms that would trigger the National Environmental Policy Act (NEPA) and require the Bureau of Land Management to call for environmental assessments and impact statements.

The Sierra Club argues that the BLM does, in fact, regulate the small mines; the agency performs 21 separate reviews of mining operations. Nevertheless, in a January 1987 ruling, the U.S. District Court in Anchorage agreed with the

BLM. In its decision, the court said that requiring the BLM to abide by NEPA for small mines would "trivialize" the law. An appeal of that decision is pending.

The Club's efforts succeeded in part, however, when in May 1987 the court recognized the effect of placer mines on three wild rivers. The BLM was ordered to prepare environmental impact statements addressing the cumulative impact of all mines in the streams' watersheds, and mining's effect on Athabascan hunting, fishing, and drinking water along two streams. Because the BLM does not regulate small mines, the studies may not necessarily help clean the streams. But they may force the BLM to set new placer mining standards.

Romantic images of the Gold Rush miner are strong in the 49th state, and mining is considered important to the state's economy. "Alaska's miners and their allies are assiduous in promoting the idea that mining is a traditional, glamorous, frontier activity," says Jack Hession, the Sierra Club field representative in Anchorage. "Miners are portrayed as a vanishing breed of individualists, a group to be cherished. Any criticism of mining is seen as an attempt to destroy a way of life."

For all its political clout, however, the placer mining industry's contribution to the state's economy is surprisingly modest. A 1986 study commissioned by the Northern Alaska Environmental Center estimates that placer mining provides the equivalent of 833 full-time jobs (many of which go to people from out of state), grosses $61 million a year, and is subsidized heavily ($16 million from 1982 to 1985) by the state. It is one tenth the size of the state's tourist industry, one seventeenth the size of its seafood industry, and one one-hundred-seventieth the size of its oil industry.

Environmentalists hope that the courts will require the BLM to apply the National Environmental Policy Act to all the mines under its control. If the courts don't, says Hession, "We will probably try to persuade Congress to put pressure on the BLM to shape up." Meanwhile, Alaskan rivers supposedly protected by federal legislation face a murky future. ■

Tom Turner is staff writer for the Sierra Club Legal Defense Fund.

ENERGY

Cheap oil, the elimination of tax credits, and bad business practices knocked the daylights out of the solar industry. Will we regret shelving solar energy when fuel prices rise again?

Dark Days for Solar

Bill D'Alessandro

When the Solar Energy Industries Association met for a strategy meeting last year, the members had one item on their wish list: survival. Only 15 people showed up to represent an industry that once numbered 267 manufacturers, 6,000 distributors, and 30,000 employees.

The solar industry today is a shadow of its former high-flying self. Low oil prices, the demise of tax credits, slashed federal research funds, and charges of fraud, high prices, and poor quality have sent the solar industry into a tailspin. Sales of solar water-heating and space-heating systems have declined 80 to 90 percent from their highs in 1985. In most areas of the country, no dealers are left to serve what little customer interest remains. The survivors spend much of their time caring for solar systems orphaned by hundreds of manufacturers who have gone out of business.

No one foresaw such dismal statistics during the 1970s. When Jimmy Carter dedicated a large solar water heater at the White House in June 1979, the country was still reeling from the 1973 Arab oil embargo. Rocketing fuel prices focused national attention on energy conservation and alternatives to fossil fuels. Carter hoped that renewable energy sources—solar, wind, biomass, and hydroelectricity—would "build a more prosperous, self-reliant, confident future in which we can all share." To the enthusiastic applause of environmentalists, he called for the United States to meet 20 percent of its energy needs from renewable resources by the year 2000. By 1980 the solar industry, supported by federal tax credits, government research funds, and high oil prices, was booming.

But in 1986 a work crew removed the White House solar collectors to make roof repairs. Although the system had reliably heated water in the White House kitchen for seven years, the collectors were never put back up. It was a symbolic decision. By then federal tax credits, the linchpin of the nation's renewable-energy policy, had already been dismantled.

Established by Congress in 1978 and expanded in 1980, tax credits allowed consumers and businesses to deduct 40 percent of up to $10,000 in purchases of solar or other renewable-energy equipment from their net tax burden. The credits enabled solar products to compete with lower-cost, conventional heating systems.

In a wider context, credits gave the solar industry a measure of parity with the country's heavily subsidized oil, gas, and electrical industries. In an independent study, Amory Lovins' Rocky Mountain Institute concluded that the federal government spent at least $46 billion to subsidize the nation's energy industry in fiscal year 1984. Equating the expenditures in bang-for-the-buck terms before a House subcommittee, Research Associate Richard Heede said nuclear power, which received $15.84 billion, supplied less than 100,000 Btu (British thermal units) per dollar's worth of subsidy. Comparably calculated, renewables provided several million Btu per subsidized dollar.

Tax credits were indispensable to the residential solar industry, and they were popular. The 40-percent deductions enabled homeowners to recoup their solar

investment in five to seven years. In 1978, the first year the credits were offered, taxpayers spent $120.3 million on residential solar installations. By 1980 that number had risen to $399 million, and by 1981 to $678.6 million. Without the 40-percent deduction, however, homeowners face a payback period that's almost twice as long.

The demise of residential solar tax credits was due, in part, to parliamentary wrangling over general tax reform. Both the full House and the Senate Finance Committee voted to phase out tax credits over several years. But the House and Senate could not agree on the scope and duration of the extension, so the credits expired. (Congress did restore energy investment credits—at 12 percent this year, and 10 percent for 1988, after which they expire—for business purchases of solar systems.)

But the solar industry is also partly to blame for the loss of tax credits. Widespread reports of unscrupulous business practices poisoned its chances of surviving the tax-reform debates. Trouble began brewing in the early 1980s when solar-marketing firms that sold financing arrangements for the systems were suspected of inflating the price of solar equipment above its fair market value. The retail company selling the solar hardware received pumped-up profits from its sales. Buyers who financed their purchase claimed tax and depreciation benefits out of proportion to the real value of the property.

While the industry was striving to bring solar-collector prices down to within a $25- to $50-per-square-foot range, these questionable financing deals were pushing prices higher. Simultaneously, allegations of fraudulent equipment-performance claims were mounting throughout the country. (North Carolina's attorney general said one company told homeowners they could save 40 to 50 percent of their annual heating bills with a minuscule 18-square-foot collector. The state predicted an average savings of 12 to 15 percent.) By 1984 the president of the Solar Energy Industries Association was touring chap-

ters around the country urging them to police their own ranks. But reports of solar scams continued, including a tough June 1985 report by *The Wall Street Journal* outlining the solar industry's abuses.

A fruitless campaign to extend solar credits beyond their December 31, 1985, expiration sapped money and staff time from industry lobbying groups and trade associations, and gave solar firms a false hope that distracted them from preparing for life without subsidies. The lobbying effort also drove a wedge between the wind industry and the solar companies. Both were vying for congressional approval to extend tax credits for their respective technologies.

Without tax credits to propel house-to-house canvassing and boiler-room phone operations, the aggressive solar-marketing companies jumped ship. Sales plummeted; solar businesses sank.

These cuts in indirect aid to all renewable-resource industries occurred despite the government's own reports that its support had given the nation's taxpayers a good return on their investment. As of 1985, according to a Department of Energy (DOE) report, U.S. businesses and households had taken tax credits worth $2.04 billion. The DOE report valued the energy produced by renewable resources at $39 billion at the prevailing world price of oil.

The federal government drastically cut its direct aid to solar energy as well. For fiscal year 1987, Congress allocated $124 million for all renewable-energy programs, one sixth of its 1980 outlay. The administration wants to slash next year's expenditures to $71.2 million. (As in past years, Congress is likely to restore some funds in the 1988 budget, despite White House objections.)

Even photovoltaics, the high-tech arm of the solar industry, is suffering. Like the rest of the solar field, the American PV industry faces shrinking federal support. Photovoltaic research received $43 million in federal funds in 1987, compared to $150 million in 1980. At the same time, energy companies cut their photovoltaic-research budgets as oil revenues dropped.

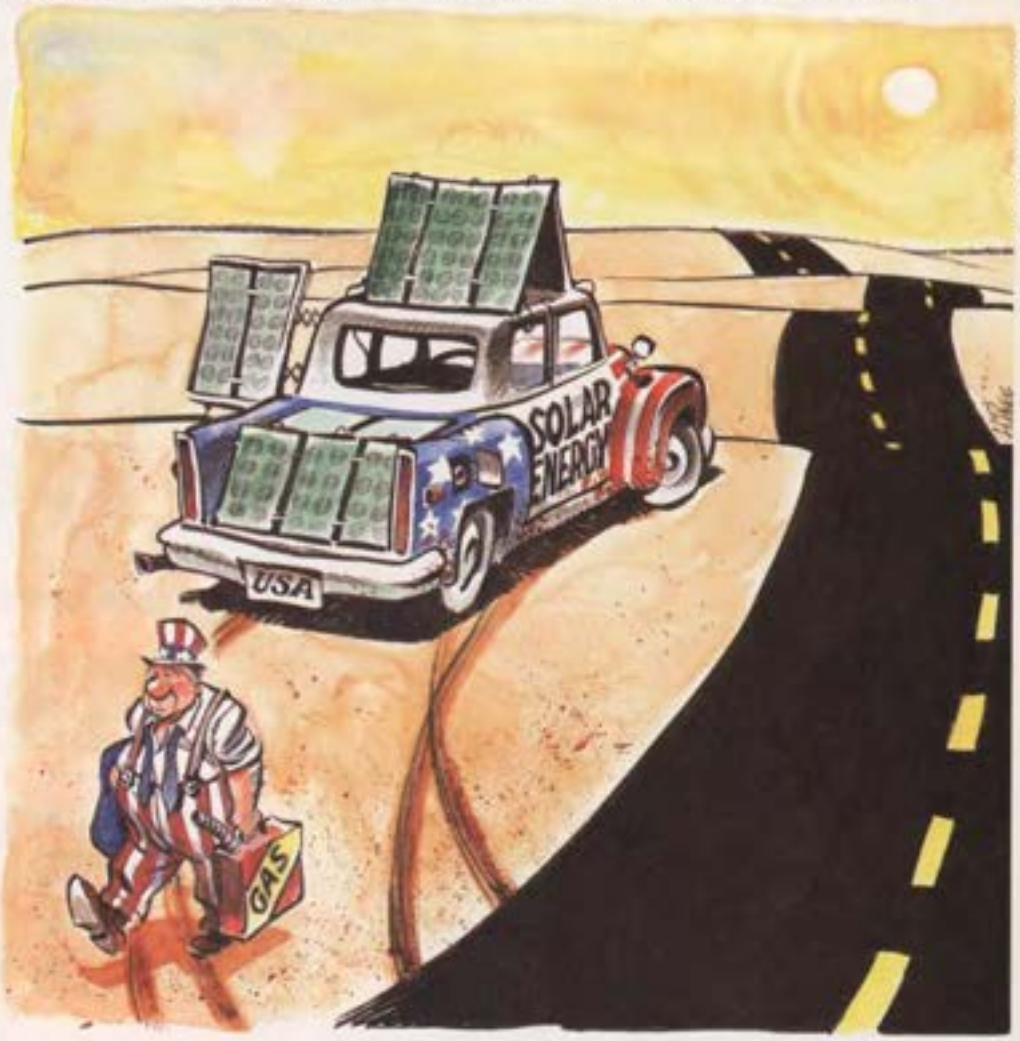
After a stormy decade, the solar industry finds itself with an established and proven technology, but with a small market and virtually no money to promote products or to invest in new research. Homeowners today can heat domestic water or swimming pools with reliable, tested, and certified off-the-shelf solar equipment. A well-designed solar water heater will save 50 to 75 percent of the conventional fuel needed to meet a home's hot-water demands. But because tax credits have been cut, the customers just aren't there.

"The old network is desperately trying to find ways to stay in the solar business," says solar-equipment distributor Norman Adelman of Asco in Ocean Township, N.J. Many manufacturers are pinning their hopes on new home construction, arranging with developers to wrap the cost of a solar water heater in a monthly mortgage. Homeowners thus incur no out-of-pocket expense, because they save roughly the same amount on their hot-water bill each month as they pay in principal and interest on the solar heater.

Given the latest fall in oil prices, will solar energy ever be able to wean America from its fossil-fuel dependence? Cautionary remarks were made as early as 1979 in *Solar Age*, a now-defunct solar-industry magazine. Julius Heldman, a vice-president of Shell Development Company, wrote: "To lobby for solar and leave the impression that it offers quick and easy solutions to drawn-out and dreadfully difficult problems is to invite public doubt and, eventually, suspension of support. The United States faces 20 to 30 years of problems in energy. Solar will be part of the eventual solution, but let's not try to oversell it as the sole, or instant, solution."

But President Truman's Paley Commission warned of the need to conserve fuel back in 1952. Sizing up the world energy picture during an era not known for its pessimism, the commission's report, *Resources for Freedom*, foresaw fossil-fuel shortages and strongly urged the United States to begin an aggressive solar-research program. The commission thought that 13 million solar houses could be built in the U.S. by 1975. Two years after the Arab oil embargo, however, there were just 187 solar buildings in the country. Today, there are an estimated 400,000. Since the elimination of solar tax credits, the pace has again slowed to a crawl.

The solar-energy industry faces a number of certainties: There will always be political wranglings over federal subsidies and research programs, and there will always be some opportunistic operators who probably belong in jail rather than in business. But more important certainties loom overhead. Worldwide energy demand is rising, the supply of economically recoverable fossil fuels is diminishing, and people are greatly concerned about pollution from fossil fuels and the safety of nuclear energy.



In an era of cheap oil, the promise of an inexhaustible and nonpolluting energy source isn't enough to fuel the solar industry. Without government backing or a technological breakthrough that halves the cost of solar equipment, it will take hard times—like a repeat of the oil embargo—to make good times for the solar industry. ■

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THE SHRINKING PROVINCE OF THE PRIMEVAL

KEITH ERVIN

For a moment, the Cessna's right wing points straight down. As we pull out of the turn, Washington's Mt. Baker—a giant, shimmering, white-capped volcano—looms ahead. Near the mountain's southeast flank, we drop into a valley below the snowline.

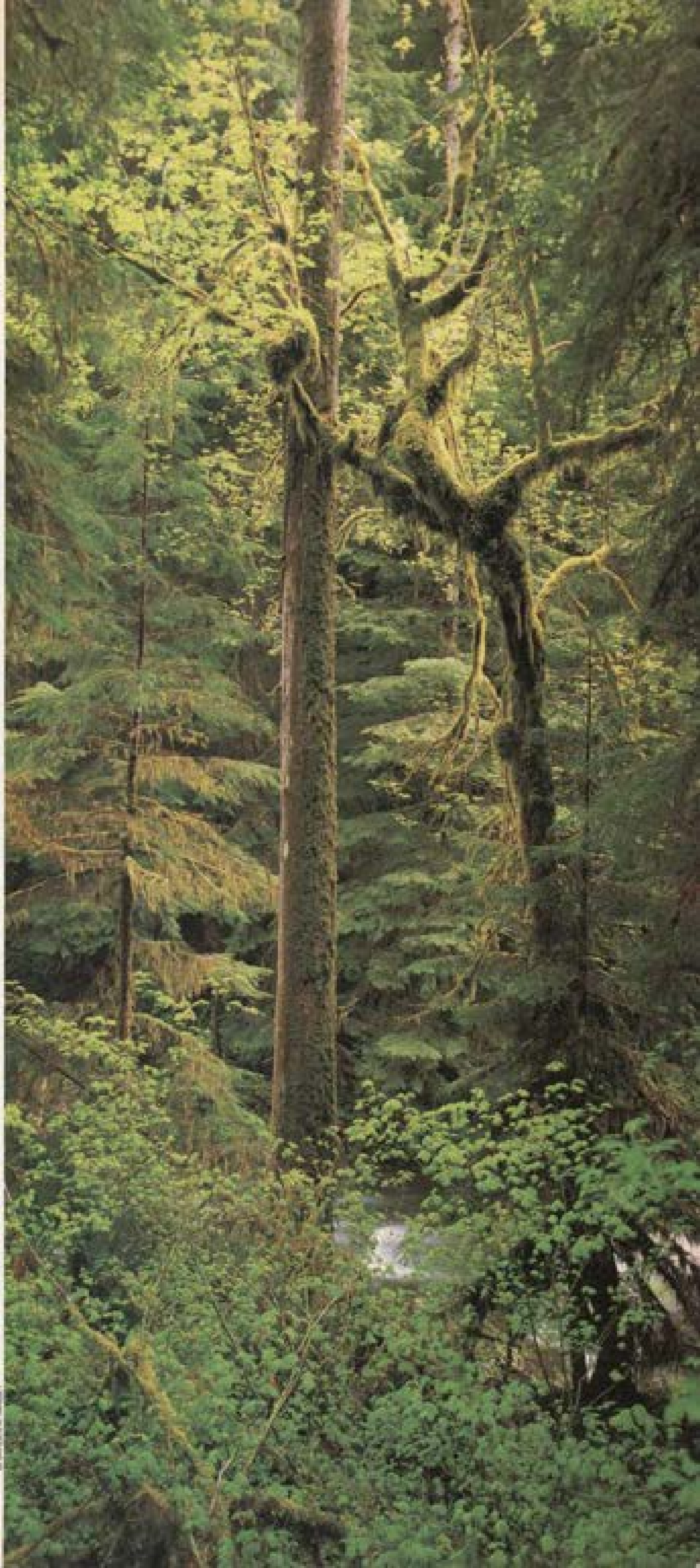
At this lower elevation the forest is lush, the trees' towering size evident even from the air. The fingerlike crowns of the dominant Douglas firs point skyward, the tips of western hemlocks bow toward earth as if in prayer, and the soft foliage of western red cedars shows a brownish tint. The dead intermingle with the living: Barren snags poke through the lush forest canopy, which rises as high as a 27-story building.

For uncounted centuries this old-growth forest stood free of the marks of man. Now it is being broken into pieces by roads and timbering. My Forest Service companions ask the pilot to circle a clearcut that hasn't yet begun to heal. In another clearing, loggers are dragging newly cut logs out with cables. Later we cross Baker Lake and skirt a ridge so steep it seems inconceivable anyone could log it. But someone has: Now it's covered by a thick stand of young Douglas fir, all the same age, all as symmetrical as Christmas trees, indistinguishable from one another. Surrounded by old growth, this stand of second

Should old-growth forests be logged or left alone? It's an old question—more urgent now than ever. At left, a harvest on Moresby Island in British Columbia. At right, a virgin stand near Washington's Mt. Rainier.

TOM W. PARKIN/PATHFINDER

CHARLES A. MAUZY



WILLARD CLAY

In California's Redwood National Park, lush rhododendrons grace the Lady Bird Johnson Grove—a stand of trees that will never be logged.

TOM W. RANKIN/NATHFINDER

A Sitka black-tailed deer: Old growth provides just the right mix of shelter, openness, and forage, but thick stands of second growth crowd out this diminutive southeastern Alaska species.

growth is as out of place as a neatly groomed college kid in a tavern full of grizzled old men.

After numerous passes over the lake, we find a barred owl's roost near the edge of the first clearcut we passed. The bird is a relative newcomer to the area. The species began its westward colonization in the 1940s, as logging removed more and more old-growth conifer forests. The barred owl was first sighted in Washington state in 1965; since then, the bird has rapidly expanded throughout the Cascades.

Historically, the old-growth forests from Northern California to southern British Columbia were the province of the northern spotted owl. Unlike the barred owl, which thrives in heavily logged areas, the spotted owl appears to require old growth—and lots of it—for survival. That's a highly specialized ecological niche, but one that was extremely stable before white settlement. Now most of the spotted owl's habitat has been converted to tree farms, and the bird has become a symbol of these fast-disappearing forests.

On an evolutionary time scale, the Pacific Coast's old-growth forest system has been splintered in the blink of an eye. Between 75 and 90 percent of the virgin forest that stood in Washington and Oregon 150 years ago has been cut down or burned. Although some old-growth forests are now in parks and wilderness areas protected from logging, boundary lines often have been drawn to exclude the most commercially—and biologically—productive forests. The story is the same from the redwoods of California to the Sitka spruce of Alaska: For every acre of old growth that has been protected, more acres have been cut.

Whether the Pacific Coast's last large tracts of primeval forest are sold and cut into lumber will depend largely on the fate of the national forests. Some two thirds of the remaining old growth in California, Oregon, Washington, and Alaska is managed by the U.S. Forest Service. To maintain lumber production at high levels, the agency wants to sell old growth (which it calls "overmature" timber) and replace it with

TREE-SAVERS' TACTICS: BILLS, BLOCKADES, BARGAINS

Conservationists are using a variety of approaches in the struggle to save what remains of the world's most massive old-growth stands. These trees lie within what foresters call the Pacific Northwest forest region, which extends from Alaska to California and from the seaside to the crest of the Coast Range and the Cascades.

TONGASS NATIONAL FOREST

The Tongass Timber Reform Act, introduced in the House and Senate in March, could slow old-growth timbering here by eliminating the forest's statutorily guaranteed appropriations—a move that would force Tongass planners to face budget scrutiny each year. Conservationists are pushing for amendments that would designate deserving wilderness areas and cancel 50-year timber contracts. "The Forest Service is running a timber plantation for the pulp mills at great public expense," says Bart Koehler of the Southeast Alaska Conservation Council. "This bill would pull in the reins on the agency."

SOUTH MORESBY

The Haida Indians drew international attention to this island chain in 1985 by blockading a logging road. The logging continued, as did opponents' lobbying, education campaigns, and demonstrations. In 1986 the British Columbian government agreed to consider a South Moresby national-park proposal, but negotiations with the federal government bogged down over the price tag.

CLEARWATER WILDERNESS

In setting up this area, the 1984 Washington Wilderness Act saved about 7,000 acres of old-growth forest just north of Mt. Rainier National Park. To protect a few adjacent old-growth groves still facing the ax, conservationists have proposed park additions and Forest Service "old-growth habitat reserves."

DARK DIVIDE

In response to a ten-year forest plan authored by conservationists, the Forest Service has halted the sale of 243 acres of old growth in the Dark Divide roadless area. The conservationist alternative will be included in the Gifford Pinchot National Forest draft plan, due out in July. "We've stopped the cut for now," says Gifford Pinchot Task Force Chair Susan Saul. "But the long-range battle is not won."

BUNKER HILL

Mohawk Valley citizens were accustomed to using this promontory's 110 acres of old growth as a park. But the federal agency in charge, the Bureau of Land Management, decided that timber production was a higher priority. Now one third of the old trees have been cut, and another third have been sold for cutting. Disappointed activists have turned their energies toward legislation to protect BLM old growth.

REDWOODS

Pacific Lumber Company, which owns 194,000 acres of timberland in Northern California, has recently decided to clear out all its old-growth redwoods in the next 20 years. Its cuts threaten 8,000 contiguous acres of giant trees. Given such massive timbering on private lands, environmentalists say the state needs to enforce statutes designed to protect public resources such as watersheds, wildlife, and water quality.

TOM & PAT LEESON

The pileated woodpecker is one of many animals that show a strong preference for old-growth forests.

ART WOLFE

A favorite food of the spotted owl, the flying squirrel seeks safety in the cavities of trees—here, in a cedar.

DOUG PLUMMER

The rough-skinned newt, a salamander that lives at the bottom of the multilayered old-growth community.

faster-growing seedlings. It's a policy that makes economic sense to the agency, at least in the short term, but could destroy an irreplaceable ecosystem.

What's so special about these old-growth forests? Until recently few people, including biologists, even bothered to ask that question. Foresters and big-game managers often called them "biological deserts." Almost no solid research was done to examine this theory. In the 1960s the Forest Service halted what little research it was supporting because, explains Dr. Jerry Franklin, a plant ecologist for the agency, "They felt we had learned everything we needed to know about old growth—which was basically how to cut it down and regenerate a young forest."

Funded by a National Science Foundation grant, Franklin and his colleagues at two universities began in 1970 to take a systematic look at the ecology of an old-growth Douglas-fir and western-hemlock forest in Oregon. They soon found that old growth "is not just a younger forest grown up to a larger size," Franklin says.

It takes 175 to 250 years of uninterrupted development for a forest to acquire old-growth characteristics. But what distinguishes old growth isn't so much its age as its structure and its associated life forms. In contrast to managed forests, the trees in old growth are a mix of sizes, ages, and species. The tremendous, multilayered canopy of an older forest creates its own microclimate, moderating temperatures, condensing fog to increase precipitation, and providing shelter from deep snow for wildlife. In the forest's complex web of life and death, lichens that hang from trees eventually fall to the forest floor, enriching the soil with nitrogen captured from the air. Dead trees, both standing and fallen, provide homes and food for a wide range of plants and animals. Young hemlocks typically take root in fallen "nurse" logs.

The Pacific Coast's old-growth forests contain some of the largest and longest-living trees in the world. A mature Douglas fir can store more than a thousand gallons of water in its sapwood. An Alaska yellow cedar can live more than 3,000 years.

Using this sort of time scale, the reign of some other grand trees is relatively brief. The Douglas fir is in fact a pioneer whose role is to give way to other species. When openings are created in a Washington or Oregon forest, Douglas fir is commonly the first conifer to take root. But because the tree does not grow well in the shade, there may not be a second generation. Shade-resistant species such as hemlock, cedar, or Pacific silver fir come in next. If forest development is uninterrupted for many hundreds of years, the forest will change from Douglas fir to mixed old growth and finally to a climax forest dominated by the successor species.

While Franklin's research team cracked the mysteries of old growth, the late Howard Wight, leader of the U.S. Fish and Wildlife Service's wildlife research unit at Oregon State University, probed other questions. Wight was intrigued—and worried—by the findings of two of his graduate students. Dick Reynolds' research showed that the goshawk has a strong preference for old forests. Eric Forsman found that spotted owls are almost exclusively old-growth creatures. Many of the owls' homes were falling victim to "blue paint disease"—their trees were being marked for logging.

In 1971, Forsman and Wight called a meeting with Oregon-based Forest Service and Bureau of Land Management (BLM) officials to warn that old-growth harvesting could threaten the owl. The meeting led to the establishment of the Oregon Endangered Species Task Force and the federal agencies' designation of a few small "spotted-owl management areas" that were off-limits to logging.

In 1974, Wight reported that a number of bird species prefer forest stands that are at least 200 years old. "I have heard some timber managers call such stands 'decadent,'" Wight wrote. "They may be decadent from the viewpoint of the size of the annual increment of merchantable timber, but to a few species of wildlife, they may be the last hope for survival in a natural setting. A good reason for this is that a mature stand of timber is a very stable environment. Over the eons, certain species have evolved in harmony with this stable condition, and in the process

GARY BRANSON

The rich wood of a "nurse" log nourishes a strapping hemlock in Washington's Willapa National Wildlife Refuge, which contains 4,000-year-old forest stands.

of evolution, little need has arisen for these species to be highly adaptable to rapid changes in the habitat."

Wildlife's dependence on abundant old growth could prove to be "an evolutionary trap," says E. Charles Meslow, who succeeded Wight as leader of the research unit at Oregon State. Meslow is among the scientists assembling a growing list of birds, mammals, and amphibians that are most at home in older forests. Scientists can't yet predict whether these species—which include the marten, the California red-backed vole, the pileated woodpecker, and the hoary bat—would be wiped out by old-growth logging.

What has become clear is that old growth is important to the well-being, if not the survival, of many animals. Elk and deer, for instance, turn to old forests for shelter and food in deep winter. Because deer find excellent foraging in clearcuts during much of the year, it was assumed for decades that logging increases deer populations. But in areas of heavy snowfall, forage in clearcuts isn't accessible in winter.

Research in Alaska's Tongass National Forest shows that Sitka black-tailed deer find far more food in the sheltered understory of old growth than in second growth. One observer has reported population declines of up to 75 percent among Columbian black-tailed deer after old-growth logging on Vancouver Island.

Small mammals, the primary prey of the spotted owl, are another vital link in

this fragile, complex ecosystem. The northern flying squirrel eats fungi it finds beneath the forest floor. Some of those fungi are mycorrhizal, meaning they attach themselves to tree roots in a symbiotic relationship. The fungi are essential to the tree because they stimulate the growth of root tips and help the tree absorb vital nitrogen, phosphorus, and water. The fungi consume sugars produced by the tree through photosynthesis. Squirrels, voles, and deer mice dig up and eat the fruiting bodies of the fungi. Along with the fungi, they ingest bacteria that make nitrogen available to plants. Where the mammals defecate, they spread mycorrhizal fungi spores and living bacteria. Trees, mammals, fungi, and bacteria are all caught up in a web of interdependence.

Scientists' growing awareness of these relationships could have serious implications for the future of "intensive forest management," as current tree-cropping techniques are called. Under intensive management, the complexity of the natural ecosystem is lost as trees are cut every 40 to 120 years. Instead of a forest whose trees range from one-year-old hemlocks to 500-year-old cedars and 800-year-old Douglas firs, a managed stand might consist of little else but 30-year-old Douglas firs.

Chris Maser, a BLM biologist in Corvallis, Ore., worries that Pacific Northwest forests will go the way of the European forests, on which American management practices are patterned. After generations of intensive management, Germany's forests have become devoid of most wildlife (except deer) and mycorrhizal fungi.

Maser, an impassioned student of the old-growth ecosystem, suspects that acid rain is not the only culprit for Germany's *Waldsterben*, or forest deaths. Disruption of below-ground biological processes is also an important factor, he believes.

Current tree-farming practices could prove as disastrous in the long run for the forest-products industry as for wildlife. "We're looking at the wrong end of the forest," Maser says. "We focus on the trees, not on the process that produces the forest. Yet without sustainable forests we cannot have a sustainable yield of wood fiber."

To make forests sustainable over the long haul, Maser says, it now appears that old growth must be incorporated into forest management. One way to do this is to alternate the current 40- to 120-year rotations with rotations long enough (perhaps 400 years) to produce and maintain old growth.

Even long-rotation tree farming alarms many conservationists. They fear that the idea could make it easier for the Forest Service to condone selling the remaining old growth: "We'll just grow more later," planners could tell themselves. Growing more is problematic because no one knows just how closely "old growth" created under human management will resemble the natural old-growth ecosystem. Then there are doubts that timber managers will have the patience to leave a commercial timber stand alone for hundreds of years.

Andy Stahl, a Sierra Club Legal Defense Fund forestry specialist in Seattle, says: "Long rotations don't make any sense. If you feel a need to protect old-growth forests, you should just preserve them."

"That's old timber," says forester and timber-company manager Ron Smith as we watch a six-foot-wide cedar log being placed on a semitrailer. With his solid build, neatly trimmed beard, red suspenders, and plaid shirt, he looks the part. If his estimate of the tree's age—500 years—is correct, it took root around the time Columbus first hit land off the Atlantic Coast.

After the driver of the logging truck secures his load and drives off, we climb out of Smith's pickup and into the rain. Babe Giebel, who loaded the truck, joins us. A few days earlier, Giebel says, he handled a cedar 12 feet in diameter. It was so big, he had to break it into pieces so that it would fit on a truck. He prefers smaller logs: "Big ugly cedars are hard to load."

Asked if he has any reservations about his work, the logger answers, "You want to hear our motto? 'Over the rivers and through the hills, we rape the land to pay our bills.'" He pauses, realizing his joke might be taken more seriously than he intended. He insists that clearcutting improves the habitat for deer. "To me there's nothing prettier than a good patch of second growth."

Folks in the forest-products industry feel that conservationists fail to understand economic realities. "If we don't harvest the old growth, it will just sit there and rot," says Smith. "It's like any other crop. If you don't use it, it just goes to waste."

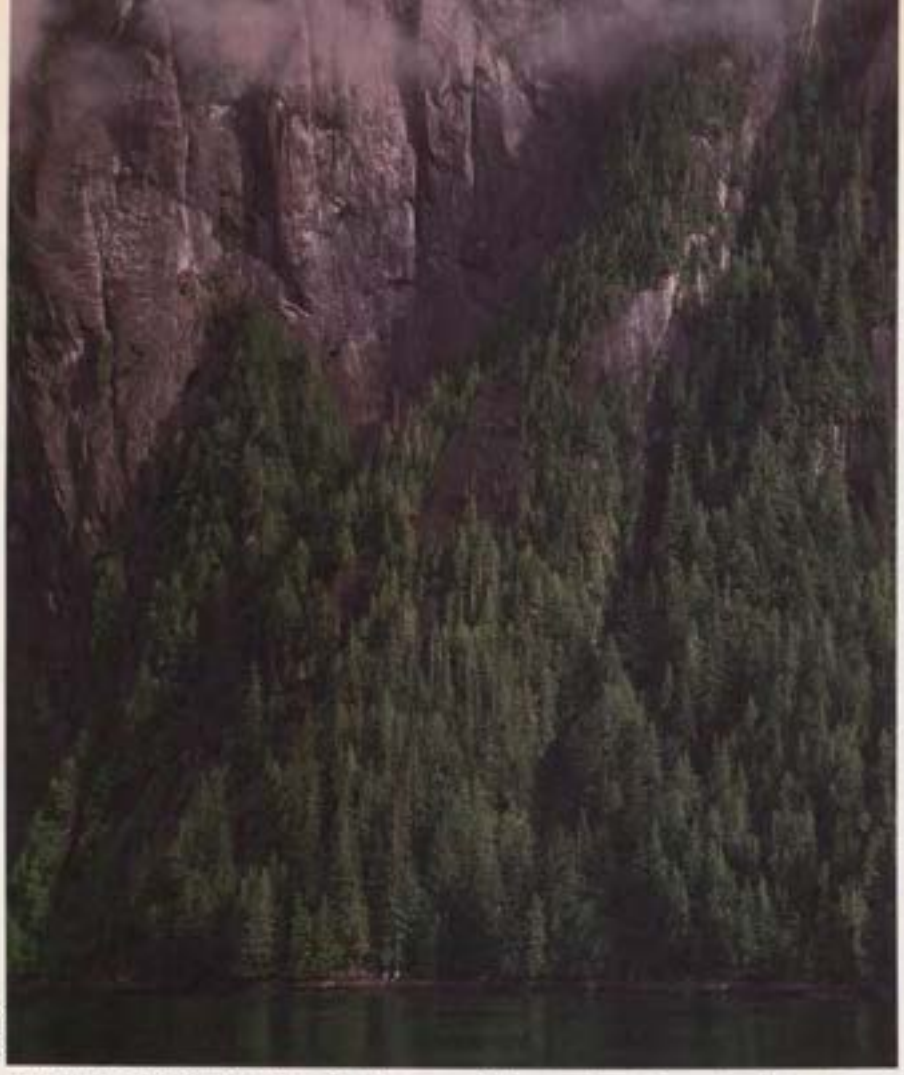
Smith and his colleagues are upset over a Forest Service spotted-owl management plan that recommends setting aside between 300,000 and 700,000 acres of old growth in Oregon and Washington as spotted-owl habitat. Last fall the timber industry convinced thousands of workers and their families to register their protest of the plan, which industry representatives say will stop the sale of timber worth $6 billion and eliminate 4,800 jobs.

The timber industry has been going through hard times. In just three years, 30,000 forest-products workers in Oregon and Washington—one fourth of the industry's work force in those states—lost their jobs. Congress recently bailed out companies that had made speculative bids on old-growth timber before the bottom fell out of the market.

But industry representatives acknowledge that the industry's current problems have nothing to do with the spotted owl. Tough competition from Canadian and Southeastern producers has lowered prices, and the advent of highly automated sawmills has shrunk work forces, they say.

Environmentalists say that the industry's job-loss predictions are vastly overblown. Old-growth set-asides would have to reach at least 1.6 million acres—more than twice the agency's current upper limit—to cause any losses in existing jobs, according to Sierra Club Associate Northwest Representative Bill Arthur.

Arthur says that while the Forest Service's spotted-owl management plan will not make a big difference for the industry, it could have devastating effects on the owl. The agency's proposed "habitat areas" would be maintained for only one third of the bird's present population. The plan would set aside up to 2,200 acres of old growth



TOM BEAN

Long protected by its steep site, the forest above is now in Alaska's Misty Fiords National Monument.

A logger at work near Smithers, British Columbia: Is he an endangered species, as timber lobbyists claim?

for each breeding pair protected—even though pairs studied in Washington forage over an average of 4,200 acres. In all probability, this plan for "managing" the owl will manage it out of existence. The Forest Service's own draft environmental impact statement on the spotted owl gives the species a "low" to "very low" long-term chance of survival under the plan.

Larry Brewer, a Western Washington University biologist who has studied the old-growth ecosystem for ten years, protests the plan on other grounds. "They're raping old growth," he says, "and they're raping it in the public's name and at the public's expense." At least when timber is sold in the Douglas-fir forests of western Washington and Oregon, most of the sales return money to the federal treasury. In southeast Alaska, the cost of planning and providing roads for timber harvests is so great that taxpayers lose 90 cents on every dollar of old-growth timber sold.

Forest Service officials seek to reassure the public about old growth by saying that the commercially harvestable stands, which include many of the same stands conservationists want to see protected, won't all be gone for perhaps 40 years. Doug MacWilliams, supervisor of the Mt. Baker–Snoqualmie National Forest, told a gathering of biologists last year not to worry if the latest round of ten-year forest plans falls short of meeting the needs of wildlife: "It will be revised in another ten years, and those things that we find are weak or wrong with this set of plans can be changed in another set of plans."

But in a decade old growth will be entirely gone in some Forest Service and BLM districts. It has virtually disappeared already from private lands and will soon be cut down on all state lands. On the Lummi Indian reservation just south of the Canadian border, "spirit dancers" no longer can walk into nearby old growth for religious purposes. They must drive 30 to 40 miles to find virgin forest—and hope that gawkers won't invade their privacy. An important Lummi site they call the Valley of the Eagles was recently logged. The Forest Service rejected pleas by Indians and its own consultants to protect spirit sites.

TOM W. RINGENBERGER

Many recent settlers are discovering what the coastal Indians have known and felt about old growth for millennia. These forests offer more than commercial timber, clean air and water, habitat for big game, and spawning grounds for salmon and steelhead. The unspoiled woods speak to something deep in the human soul. The towering trees, the deep silence broken only by the sounds of songbirds and falling water, the surprising openness, the cathedral-like half-light, the sense at once of antiquity and timelessness—all are part of old growth. ■

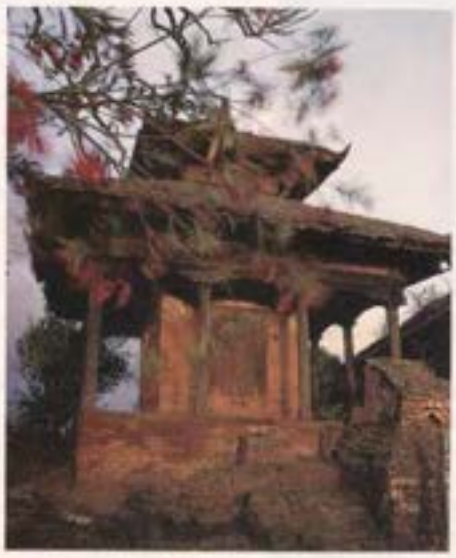
KEITH ERVIN *covers environmental affairs for* The Weekly, *a Seattle news magazine.*

Text and Photos by David Zurick

A QUESTION OF BALANCE

In a remote Nepalese village on the edge of the Himalaya, life today is more precarious than ever.

Each year on the eve of the full moon in the springtime month of *baisekh*, a small group of elderly Brahman priests climbs through the oak and pine forests above the village of Phalabang in western Nepal. Their half-day trek takes them to the grassy summit of Tharkot and a circular wall of crumbling stone. In the center the priests place a copper vessel of water carried up from the village spring at Chaite Dada. Along the periphery of the wall they arrange pine boughs and sleeping mats. The priests will spend the next two days in purification rituals, and they will pray for rain.



Looking east, then west, the priests view the undulating and broken crest of the Himalaya's southern ramparts, which stretch to the horizon in both directions. Thirty kilometers to the south lie the Indian plains, lost in a brown haze of windborne dust from Rajasthan. The priests turn last to the north, the fourth cardinal direction. Here, a wide swath of dissected uplands extends some 35 kilometers. These middle mountains appear as a succession of ever-higher ridges that dissolve into the snowy peaks of the main Himalayan crest.

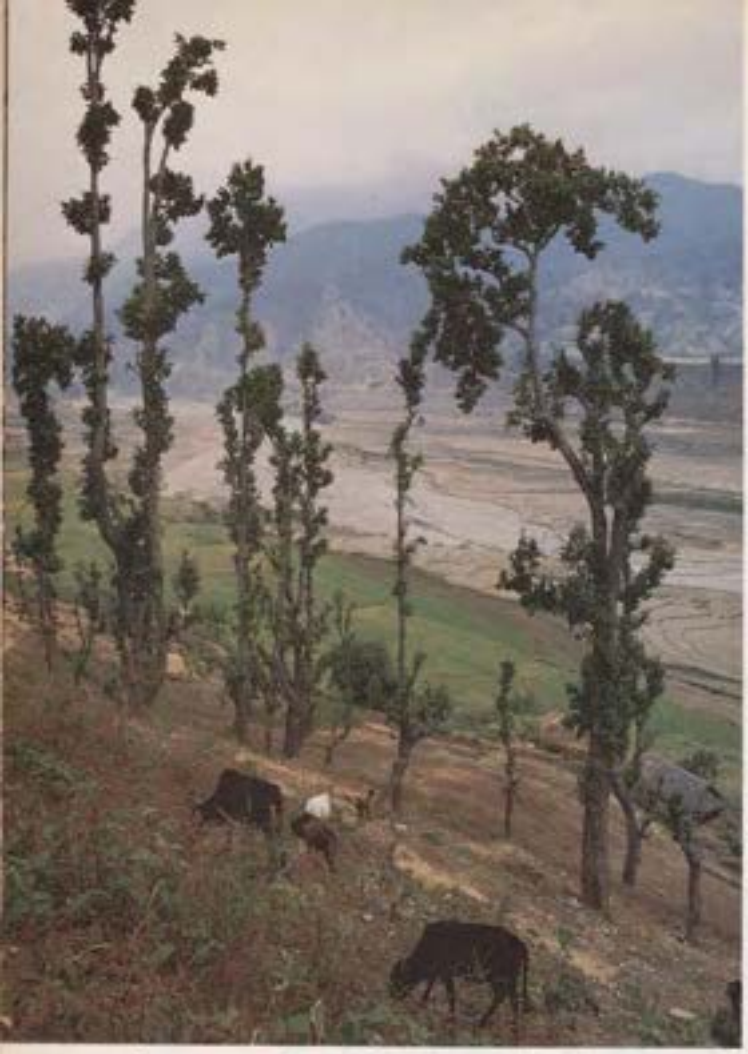
Atop this windy, sun-drenched peak, the priests also view their more immediate surroundings. Houses and terraced grain fields dot the ridges and lower slopes. Rice grows in the irrigated valley bottoms, and livestock graze the upland pastures. The priests' bond with the mountains is strong, for they are farmers as well as holy men. Like 13 million other Nepalese villagers, they have carved their lives and homes from the mountainsides of the Himalaya.

From afar, these people and their land appear idyllic, even enchanting. Nepalese village life expresses a certain easy gracefulness. Yet deforestation, erosion, river siltation, and other signs of ecological degradation threaten this alpine system and the culture dependent on it.

Hoping to gain a better understanding of how this environmental collapse affects the daily life of a village, I went to Phalabang.

The Nepalese population is growing at an annual rate exceeding 2.3 percent, and even the most remote areas support numerous villages and scattered groups of herders. In the mountains

The village spring dries to a trickle during the winter months (left). These women direct the tiny flow by placing a piece of split bamboo between the jug and the spring outlet; under these conditions, it may take almost an hour to fill a single water jug. Above, a temple built by a Phalabang raja and dedicated to Shiva, the Hindu god of destruction and regeneration.



Cows graze in a heavily lopped but still-living forest. Lopping is a common practice throughout Nepal: A tree's branches are cut for fuelwood and the leaves are fed to livestock. The understories of such forests are heavily grazed, exposing the soil to the erosive power of monsoon rains.

A day's walk is also a day's work for the children of Phalabang: A young boy gathers pieces of firewood and fodder while a young girl cares for her small sibling. (Note the child slung on the back of the tallest girl in the group.)

A woman tends the Phalabang nursery, part of a government-sponsored program to reforest village slopes and return them to their former productive state. In a growing number of rural areas throughout Nepal, nurseries provide seedlings to interested farmers and village councils.

Sections of forest floor are set on fire annually in hopes of promoting undergrowth, but the fires often rage out of control, destroying sections of the tree canopy. Even when kept in control, the burning is becoming ineffective, and livestock must be taken higher to graze.

around Phalabang, more than 1,500 people occupy every square mile of arable land, making it one of the world's most densely populated rural areas. Phalabang has some 800 households whose members till the earth and graze livestock in the forested ridges and high grasslands.

Around the village is a mosaic of scattered fields, some no larger than the width of a plow. The division of land into such meager parcels results from inheritance practices whereby household farms are divided into ever-smaller plots as sons come of age and inherit their share of the family property.

During my months in Phalabang I became acutely aware of how closely the natural environment is linked with village life, and of how the seemingly endless, unchanging patterns of daily activity are geared toward meeting the immediate needs of individual families. Villagers spend all day walking to the forests to gather firewood and fodder. They stand for hours each morning at the village spring for water. Born of necessity, this closeness to the environment is the foundation of rural Nepalese society—and the crux of the ecological and human dilemma of Nepal's midlands region.

The farmers and herders who live in Phalabang exist in a world where every act is measured carefully against the needs of the household and the capacity of the natural environment. As a village friend told me, "We must balance."

As is true throughout Nepal, Phalabang villagers rely almost exclusively on firewood for cooking and for heating their homes in winter. Every household burns more than an armload of wood a day—several hundred kilograms each year. The central feature of every home is the hearth, a molded-clay fire pit. Here household members gather, huddling for warmth during their daily meals and sharing in the simple celebrations of family life. The windowless mud dwellings are brightened by the glow of morning and evening fires: The hearth makes the home.

But the supply of fuelwood is dwindling, and the security of the home is uncertain. This is the reality of the fuelwood crisis, or at least part of it.

Another part is the devastating impact that increased fuelwood demand has on hillside trees. A World Bank report suggests that if current levels of use continue, most of Nepal's ancient forests will be gone in 50 years. Because conditions vary greatly from place to place, countrywide predictions are tenuous, but in Phalabang there has been a significant clearing of forest area. This makes it ever more difficult for villagers to gather the forest products they need. In the past 30 years, Phalabang's forests have decreased by almost 25 percent; areas near the village that appear as canopy forest in 1953 aerial photographs are now shrub and grassland.

Fuelwood gathering, a task of Nepalese women and children, is often combined with fodder collecting. Gatherers spend up to eight hours a day collecting 25 kilograms of wood—double the time necessary a generation ago, when the forests were closer and trees more numerous. As sunset approaches, the women and children begin their long walk back to the village, laden with woven baskets filled with leaves for hungry animals, branches and split tree trunks for fires, and, occasionally, wild fruits and vegetables for meals.

Phalabang villagers understand their impact on the local environment very well. An elderly member of a priest-caste family said to me: "When I was a boy, I was afraid to climb up that hill because the forest was so thick, and I was afraid of the bears. Now look: nothing. So five years ago I planted trees up there. But people cut them and fed the leaves to their buffalo and goats. What else could they do? I understand it, but it is not good. We do what we must do."

Nepalese officials have begun programs in many villages to reverse the trend of deforestation. In Phalabang, for example, the government started a small tree nursery a few years ago to distribute seedlings to farmers.

Traditional farming in the middle mountains, upon which all villagers in Phalabang depend, requires the cycling of nutrients from forest to field. Each day livestock are taken to graze in the forests; in the evening they are bedded down on the farm, and their manure is collected for composting. (I was at first surprised by the large numbers of seemingly unproductive cows, goats, and buffalo in the village, and perplexed that all the villagers said the same thing: "No, our cow gives no milk." It soon became apparent, however, that the animals are kept not for their dairy products but for their manure.)

With fuelwood becoming more difficult to obtain, some villagers in parts of Nepal are beginning to burn manure as fuel, thus removing this critical component from the farming system. But the Phalabang farmers recognize the importance of livestock dung in replenishing the nutrients in their fields, and here there is little manure-burning. Instead, the villagers spend up to ten hours a day in the forests, grazing livestock and collecting leaf fodder—when they cannot hope for the reward of even a small amount of milk for their tea.

At the peak of the hot, dry season, before the onset of the summer monsoon, a blanket of smoky haze cloaks the mountains around Phalabang. Star-like pinpoints of light speckle the hillsides at night. At this time each year, sections of the Phalabang forests are set afire. Controlled burning of the forest floor is thought to contribute to flushes of luxuriant grass for grazing. The yearly firing, however, is meeting with diminishing returns. The grass beneath the trees, already sparse, is not reinvigorated through annual burning as it once was. Tree roots are damaged and seed sources destroyed, leading to further loss of vegetative cover. As livestock trample the well-worn cattle paths, the forest soil becomes even more vulnerable to erosion, gullying, and landslides.

The forests of rural Nepal are dying not because of the reckless actions of uncaring abusers, but because they are a part of the village lifestream. "We are watching our forest dry up," one woman said to me.

In Phalabang, as in other farming cultures, the people remain dependent on aspects of the environment over which they have little control. The element of uncertainty is most evident in the dependence on the rains.

Soil must be plowed before planting, and plowing requires sufficient moisture to loosen the dirt. In May, cloud

A village family. Since Phalabang was both a strategic point on trading routes and a productive site for agriculture and grazing, original settlers included Magar herdsmen from the high mountains and Hindu farming populations from the plains.

The center of family life is the home, and the center of the home is the hearth. Occasionally, mulberries from the the forests and wild pears from the hillsides supplement the steady diet of rice, potatoes, and legumes.

buildups hint of rain. Each afternoon, cumulus clouds tower above the village, and the people watch anxiously. Days will pass with no precipitation. A week or so later, a late-afternoon shower hits the village. The people rush to set afire the stacks of compost they placed in the fields earlier that day. The smoldering piles are spread onto the land and left overnight. Early the next morning what had been a dry, sultry village is transformed into a glistening center of activity as plows are hitched to bullock teams and the moist fields patterned with furrows. As the *mul* is turned into the ground, the circle is closed. Forest and field are joined under the plowshare and driving rain. The priests' prayers have been answered: The rains came in time. It will be a successful year, everyone agrees.

When villagers talk of their forests "drying up," they are referring not just to the trees, but to their entire landscape. Since the early 1950s, four springs in Phalabang have gone permanently dry. The scarcity of drinking water forces women and children to spend up to four hours each day at the village well. Lines form before dawn and often continue through dusk.

Water is scarce for animals and crops as well. Many communal watering holes have also dried up, adding to the burden of caring for livestock. Water flow in the major streams fluctuates widely according to season, contributing to the difficulty of irrigation. In recent years, villagers have also become concerned about a decrease in total annual flows.

The increased silting of village streams exacerbates the worry over declining water levels. Along the Sarda and Luwam rivers and their tributaries, villagers have constructed stone and earthen irrigation channels to divert the water to rice paddies and wheat fields. But the channels, which during high-water periods fill rapidly with silt and mud, need constant attention. According to the villagers who tend these systems daily, the rate of siltation is much greater today than it was three or four years ago. When I asked a villager where all the sediments were coming from, he responded with a glance at the surrounding denuded mountain slopes.

The environmental degradation of one of the world's most extensive and sublimely beautiful mountain systems is not being taken lightly. Ecologists are responding with intensive research and resource-development strategies. Ultimately, the focus must be on the village, where larger concerns and policies intersect with the lives of people who have revered the mountains for generations—and who have made the mountains their home.

As the priests of Phalabang view their land from Tharkot, they see the cleared forests and the hillsides scarred with gullies. They also see neat fields of maize, smell smoke drifting upward through thatched roofs, and hear cowbells and squeals of laughing children. The village is hearth and the mountains, sustenance. For the people of Phalabang, it always has been so. ■

DAVID ZURICK *is a geographer living in Honolulu. His academic work includes a cultural-ecology study of Nepal.*

BOATS TO GO

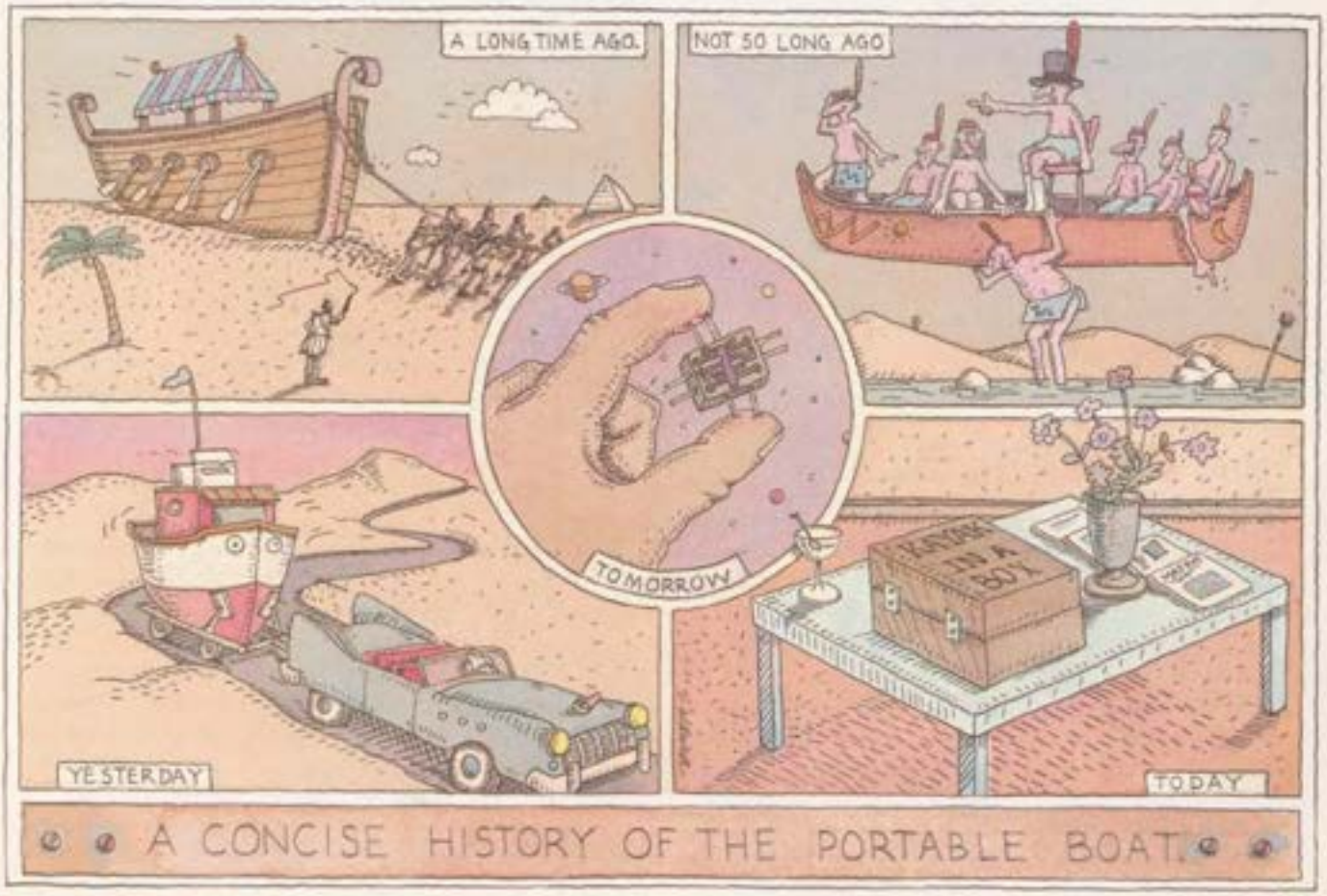
REED McMANUS

A kayak, canoe, or raft is great fun once you get it afloat. But if just getting it to the water does you in, a portable boat might be just the thing to ease your burden.

Every new boater soon realizes that boats, like ducks, are ungainly out of the water. Most "portables"—a broad definition covering any boat that doesn't require a trailer, a marina berth, or a chief purser—are more accurately "luggables." The boat must be muscled on and off a car's roof rack and, unless an assistant is available, carried like a flailing windmill blade to the water's edge. Kayaks, canoes, rowboats, and small sailboats all belong in this expansive category.

For many, a cartop boat's inconveniences are bearable. But urban dwellers with minimal storage space may simply have no room to store a 10- to 17-foot boat, and globe-trotters with dreams of paddling Alaskan rivers or Scandinavian fjords may sink back into their easy chairs when they discover that few airlines, rail lines, or bus services accept boats as baggage.

Fortunately, truly portable boats are widely available. These include foldable and



KIRK CALDWELL

collapsible kayaks and canoes for light rapids and flatwater (the open ocean, lakes, and any calm water) as well as inflatable kayaks, canoes, and rafts for whitewater (river running). The boats fold, disassemble, or deflate into pieces that can be carried with relative ease, stored in a closet, checked as airline baggage, and stowed in a car or small plane.

A boat designed to be both seaworthy and portable often requires a trade-off in performance, though. A boat, like a musical instrument, is best designed for a single purpose. A sea-touring kayak is long and relatively wide, with a V-shaped hull that provides smooth, straight tracking on long cruises. A river kayak is short, light, and highly maneuverable. It will, however, lack the sea kayak's stability and carrying capacity. A river raft provides stability and storage space for a group of river runners, but is difficult to paddle across calm water. A boat that tries to bridge the gaps rarely excels at any specific activity.

The extra material required by a folding wood-and-cloth sea kayak usually makes the portable kayak heavier, wider, and slower than its one-piece fiberglass, Kevlar, or polyethylene kin. (A portable is not necessarily lighter than a one-piece boat, just less cumbersome when it's out of the water.) An inflatable canoe or kayak, made of unreinforced or nylon-reinforced polyvinyl chloride (PVC), is less maneuverable than a rigid kayak because it bends more easily. Inflatables also ride high in the water and are buffeted by winds. Among portables, only small (under 14 feet) inflatable rafts differ little from their prototypes. They are simply smaller versions of heavier and bulkier professional guide rafts.

As simple as it sounds, it's important to know what you're looking for when you shop for any boat, portable or not. If your interest is piqued by both sea kayaking and whitewater rafting, sign up for courses or guided excursions in each activity. (Many Sierra Club chapters and most canoe and kayak stores offer classes and tours. A typical day excursion costs about $45.) You'll get a better idea of your interests, and a better feel for how boats are designed for different uses, while learning basic seamanship, paddling, and rescue skills. You may eventually decide not to buy an uncompromising top-of-the-line craft, but you'll understand the trade-offs demanded by a portable, multipurpose, or low-cost boat.

Portability's dollar cost depends on the type of craft you select and the quality of its materials. Stripped-down portable kayaks can cost as little as $1,000, but most are priced from $1,500 to $2,300, roughly $500 more than their rigid equivalents. At about $800, foldable cloth-on-frame canoes are priced competitively with fiberglass canoes. As for whitewater portables, a low-end inflatable canoe costs as little as $150; a heavily reinforced inflatable, $300 to $700. (The inflatable's hardshell counterparts range from $600 for a bare-bones polyethylene model to more than $1,800 for a fully rigged two-person Kevlar model.) Inflatable rafts start at about $600 and top out at over $3,000.

Foldable kayaks are the oldest and best-known portables. A German tailor, Johann Klepper, created the first portable kayak in 1907. His birch-and-ash, canvas-covered craft borrowed its design from age-old Eskimo seal-skin-on-driftwood-frame boats. But Klepper's intricate creation folded up like a Chinese puzzle and packed into two canvas bags that easily accompanied its owners on a train ride to a Bavarian river. Today's Klepper, with the significant additions of modern fittings and a polyester-reinforced Hypalon rubber hull, is similar to the original design.

Numerous manufacturers have tried to develop the perfect foldable kayak. Most follow the Eskimo's skin-on-frame blueprint, while some have replaced the wood skeleton with alloy tubing and polyethylene crossribs to reduce the boat's weight. (One manufacturer's 38-pound/one-person and 58-pound/two-person models fit into their own backpacks.)

Foldable kayaks have lightweight canvas, polypropylene, or Cordura nylon decks and waterproof coated-fabric hulls. The kayaks' most vulnerable areas, the keel and the chine (the boat's "spine"), are often reinforced to withstand abrasion. As one might expect, the decking, hull, and frames require more frequent maintenance and tend not to last as long as a fiberglass or polyethylene boat, but they are easier to repair.

Inflatable sponsons (stabilizers) running the length of the boat make foldable kayaks remarkably stable. But these "air bags" and the frame's weight make the boats wider and slower than hardshells. They excel on sea treks or flatwater cruises and can hold their own on easy and moderate (Class II and III) rapids. "Foldables certainly don't turn as fast as a slalom kayak," says George Larsen, a veteran Sierra Club kayak trip leader who bought his Klepper 40 years ago, "but they're fast going straight down a river." As for open-water cruising, Larsen says he has no trouble keeping up with rigid sea-touring kayaks.

With experience, a foldable kayak or canoe can be assembled at waterside in 20 to 30 minutes. The best designs use few if any small, loose pieces, require little pushing and pulling to create a taut skin (flexibility creates friction that slows a boat), and can be set up and taken apart even with cold or mittened hands. Most foldables offer optional sail rigs and masts.

Many people balk at a kayak's cramped quarters, preferring the spaciousness and cargo capacity of an open-decked canoe. One manufacturer's extremely light (47 pounds) PVC and aluminum-frame foldable canoe is highly maneuverable yet larger, more buoyant, and more comfortable than a portable kayak. While the kayaker sits low in the cockpit with legs extended, the canoeist kneels and can shift positions easily. Designed with substantial "rocker"—the curvature of the boat's bottom from bow to stern that makes canoes and river kayaks so easy to turn—the folding canoe is significantly more adept at handling moderate whitewater than the folding kayak. As with any canoe, however, forward paddling is less efficient than in a kayak, and the boat's high profile acts like a sail in the wind.

The sectional kayak made of fiberglass or Kevlar is a recent twist on portable kayak design. A one-piece boat is cut into three sections. Extra bulkheads are added to make each section watertight; bolts connect the parts into a rigid 17-foot boat. According to one manufacturer, the added bulkheads make the

RON RAINE/WILDERNESS SUPPLY PHOTOS

Folbot's Super foldable kayak (inset) consists of a urethane-coated hull stretched over a frame of birch and aircraft aluminum. For rough-water treks, a spray cover encloses the cockpit. On calm water, many paddlers prefer the canoelike roominess of an open cockpit.

A two-seater Klepper Aerius (right). Foot-operated lines reach from the cockpit to a rudder that aids maneuverability in rough water. A shucked Klepper (below) assembles in 20 to 30 minutes. The boat has no nuts, bolts, or small pieces, and can be assembled without tools.

LARRY RICE (TOP LEFT); ALL OTHER PHOTOS MARTY LEDEN/ADVENTURE PHOTO/BANK

"take-apart" kayak stronger (and heavier) than a one-piece design, and the pieces can be packed with cargo and checked as airline baggage.

Inflatable boats—canoes, kayaks, and rafts—are an entirely different breed of portable. Designed for river running rather than sea touring, inflatables are, as any devotee of air mattresses would expect, very stable and comfortable.

Inflatable canoes and kayaks appeal most to the undemanding weekend whitewater fan. Open-decked canoes are the most common; covered-deck kayaks are also available. These easily paddled "orange torpedos" perform like a cross between a rigid kayak and a raft, offering an exciting and inexpensive introduction to running moderately difficult rivers.

Open-decked inflatables require less formal training than rigid kayaks: You can't successfully perform the kayaker's "eskimo roll," but you can't get trapped

One if by sea, three if by car. Assembled, the single-seat Nimbus Solander sectional kayak (top) looks like a typical rigid kayak. Bow and stern hatches provide access to the boat's storage compartments. The Nimbus breaks down into three watertight sections that fit into cars, airplanes, and closets (bottom).

inside the boat either. In addition, three main air chambers provide ample buoyancy and a soft cushion should you collide with a rock. And inflatables are light. An unreinforced "rubber ducky" weighs as little as 21 pounds, light enough to be backpacked to a secluded stream for a day trip. A reinforced inflatable weighs about 40 pounds, about the same as a single-person polyethylene river kayak.

While most experienced river kayakers use hardshells because rigid boats are faster, more maneuverable, and can handle more demanding whitewater, they generally appreciate inflatables. "They're cheap, easy to paddle, and stable," George Larsen says. "A beginner can quickly learn how to negotiate a Class III river in one of these. You just can't do that in a rigid boat." Nancy Dagle, a Sierra Club river trip leader, says: "Inflatable canoes are perfect for starting children as young as ten on the river. They can learn basic paddling skills, fall out of the boat, climb back in, and not be afraid. Just make sure they're comfortable swimming in the river they'll be rafting."

Rafts offer the most family-oriented (and the least-individualistic) river cruising of all inflatables. Smaller versions of the large rafts used by professional river guides, they provide ample room for four to six rafters and their equipment and can be outfitted with a rowing platform to accommodate a helmsman. (While a paddle boat allows everyone to get in on the action, an oar boat is easier to maneuver because the helmsman is always in control. He or she does not have to coordinate a crew with varying skill levels, and children or novices can go along for the ride.) Even these smaller rafts, however, are heavy and bulky compared to portable canoes and kayaks. Their size allows them to excel in the strong currents of the West's open streams, but hinders them on narrow eastern rivers.

Portable boats are right at home in some of the world's most exotic places (lakes, rivers, and oceans) and in some of its least exotic (airplanes, trains, car trunks, and closets). For both whitewater and flatwater fans, portability means the boat doesn't turn into an anchor when it's out of the water. The folding kayak's ability to be easily transported and stored appeals to sea tourers crisscrossing the globe by train or airplane, searching for new ports of call. Inflatables suit river runners of all ages who want a quick and fun introduction to whitewater, and who appreciate bouncing through rapids surrounded by a comforting cushion of air. You may have to compromise on performance or pay a higher price to gain portability, but many folks consider the cost worthwhile for a boat that stays out of the way when it's out of the water. ■

REED MCMANUS *is an associate editor of* Sierra.

MARK C. GIBSON

Inflatables tend to bob over waves rather than drive through them like rigid kayaks, but they're great fun on Class II and III rivers. Spray covers and an upturned bow and stem do a fair job of shedding water. Self-bailing boats allow paddlers to continue downriver without stopping to empty the boat after each rapid.

Three separate air compartments make inflatable boats comfortable, stable, easy to paddle, and safe. You can't get trapped in an open-decked inflatable as you can in a closed-deck kayak, and crashes are softened by the boat's air cushion.

APPA RIVER TRIPS

GALE WARNER

At the Summit Meeting

In an unusual exercise in East-West diplomacy, 23 citizens of the Soviet Union and the United States, plus one from Switzerland, met in the Caucasus. Their goal: negotiation of Mt. Elbrus, Europe's highest peak.

WE ARE TRYING TO STAY ON THE TRAIL, avoid puddles and rocks, admire the scenery, and find the word "different" in a pocket dictionary—all at the same time. Olga and I squint at the tiny Cyrillic letters in midstride, our heads nearly knocking together. Finally we find "different," but I also find that what I really want to say is "different from," not at all the same construction in Russian. We fall into silence, belaying each other with a squeeze of the hand.

THE ROPE IS TENSE AND ALIVE IN MY HANDS, the sun hot on my back. I brace my feet, give more tension, fix my eyes on Sasha. I can feel by the way he moves at the end of the rope that he is in trouble. He needs to move out on the face, to trust a small foothold and reach high with his right hand, but he has never climbed before. I am watching him closely and am not surprised when he falls. I catch him.

THAT EVENING SOMEONE STIRS A POT OF SOUP, while others slice bread and cheese and pry open meat tins with knives. Someone else goes to look for whoever carried the cabbages. We carry huge bags of cabbages into the mountains, as well as boxes of potatoes, tomatoes, and apples; glass jars of peas and marmalade; unsliced loaves of brown bread and lumps of butter wrapped in white paper. At first some of us protested carrying the weighty foods, but we are stronger now and used to the load on our backs. And we have grown fond of our plain bread and butter, our boiled potatoes, our *schi* and our *kasha*. We tell Zhenya she makes the best *kasha* in the world. "I have been making it for 20 years, it ought to be good," she says with a shrug, but she is pleased.

We eat standing up, talking in little clusters, discussing tomorrow's pass. The ragged edge of the mountains at the end of the valley slices into the darkening sky. Dinner chores are done, and Zhenya picks up an untunable guitar and somehow draws music from it, bewitching us with ballad after ballad. After singing some American folk songs, we teach the Soviets a few Native American chants and rounds. They immediately respond to the rhythms and harmonies. The lack of words puts us on an equal footing, and we can at last sing together at full voice. Firelight on our faces binds us together into a single clan gathered around the hearth.

At times I feel I am dreaming, that this cannot be quite real. Either our journey is a dream, or the enmity between our countries is a dream; it does not seem possible that reality could contain both. We are constantly aware of our national identities: I am playing Hacky Sack with a *Russian*. She is slicing cabbage with an *American*. Simple thoughts with the force of tremendous revelation.

Indeed, we are here because of a dream that passed from one person to another. An American woman named Cynthia Lazaroff organized the first Soviet-American wilderness expedition in 1985, bringing ten American teenagers to these same mountains to hike with ten of their Soviet contemporaries. A young Soviet physician named Boris Donnikov who accompanied that group was inspired by the camaraderie among the teenagers and envisioned a similar trip involving doctors. Donnikov talked his idea over with Ken Mack, a youthful leader of the expedition and the son of John Mack, a member of the Nobel Peace Prize–winning International Physicians for the Prevention of Nuclear War (IPPNW).

That fall the senior Mack contacted Harvard medical student David Kreger, who took on the organization of the trek. Dr. Evgeny Chazov, a prominent Soviet cardiologist and then co-president of IPPNW, agreed to help facilitate the trip and suggested a symbolic focus: carrying to the summit of Mt. Elbrus —at 18,481 feet the highest peak in Europe—a "message to the world" signed by himself and by Bernard Lown, IPPNW's American co-president. In July 1986, after a flurry of telexes and paperwork, thirteen Americans, one Swiss, and ten Sovi-

ets assembled in the Caucasus for a three-week expedition.

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Although everyone except one other American and me is a doctor or medical student, the main thing we have in common is our love of the mountains. It is this, more than the shared medical backgrounds, that unifies the group.

The sheer walls of language and culture are daunting at times, however. During meals at the base-camp hotel, we stare at each other across long, well-set tables and glasses of sugary hot tea. Without the language of forget-me-nots and talus slopes, we have no trail for our words. It is hard and sometimes awkward. We flounder, we force our way through tangles of words, we laugh somewhat desperately at half-understood jokes. The tremendous feelings cross in a smile or an offering of food. But we never linger over our hotel meals. Back outside, in the sunshine and mountains, we breathe a huge sigh of relief; we can communicate again.

As the Americans learn more Russian, and the Soviets remember long-ago English lessons, we begin moving, with the help of translators and sketchbooks, toward conversations about politics, lifestyles, and ideas. Together we admire woolly lousewort, asters, pink smartweed, harebells, rhododendron, and dozens of other wildflowers we cannot name. We glissade down snow couloirs, slipping and self-arresting. We gather wild strawberries and mushrooms, throw Frisbees and snowballs.

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One day we stand before a group of a hundred fresh-faced, sunburnt young Soviet climbers at a mountaineering camp and talk, through a translator, about why we have come. After the meeting the climbers shyly gather around us, their smiles and body language speaking volumes. Then someone plugs an American rock tape into a loudspeaker. "When I saw the Americans and Soviets dancing together," Lyosha says later, "when I saw us holding hands, smiling, crying, singing, it seemed so impossible to me, so unimaginable, and yet here it was happening before my eyes. And I had a vision of our children also dancing together and laughing, also holding hands, and no one thinking it strange or impossible."

On the long walk back to our tents, Boris Donnikov keeps repeating: "*This* is why you are here."

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In order to cross the glaciers and gain Betcho Pass before the snow softens, we plan to leave camp at 5 a.m. But not everyone gets up in time, and before camp chores are finished, Slava Onischenko, an Everest veteran and head guide, sets off with about two thirds of the group. The others are left behind to clean pots and pack stoves. A 20-minute gap materializes between the lead group and the second group. The climb is steep and slippery. When the first group stops to rest, the second group almost catches up, only to see the first group sling on their packs and take off.

It seems to members of the second group that the first doesn't want them to catch up, and they slog on, resentment building with every step. No one wants to be pegged as a member of the "slow group," and those in the rear feel unfairly treated. A distinct and unwelcome whiff of competition is in the air. An American walking between the groups falls while crossing a stream because no one is nearby to help him.

As soon as they gain the pass, five members of the first group bound down the snow and offer to carry the packs of those still climbing. But tensions are already so high that this is interpreted as a further rubbing in of their "strength" compared to the others' "weakness." We are reunited at the pass, but eight people are sullen and angry.

The American leader calls a meeting, explaining that it is extremely important for group morale that we stick together. The Soviet leader defends his actions as simply an attempt to get as many people up the pass as possible before the snow softens. Members of the first group admit that there has been some competition but dismiss it as natural and inevita-

Climbers take a breather during a day hike from the Baksan Valley.

DALE RAMMER

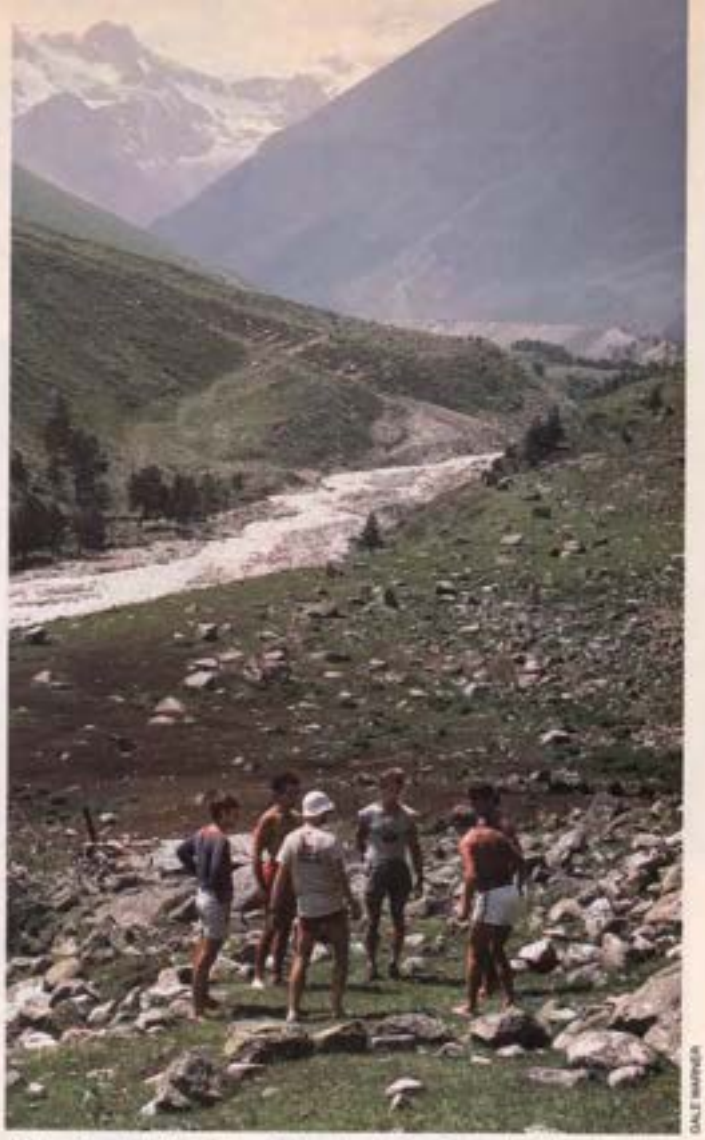
Undaunted by cold, turbulent waters, a few members of the group roll up their trousers and build a bridge of human hands across the Nakra River.

GALE WARNER

Their expedition almost over, the climbing diplomats gather for a group portrait at Priutt Hut on Mt. Elbrus.

A Soviet and two Americans share a song one morning at camp. Music filled an important niche during the expedition, often communicating emotions more successfully than conversation could.

"May all people learn to care for this beautiful planet with a love that is faithful and constant. May there be future generations to discover these words and know their meaning." Evgeny Chazov (left) places the message of hope into the capsule that will be buried at the summit of Elbrus. At right, the climbers approach their goal.



GALE WARNER

At day's end the Soviets and Americans confront each other in a new type of superpower gamesmanship: Hacky Sack.

RICK DONAHUE

ble. The American leader says that's precisely the point: We're here to prove that cooperation is a stronger force than competition, to demonstrate a different way of climbing a mountain.

During the ten-mile descent, everyone makes an extra effort to stay together. But exhaustion amplifies the bruised feelings, and dinner that night is eaten in language-based groups. Almost everyone feels tired, cranky, victimized, and misunderstood. Yet also in the air is a fervent desire to put things right. Gradually the hurt feelings are smoothed over with hugs, cups of hot tea, explanations, or songs.

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Two days later we are staring at a river in dismay. The bridge has been washed away in the spring melt. "*Cuckoo-grinya*," says Slava, raising his palms with a faint smile. (Roughly translated, *cuckoo-grinya* means "well, that's that, Charley.") Reluctantly, we take off our boots and socks, roll up our pants, loosen the straps on our backpacks, and eye the river that stands between us and four more miles of climbing to the 13,500-foot Dongus-Orun Pass. The river is wide, unruly, waist-deep in places, and icy. *Cuckoo-grinya*, indeed.

While most of us linger on the bank, gathering our nerve, a few doff their packs and plunge in, hopping from rock to rock in the swift waters. They then join hands, balancing on submerged rocks and logs, forming a living bridge for the rest of us. One by one, as we inch into the deepest channel, we reach for Slava's hand while he holds on to Yura, and Yura holds on to Jeff, and Jeff wedges himself onto the bank. Encouragement in both languages is shouted above the river's roar; cheers and applause erupt as each person splashes safely to land. We put on dry socks in high spirits. The way to the pass is clear.

We are now ready for Elbrus.

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On a cloudless day we reach the hut at 13,800 feet on the slopes of Elbrus, where a television crew, newspaper reporters, and Dr. Chazov are waiting to hold a press conference with us. We are giddy and confident and pay little attention to the wind that starts blowing at sundown.

But by 2 a.m. the wind has gathered strength, and an ominous lenticular cloud hangs over the mountain. Beginning an ascent is out of the question. Instead, we spend the day playing cards, talking, and writing in our journals. As the storm becomes a blizzard, we have plenty of time to contemplate the possibility that the weather may prevent us from taking a single step further. I think about what this trip has meant, and what, if anything, failing to climb Elbrus would change.

The following midnight the storm breaks and the wind dies. At 2 a.m. we dress, put on our crampons, and move into the silver landscape outside the hut. Elbrus smolders under the full moon. The enormity and absurdity of our mission stares me in the face. We must be crazy to think we can climb that thing. We should be back by our campfires, asleep in our beds, heading for home, anywhere but here on the slopes of a mammoth and mocking mountain.

But the full moon is reassuringly bright. The main ridge of the Caucasus is half-buried in a shimmering mist, leaving the highest peaks silhouetted by the moon. If it's crazy to be here, it's crazier still to give up after all we have gone through, after all the energy and love we have expended. Slava takes his place at the head of the line, and we begin to walk. There are no huzzahs or pistol shots, no cheering crowds. We simply begin to walk.

Hours later, after the moon has set and the sun begins touching the peaks, we are still climbing. At rests we feed each other pieces of chocolate and gather close to protect each other from the wind. Our water and sunscreen freeze in their bottles. Our boots sink into the deep fresh snow, our ice axes and crampons clang against the volcanic rock.

It could be hours later, or minutes. I look up and see Volodya waiting for me a few steps ahead. "Galya, we will go together," he says firmly, taking my hand. "Only 20 steps to go." His steps are faster than mine; we take nine or ten and are both gasping for breath. Our fingers cling together through layers of mittens. "Only 15 steps to go." The mountain is now strangely flatter. Volodya tugs on my hand insistently. "Only ten steps." I lose my balance for a moment and feel his hand clench as I stumble. He brings me back to my feet. "Only . . . five . . . steps." Only a little more. And then the mountain falls away on all sides.

◆

"In the nuclear age, the nations of the world are all climbers on a mountain, depending for their survival on the rope of tolerance. The bonds of friendship forged in the wilderness are threads spanning the chasm between countries long separated by fear and ignorance." The words will be translated and reprinted in *Pravda* and a half-dozen other Soviet newspapers. They will be reported in American newspapers and magazines as well as broadcast on radio and television.

But as we bury our message in the snow, raise each other's arms high, and shout each other's names, all that matters is that the words are true. ■

GALE WARNER, *a writer living in Gloucester, Mass., co-authored* Citizen Diplomats: Pathfinders in Soviet-American Relations *(Continuum Books, 1987) with Michael Shuman.*

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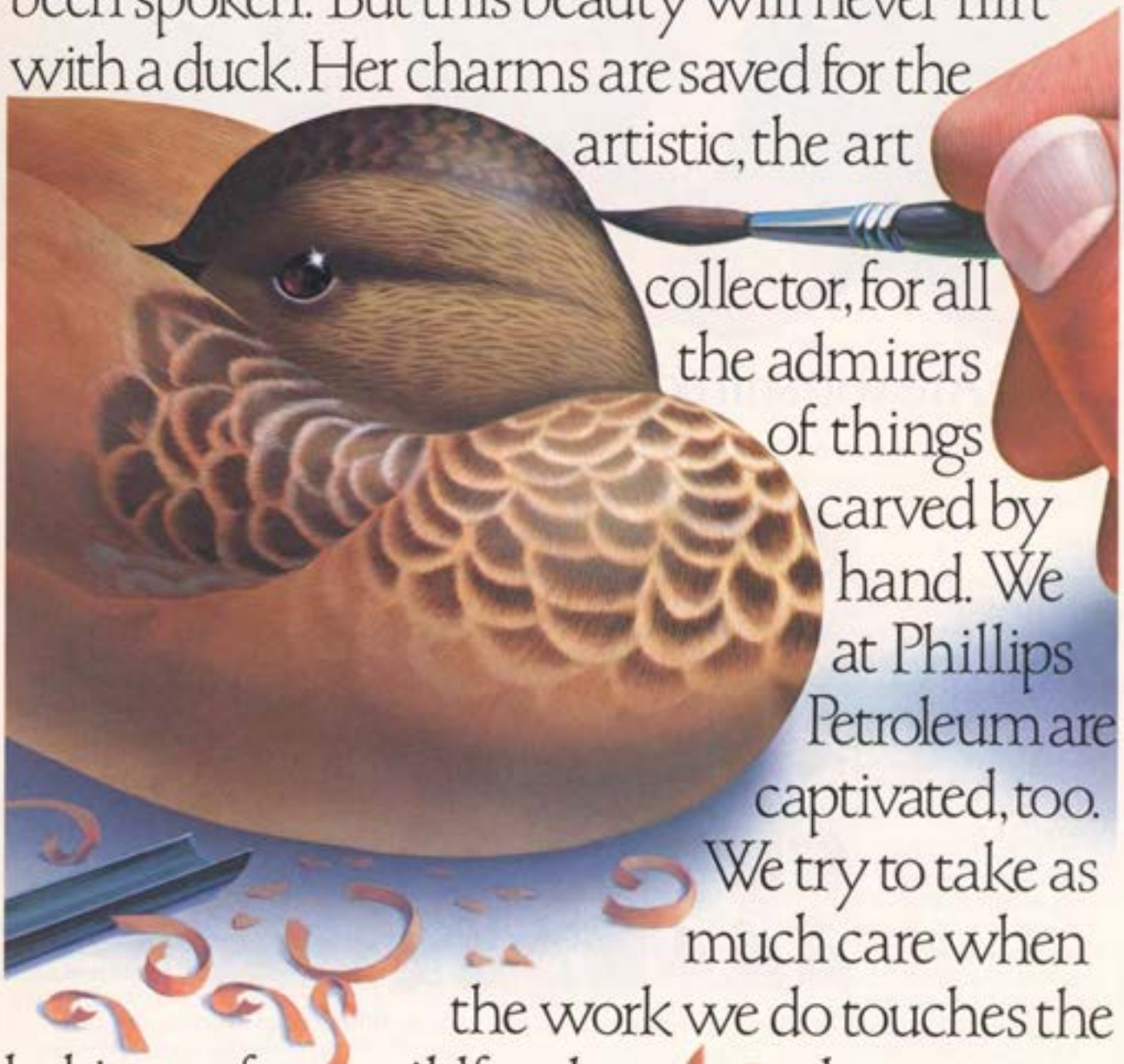

PHILLIPS 66

SIERRA CLUB 1988
FOREIGN OUTINGS

MAKE 1988 YOUR YEAR to join an exotic Sierra Club Foreign Outing. Our enthusiastic volunteer leaders have planned an exciting variety of trips for the coming year—from visiting archaeological sites in East Africa to sea kayaking in Baja California to skiing in the heart of the Tyrolean Alps. We also offer a special springtime trip to Paris to meet with French conservationists and to explore the inner workings of this timeless City of Light. Look over this preview of foreign trips, and begin making your unique 1988 vacation plans with the Sierra Club. For more detailed information on the following trips, send in the coupon on page 70. Please see the January/February 1987 issue of *Sierra* for our reservation and cancellation policy and an application form. *Note: The dates and costs of foreign trips are subject to change.*

STEPHEN KASPER

Africa

[88635] African Safari Spectacular: Tanzania—June 27-July 12. *Leader Bud Bollock, 1906 Edgewood Dr., Palo Alto, CA 94303. Cost: $2,790.* Share the unusual experience of a stay at the chimpanzee preserve of Jane Goodall on the shores of Lake Tanganyika. Then, from our safari camp, observe the vast herds of wildlife on the seemingly limitless plains of the Serengeti. At Ngorongoro Crater, the world's largest concentration of game roams the Masai homeland. We travel by Land-Rover to view Olduvai Gorge, site of the Leakeys' fossil discoveries. Nearby Lake Manyara National Park features elephant herds and tree-climbing lions. Come visit some of the finest, least-spoiled places on Earth. Leader approval required.

[88660] Journey through Time: Early Man and Wildlife Safari, Kenya and Tanzania—July 20-August 10. *Leader, Ruth Dyche, 2747 Kring Dr., San Jose, CA 95125. Cost: $4,340.* East Africa's rich anthropological sites where fossils of early man continue to be discovered are the focus of this unique and varied journey. Humanity's past will be revealed to us as we visit Richard Leakey's camp at Koobi Fora on Lake Turkana, Olorgesaillie near Lake Magadi, Hydrax Hill, Kariandusi, and Olduvai in the southern Serengeti. We will also visit the best wildlife areas of Tanzania and Kenya: Ngorongoro Crater, Lake Manyara, and the Masai Mara provide an unrivaled game-viewing experience. Accommodations will be comfortable in lodges and tented camps. Travel will be by Land-Rover and twin-engined aircraft. An anthropologist will accompany us to help interpret the mysteries of man's beginnings.

[88700] Walk on the Wild Side in Kenya—September 4-25. *Leader, Anneliese Lass-Roth, 712 Taylor Ave., Alameda, CA 94501. Cost: TBA.* Rugged and rewarding sums up our three-week walking safari, which incorporates animal viewing with intercultural sharing. The trip will provide a fascinating blend of Kenya's varied fauna, flora, and culture. Hiking will be moderately strenuous. Leader approval required.

[89820] Christmas Camping and Wildlife Safari, Kenya—December 17-30. *Leader, John DeCock, 53 Landers St., Apt. 2, San Francisco, CA 94114. Cost: $3,285.* Treat yourself to an African holiday safari. This gem of a trip offers a fine overview of Kenya's premier wildlife and birding areas. Among the places we will visit are Meru National Park where we can expect to see gazelle, monkey, zebra, and possibly lion and cheetah; Lake Nakuru, with its huge concentration of pink flamingos; and the Masai Mara, famous for its large herds of wild animals. We will also camp and hike on the slopes of Mt. Kenya, whose snow-covered peaks dominate the landscape. A hot-air-balloon ride over the Masai Mara is an optional feature. Travel will be by landcruiser. Accommodations will be comfortable in lodges and tented camps.

Asia

[88545] Rolwaling Trek, Nepal—March 19-April 9. *Leader, Peter Owens, 117 E. Santa Inez, San Mateo, CA 94401. Cost: $1,240.* This trip offers a 19-day trek into the remote Rolwaling Himal west of Mt. Everest and 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 handful of Sherpas who live there. Spring comes early to Nepal and the rhododendrons, Nepal's national flower, will be in full bloom. Maximum elevation reached will be 16,000 feet.

[88575] China, Tripping the Eastern Fantastic—April 28-May 17. *Leader, Dolph Amster, P.O. Box 1106, Ridgecrest, CA 93555. Cost: $3,095.* Come and experience a slice of today's metropolitan and rural eastern China. From Beijing to Shanghai, we will explore cities and villages, communes and temples. We will do overnight ascents of T'ai Shan (5,000 feet) and Lotus Flower Peak (6,000 feet) in the Huang Shan (Yellow Mountains), go for a boat ride on Tai Lake, and stay with a farm family. Traveling by plane, train, and bus (plus doing some hiking), our accommodations will be the best available hotels or guest houses. This is a moderate, easy-paced trip. Leader approval required.

[88580] Flowers and Birds of the Middle Kingdoms, Bhutan and Sikkim—April 30-June 2. *Leader, Jane Edginton, 2733 Buena Vista Way, Berkeley, CA 94708. Naturalist, Hugh Braswell, M.D. Cost: $3,995.* We will explore exotic and little-known Bhutan and Sikkim in the pre-monsoon rhododendron season, offering the opportunity to see the Himalayan bird population in spring plumage. The trip will include some cultural sightseeing but will emphasize natural history treks in the central Bhutan Himalayas and near Kangchenjunga in Sikkim. The hiking, on average, is moderate but may be strenuous on any given day, depending on the weather, which can be damp, and the altitude, which will range from 4,000 to 14,000 feet.

[88590] The Garhwal Himal—Abode of the Gods, India—May 16-June 8. *Leader, David Horsley, 4285 Gilbert St., Oakland, CA 94611. Cost: $1,910.* The Garhwal, located in the northeast corner of India, is a part of the Himalayas that is little known to trekkers. Yet the mountains of this region are often described as the most interesting and impressive of the entire range. The trip begins in Delhi, where we take a private bus to Rishikesh and Hardwar, visiting Hindu temples on the banks of the sacred Ganges River en route to our trailhead. Our trek encompasses the spectacular "Valley of Flowers" and Kuari Pass regions, taking us through beautiful forests and flowering meadows with the Himalaya Mountains (including India's highest peak, Nanda Devi) and their glistening glaciers always in view. The trails in the Garhwal rarely climb to more than 14,600 feet, but they can be steep and physically demanding. The rewards of this trek will be many. From our exalted vantage point it will be easy to

see why the Garhwal is considered the Abode of the Gods.

[88600] Everest from Tibet via Kathmandu, China and Nepal—May 30-June 25. *Leader, Peter Owens, 117 E. Santa Inez, San Mateo, CA 94401. Cost: $3,185.* Join us for the Sierra Club's first trip to Rongbuk Glacier and Everest Base Camp on the Tibet side, starting and ending in Nepal. Included are overland visits to both Shigatse and Lhasa in Tibet as well as Kathmandu sightseeing in Nepal. The trek will reach a maximum elevation of 17,000 feet.

[88615] Guilin and Yunnan Bicycle Tour, China—June 12-July 1. *Leader, Sy Gelman, 1387 7th Ave., San Francisco, CA 94122. Cost: $2,760.* This is a bicycle tour for the adventurous. Exploring Guilin and Yunnan Province, "the land of eternal spring," we will ride through spectacular and unusual landscapes, visiting areas few foreigners reach. We will also stop along the way to see the Great Wall and the sights in Beijing. Our Chinese ten-speed bikes will give us the freedom to roam through open-air markets, meet and mingle with the Chinese people, and observe their lifestyles. A sag wagon will transport our luggage and give us an occasional break from biking. Expert English-speaking guides will be our interpreters. Expect the unusual: This will be an experience to remember.

Dudh Khola, Nepal

JOHN DeCOCK

[88630] Tilicho Lake, Nepal—June 25-July 23. *Leader, Bob Madsen, 3950 Fernwood Way, Pleasanton, CA 94566. Cost: $1,550.* One of the highest lakes in the world at 16,300 feet is nestled behind the Annapurna Massif. We'll reach Tilicho Lake after a 12-day hike. Starting our trek in a tropical region, we'll ascend to alpine country, gradually acclimatizing ourselves in the process. We'll pass through villages with Hindu and Buddhist cultures. During this monsoon-season trek we can expect rain only about half the time. The Tilicho Lake region is in the rain shadow to afford days of no moisture. The return trip will be by an equally interesting route.

[88655] Batura Glacier, Nanga Parbat, Hunza Trek, Pakistan—July 18-August 15. *Leaders, Patrick Colgan and Peter Owens, PO Box 325, La Honda, CA 94020. Cost: $2,205.* Our trip to the Northwest Frontier District of Pakistan will include two eight-day treks. The first explores the 30-mile-long Batura Glacier in Upper Hunza, which offers unforgettable views of the 25,000-foot Batura Peaks. The second trek starts in the Astor Valley beneath the sheer south face of 26,600-foot Nanga Parbat, the ninth highest peak in the world. Between our two treks we will visit remote Hunza Valley, a real "Shangri-La" renowned for its long-lived inhabitants. Rakaposhi, at 25,500 feet, rises majestically above the valley's many apricot orchards. Maximum elevation reached will be about 14,000 feet.

[88705] Tian Shan China Trek—September 11-30. *Leader, Don McIver, 7028 West Behrend Dr., Glendale, AZ 85308. Cost: $2,675.* Originating in Hong Kong, this trip will take us to Xinjiang Province in far northwest China, location of the beautiful Tian (Heavenly) Shan Mountains. The province's capital, Urumchi, is an oasis amid barren deserts, forested highlands, and snowcapped peaks. Near the famous "Silk Road" trade route, middle-eastern influences are strong and ethnic minorities still dress in colorful costumes and practice their distinct cultural traditions. While in the mountains, we'll hike and camp at Sky Lake. In Turfan, an oasis more than 500 feet below sea level, the grapes, melons, and music of the Uygur peoples offer a special treat. Returning to the east, we'll stop at Xi'an to see the ceramic army of the Qin emperor and at Beijing to visit the Forbidden City and the Great Wall. We'll complete our trip by returning to Hong Kong. Travel will be by plane, train, and bus. Best available accommodations will be provided.

[89800] Yangtze Valley–Grand Canal, China by Bicycle—September 25-October 15. *Leader, Phil Gowing, 2730 Mabury Square, San Jose, CA 95133. Cost: $2,650.* China is a land of eternal wonder with fascinating and beautiful scenery, exotic cultures, and warm and friendly people. This trip will be a great opportunity to explore the Yangtze delta area and tour a bit of the Grand Canal. On our bicycles we will rub elbows with the Chinese as they go about their daily business, visit some of the smaller villages and rural areas, see the great sights of some of the major cities, and satisfy much of our curiosity. We will visit the Great Wall, the Ming Tombs, Forbidden City, Mao Zedong Memorial Hall, and much more. You don't have to be an expert cyclist to join us. We plan only 35 to 50 flat miles per day at a leisurely pace, with backup vehicles available for inclement weather and tired cyclists.

[89805] Annapurna Circle Trek, Nepal—October 3-28. *Leader, Serge Puchert, 11025 Bondshire Dr., Reno, NV 89511. Cost: $1,560.* On this moderate 26-day trip, we will circle the Annapurna Massif by a route that takes us up the Manang Valley and over Thorong La Pass (17,650 feet). Then we descend to Muktinath, a sacred shrine for both Buddhists and Hindus, and proceed down awesome Kali Gandaki gorge between Annapurna and Dhaulagiri. We'll have time to explore Kathmandu and Pokhara, Nepal's second largest city. Throughout the trip we will have

the opportunity to interact with the Nepalese and learn about their various cultures. Leader approval required.

[89810] Helambu, Majesty and Monasteries of Nepal—October 30-November 18. *Leader, Carolyn Downey, 1931 E. Duke Dr., Tempe, AZ 85283. Cost: $1,295.* As an ancient Sanskrit proverb says, "A hundred divine epochs would not suffice to describe all the marvels of the Himalayas." See some of these marvels as you trek in the most spectacular mountains on Earth in the Helambu area north of Kathmandu. Near our highest elevation (13,000 feet) at Panch Pokhari (Five Lakes) there are splendid views of the Himalayas all the way east from Langtang to beyond Everest. . . a perfect spot for our layover day. This will be a moderately paced trek. Porters will carry dunnage, and we'll have time to photograph the mountains, mingle with the local inhabitants in little tea houses, visit Buddhist monasteries, and experience the incredible beauty of the area.

[89815] Mountains to Jungle, Gorkha-Chitwan Photo Trek, Nepal—November 21-December 10. *Leader, Dolph Amster, P.O. Box 1106, Ridgecrest, CA 93555. Photographer, Martha Murphy. Cost: $1,775.* Following two days in the Kathmandu Valley, this culturally and photographically oriented trek leaves historic Gorkha for Gurung, Tamang, and other villages where westerners seldom go. En route for 12 days, we will view the Manaslu, Annapurna Himal, and many other high peaks, and pass the *gompa* at Serandanda. We proceed to Royal Chitwan National Park and stay in comparative luxury for two nights in a lodge. At the park we will view many species of jungle animals as well as enjoy special evening entertainment. This is a moderate trek with a maximum elevation of 11,500 feet. Leader approval required.

[89825] Lamjung Christmas Trek, Nepal—December 17-31. *Leader, Peter Owens, 117 E. Santa Inez, San Mateo, CA 94401. Cost: $955.* Come spend the holiday season on this moderate 12-day trek into the charming Gurung villages located on the eastern slopes of the Annapurna range. Our route takes us very close to Annapurna IV (24,688 feet), Annapurna II (26,041 feet), and Lamjung (22,740 feet). Timed to coincide with school holidays, this trip will emphasize interaction with local people and our Sherpa and Tamang staff. Many of our evenings will offer opportunities to join in local singing and dancing. Maximum elevations reached will not exceed 13,000 feet. Leader approval required.

Europe

[88517] Cross-Country Skiing in the Austrian and Swiss Alps—December 19, 1987-January 3, 1988. *Leader, Wayne Woodruff, P.O. Box 614, Livermore, CA 94550. Cost: $2,220.* Spend the Christmas holidays cross-country skiing in the "Heart of Europe." Christmas Day will be spent skiing in western Austria in the Vorarlberg region, and New Year's Day will be spent in the Grisons region of Switzerland, in the upper Engadine. This trip is designed especially for beginners and intermediate skiers; previous ski experience is not necessary. Accommodations will be in comfortable hotels. The trip price includes equipment rental and cross-country ski instruction by a certified Nordic ski instructor.

[88530] Cross-Country Skiing in the Austrian Tyrol—January 23-February 7. *Leader, Carolyn Steinmetz, 96 Hawthorne Ave., Los Altos, CA 94022. Cost: $2,080.* Experience the thrill of the Tyrol in winter, gliding silently over alpine meadows covered with glistening fields of crisp white snow. We will discover the heart of the Tyrolean Alps on this trip designed for both novice and experienced skiers. Morning cross-country ski lessons and afternoon excursions for all skill levels will be led by licensed Austrian ski instructors. We will spend the weekend in enchanting Salzburg, where we will enjoy a Mozart concert. Accommodations will be in quaint, comfortable family-run inns. There will also be time for historic tours, shopping, and other

County Mayo, Ireland

après-ski attractions in this legendary winter wonderland. Trip price includes ski equipment rental and instruction.

[88540] Arlberg Ski Adventure, Austria—March 19-26. *Leader, Ann Hildebrand, 1615 Lincoln Rd., Stockton, CA 95207. Cost: $1,610.* Experience skiing where it all began—the renowned Arlberg area of Austria. With the expertise of local guide-instructors we can perfect our off-piste technique, using the convenience of ski lifts. The possibilities for unforgettable descents are nearly limitless as we ski from village to village. The group will be divided into two eight-person sections for the most advantageous instructor/skier contact. Accommodations will be in a comfortable hotel in Lech. The trip is designed for intermediate to advanced downhill skiers who wish to experience the thrill and challenge of off-piste skiing. On-piste possibilities are available for the less adventurous.

[88560] Paris: A Different Perspective, France—April 21-30. *Leaders, Sidney Hollister and Sandy Tepfer, 42 August Alley, San Francisco,*

CA 94133. Cost: $2,130. A Sierra Club premiere—the chance to celebrate April in Paris, when cafés put their tables out in the sunshine and the city's chestnut trees put out their blossoms. Meetings with Parisian environmentalists and French conservationists will help us understand the inner workings of Paris and its ecological ties to the country at large. And, since any understanding of Paris includes eating in its colorful restaurants, visiting outdoor markets, and lingering over an espresso in a café, we'll do that too. We'll also walk the boulevards and narrow streets of historic neighborhoods, sample the city's cultural events, take a boat trip on a tree-shaded canal, and stay in small hotels in the heart of this ever-changing yet magically timeless City of Light.

[88595] Walks in Historic Portugal —May 22-June 9. *Leader c/o Lynne Simpson, 1300 Carter Rd., Sacramento, CA. 95864. Cost: TBA.* Our route combines walking excursions with visits to cultural and historic areas of Portugal. Mountain ridges, rising to 6,500 feet, offer panoramic vistas and easy to moderate walks following the pathways of the Romans, Moors, Spanish, and Portuguese. Vans will transport our group, accompanied by our Portuguese guide, to accommodations at *pensions* and *estalagems*. Along the way we will visit historic towns and buildings of the 12th to 14th centuries.

[88605] Walking in the West Country, England—June 1-17. *Leader, Robin Brooks, 920 Kennedy Dr., Capitola, CA 95010. Cost: $2,225.* Cornwall, Devon, and Somerset are prime country for walkers. In Dartmoor National Park, sharp granite outcroppings punctuate the lonely moors where Sherlock Holmes met the Hound of the Baskervilles . Gentler Exmoor National Park is *Lorna Doone* country, complete with picture-book villages, castles, and churches. The dramatic cliffs of the South West Coastal Path surround the entire West Country: subtropical gardens and picturesque fishing villages on the Channel Coast contrast with the rugged Atlantic. Comfortable hotels, featuring local specialties like Devonshire clotted cream, Cornish pasties and Somerset cider, await us after our moderate daily walks.

[88625] Biking La Belle Brittany, France—June 21-July 5. *Leaders, Lynne Simpson and Don Donaldson, 1300 Carter Rd., Sacramento, CA 95864. Cost: $1,995.* If thoughts of ocean mist, menhirs, crenellated walled cities, Celtic customs, local cuisine, and exercise appeal to you, you'll enjoy this moderate biking excursion to Brittany, home of the only large Celtic population in continental Europe. This trip will cover both coastal and inland regions. We'll explore the regional park of Armorique, the druidic remains at Carnac and Concarneau and inspect picturesque Breton villages. You may either bring your own bike or rent one. Lodgings will be in small hotels in this off-the-beaten-path corner of France.

[88640] Ireland, Bike and Hike—July 9-23. *Leader, Don Donaldson, 4125 Terra Granada, Apt. 1B, Walnut Creek, CA 94595. Cost: $1,690.* Ireland is a land revered in song and verse, a land of tumultuous history in 40 shades of green. We'll visit castles, keeps, and ruins through counties Clare, Galway, Mayo, and Sligo. For two memorable weeks, we'll leisurely make our way on backroads along Erin's beautiful west coast, through the land of Joyce and Yeats, and spend our nights in Irish guesthouses and farmhouses. There'll be optional hiking, biking, or relaxing on layover days. A sag wagon will ferry dunnage on moving days. Our trip starts at Shannon Airport (near Limerick), visits Galway and Sligo towns, and ends on the northern coast, where we'll bus back to Limerick.

[88645] Hiking the Northern Basque Country, France—July 10-23. *Leader, Nancy Auker, 120 Sheridan Rd., Oakland, CA 94618. Cost: $1,675.* Hiking sparsely traveled trails of the Pyrenees, our French guide's route will include ancient Roman roads, magnificent gorges, and shepherds' summer mountain homes. A visit to a Basque museum previews this unique cultural experience. We will attend *fêtes*, a *pelota* game, and celebrate Bastille Day, the most lively French national holiday. A van will carry our baggage to each *gite* (hostel), where meals are specially prepared by a French cook. The hikes will be moderately strenuous —an average of eight to ten miles a day, with 3,000-foot ascents and descents. This trip is a rare combination of scenic beauty, great hiking, and cultural learning.

[88650] Tyrolean Hiking Tour, Austria—July 18-August 2. *Leader, Vicky Hoover, 735 Geary St., Apt. 501, San Francisco, CA 94109. Cost: $1,480.* A 16-day adventure, wandering in the heart of the Austrian Alps in the provinces of Salzburg and Tyrol. We'll hike from one Alpine hut to another—from the picturesque town of Lofer near musical Salzburg, via historic Kufstein, to charming Mittenwald at the Bavarian border. We'll also enjoy occasional hotel stops in between. We need carry only personal belongings and lunches as we wander in civilized European style, high above the villages past spectacular meadows, rocks, and snow scenery. Our route includes the famed Kaiser Gebirge, the rugged Karwendel Alpen, and the sparkling Achensee. Daily hikes will be mostly moderate but often steep, offering sufficient challenge to the experienced hiker and plenty of scenic excitement to the Alpine traveler.

[88665] Cultural and Historical Outing to the Roof Top of Europe, Switzerland—July 28-August 6. *Leader, Ann Hildebrand, 1615 Lincoln Rd., Stockton, CA 95207. Cost: $2,175.* A ten-day hiking tour to one of the most scenic areas of Switzerland, the region of Graubünden, will focus on flora, fauna, as well as the culture and history of the Romansh people. One of the many delights of this outing will be a ride on the famous Glacier Express to the Italian-speaking part of Switzerland. The hiking will be moderate but at a leisurely pace. Accommodations will be in a comfortable hotel.

[88670] Service Trip to the Austrian Tyrol—July 31-August 14. *Leader, Jean Ridone, 272 Coventry*

Rd., Kensington, CA 94707. Cost: $805. This will be a moderately strenuous trip that will combine the satisfaction and fun of a service trip with the adventure of a foreign outing. We will be working with members of the Austrian Alpine Club, Innsbruck Chapter. The first week will be spent repairing and maintaining trails. The second week will be fun. We will set up a base in the village of Igls, which sits on a shelf above Innsbruck, and take daily trips into the surrounding countryside. Leader approval required.

[88680] Around the Feldberg, West Germany—August 15-27. *Leader, Sigrid Miles, 1056 First Ave., Napa, CA 94558. Cost: $1,510.* The Feldberg is the highest mountain in the Black Forest, rising to 4,900 feet. Our walk in the Black Forest leads us through picturesque villages, isolated hiking trails, forest, meadows with alpine flora, up and down mountains with beautiful views of the surrounding valleys. We will stay in first class hotels, our luggage will be transported, and all we will need are our daypacks, cameras, binoculars, good hiking boots, and the spirit to experience this unique way of enjoying the hospitality of West Germany's Black Forest.

[88690] Central Alps, France—September 4-16. *Leaders, Marilyn and Jerry South, 483 Throckmorton Ave., Mill Valley, CA 94941. Cost: $2,065.* Moving between village inns and mountain huts we explore Les Ecrins and Queyras, two parks southeast of Grenoble. In the repose of early autumn, these adjacent preserves offer the hiker contrasting terrain, ranging from 13,000-foot peaks and dazzling glaciers of the high Alps to lush, sun-drenched meadows of the lower, Mediterranean-influenced elevations. We'll have some layover days, hiking options, and time to seek the Sierra Club plaque marking our early '70s visit to this fabled region.

[88695] Biking in Denmark—September 4-17. *Leader, Len Lewis, 140 Stacey Lane, Grass Valley, CA 95945. Cost: TBA.* Denmark is a biker's paradise: 23,000 miles of bike paths and the highest point in the country is only 500 feet above sea level. Our route will take us from Copenhagen across the island of Zeeland, then by ferry to the island of Fyn, north through Jutland, and back by ferry to Zeeland and Copenhagen. There we will visit the famous Tivoli Gardens and climb the Round Tower for a great view of the city. Among the highlights of our trip will be the beautiful lake country of Viborg and Elsinore of Shakespeare's *Hamlet*. This is an easy to moderate trip for the young at heart.

[88710] Hiking Tour of the Austrian Alps—September 21-30. *Leader, Len Lewis, 140 Stacey Ln., Grass Valley, CA 95945. Cost: TBA.* This will be a ten-day, moderate hike in the Vorarlberg area of western Austria. We'll be hiking from one picturesque village to the next, and we'll stay overnight in small guesthouses or *pensions*, where we will enjoy the renowned Austrian *gemütlichkeit*. Our luggage will be transported each day to the next stop so that you will only need to carry the items needed for the day. Leader approval required.

Latin America

[88531] Sea Kayaking in Baja California, Mexico—December 19-26, 1987. *Leader, Mark Larson, 1265 Grant Ave., Arcata, CA 95523. Cost: $780.* Kayak the Sea of Cortez along the Baja Peninsula between La Paz and Loreto, visiting offshore islands, isolated beaches, and remote *ranchos*. Opportunities for hiking, beachcombing, birdwatching, and exploring abound. We will paddle along Espíritu Santo Island, dotted with deep coves and sandy beaches for camping. Snorkeling is excellent here, and the trip includes a day to do so at a sea-lion rookery. The trip is designed for beginning as well as experienced paddlers. Expert instruction will be given, and we will be accompanied by a safety support boat. This trip offers an ideal experience with the sea kayak, unique in its agility and closeness to the sea.

[88532] Magdalena Bay Sea Kayaking, Baja California, Mexico—February 20-27. *Leader, Carol Dienger, 3145 Bandera Dr., Palo Alto, CA 94304. Cost: $780.* Few methods of travel allow a more intimate bond with nature than kayaking. Journey with us on the narrow waterways of tranquil Magdalena Bay. This is the winter home for hundreds of California gray whales. To these protected inner waters the whales come each year to mate and to bear their young. We'll also be able to see a wide variety of migrating shore and sea birds as we paddle through miles of mangrove-lined channels. On the barrier island, huge rolling barchan dunes await exploration, and miles of uninhabited shore are a paradise for the beachcomber. The trip is designed for inexperienced to expert paddlers. Instruction will be given, and a support boat will accompany us to carry duffel, food, and fresh water. The trip begins and ends in La Paz.

[88533] Belize: Reef and Ruins, Central America—February 20-29. *Leader, Wilbur Mills , 3020 N.W 60th St., Seattle, WA 98107. Cost: $1,070.* The longest barrier reef in Central America, an amazing variety of birds and wildlife, and mysterious Mayan ruins—we will explore these and more in Belize! Using a rustic ranch as our base, we'll spend several days in Belize's lush interior, exploring limestone caves, a jungle river, and local ruins. One highlight will be an overnight visit to the magnificent Mayan ruins of Tikal in neighboring Guatemala. Then we'll move to the Caribbean coast and a palm-studded island adjacent to the barrier reef. We'll stay at a small guesthouse on the beach, snorkel in crystal-clear, 80-degree water, and feast on fresh seafood.

[88550] Exotic Highland and Lowland Parks of Costa Rica—March 27-April 2. *Leader, J. Victor Monke, 9033 Wilshire Blvd., Suite 403, Beverly Hills, CA 90211. Cost: TBA.* Come explore the incredibly diverse flora and fauna of Costa Rica in the company of expert naturalist guides. In the highlands, we'll visit Poas Volcano's moonscape peak with its mile deep and wide active caldera. We'll also go to

adjacent Emerald Lake and the Monte Verde Cloud Forest, the habitat of 2,330 species of plants, birds, and mammals. In the lowlands, we'll visit the Palo Verde Refuge, which is a sort of intercontinental hotel for migratory fowl, and historic Santa Rosa, abundant with wildlife. It's springtime every day in Costa Rica. Come and enjoy this exotic and beautiful country.

[88553] Sea of Cortez Kayaking, Baja California, Mexico—April 2-9. *Leader, Harry Neal, 25015 Mt. Charlie Rd., Los Gatos, CA 95030. Cost: $780.* Espiritu Santo and Partida Islands lie off the Gulf Coast north of La Paz. Explore sandy coves and inlets (excellent fishing and snorkeling), hidden canyons, fascinating geology, and spectacular desert vegetation. Spend a day snorkeling at Los Islotes (a sea-lion rookery). The trip is designed for inexperienced to expert paddlers. Instruction will be given, and a support boat will accompany us to carry duffel, food, and fresh water. The trip begins and ends in La Paz.

[88565] River Rafting, Jungle and Beach Adventure, Costa Rica—April 23-30. *Leader, Ruth Dyche, 2747 Kring Dr., San Jose, CA 95125. Cost: $1,255.* This one-week adventure provides a variety of fascinating activities and environments. We will begin with three exciting days of paddle rafting on the Rio Pacuare River with a professional river guide. We will experience the thrills of whitewater and the serene beauty of deep river canyons, jungle beaches, clear pools and spectacular waterfalls. A short flight will then take us to Manuel Antonion National Park, one of Costa Rica's most beautiful areas where jungle and beach intersect. A large variety of birds and wildlife can be seen on jungle hikes. The beach offers swimming, body surfing, and snorkeling. Marine life abounds. There will be two days in the historic city of San Jose, and optional tours will be available for further exploration.

[88610] Tawantinsuyo: "The Four Quarters of the World," Bolivia and Peru—June 4-27. *Leader, Jerry Clegg, 9910 Mills College, Oakland, CA 94613. Cost: $2,570.* By plane, boat, train, and on foot, this ambitious outing will take you through all four ecological zones of one of the world's great scenic areas. It starts on the *altiplano* of Bolivia east of Lake Titicaca at La Paz, winds through the ice peaks of the Vilcabamba range to reach Machu Picchu in eastern Peru, delves into the Amazonian rainforest, and comes to a close on the coastal desert of the Pacific at Lima. En route you will come to know the world's highest capital city, its highest navigable lake, and its highest rail line. You will make sturdy friends, hike to 15,000 feet, see unfamiliar stars, wander about imposing ruins and vast markets, and have an extraordinary time in the extraordinary remains the Incas called Tawantinsuyo.

Chinchero, Peru

[88620] Peru-Bolivia Adventure—June 20-July 10. *Leader, Chuck Schultz, 1024-C Los Gamos, San Rafael, CA 94903. Cost: $2,540.* Peru, at the heart of the Inca Empire, and Bolivia, a bit off the beaten path, both offer high Andes adventure. After a visit to Lima, we'll go to Cuzco, gateway to the Urubamba Valley and Machu Picchu. We have five days in the Cuzco-Pissac-Machu Picchu area. Then a glorious train ride across the *altiplano* brings us to Lake Titicaca, home of the Uros Indians and site of the austere *chulpas* of Sillustrani. Crossing into Bolivia, we visit the Callawayas (known for their herbal healing) before beginning our five-day trek in the Cordillera Apolobamba. Our journey takes us to isolated hamlets, to Inca mines, and over glacier-guarded passes. Trek elevations range from 12,000 to 16,000 feet. At trek's end we're off to La Paz (seeing *vicuñas* along the way) for R&R and a brief visit to Tiahuanaco before ending the trip.

Middle East

[88995] Exploring Israel—March 3-29. *Leader, Ray Des Camp, 510 Tyndall St., Los Altos, CA 94022. Cost: TBA.* Our trip through Israel will give us an intimate view of this tiny land—its people, its landscapes, and its political, religious, and natural history. Driving, hiking, camel trekking, and flying will allow us the broadest possible exploration of the country. Our itinerary will include the coastal area and the headwaters of the Jordan in Galilee to the north, through the Judaean Desert and the Negev to Elath, the Gulf of Aqaba, and the Sinai to the south. We'll travel with an English-speaking Israeli guide to a crusader castle, a Druze village, Jericho, Qumran, Ein Gedi, Masada, and the Dead Sea. We'll sample kibbutz life; visit the monastery of St. Catherine, where we'll climb Jabal Musa (Mt. Sinai); swim in the Gulf of Aqaba; and explore and enjoy Jerusalem. While on tour we'll stay overnight in hotels and kibbutzim, or camp out.

[88675] Taurus Mountains, Mt. Ararat, Turkey—August 13-September 3. *Leader, Bob Miller, 11713 N.E. 150th Pl., Bothell, WA 98011. Cost: $2,580.* Turkey has a number of very rugged mountain chains, among them the Taurus Mountains, a limestone

group on the southern coast, which are made up of a complex system of spires, peaks, and ridges of almost mystical beauty. Our trek through the spectacular scenery of the Aladaglar region of the Taurus Mountains takes us not only close to the three highest peaks but also into areas seldom visited except by nomads, who use the remote canyons and high valleys for pasture during the summer. After our trek into the Taurus Mountains, we'll climb Mt. Ararat (16,800 feet), establishing two base camps on the way. The ascent to any level is optional; the vistas from any elevation are worth the effort. In addition to our trekking, we will visit Ankara, Cappadocia, and Istanbul.

Pacific Basin

[88512] Summertime Trek in the National Parks, Australia and Tasmania—December 15,1987-January 2,1988. *Leader, Pete Nelson, 5906 Dirac St., San Diego, CA 92122. Cost: $2,340.* On this trip we will explore three scenic national parks. Tasmania's Cradle Mountain-Lake St. Clair National Park has high peaks, deep gorges, and alpine meadows. From a base camp we have a choice of walks and ascents; to Mt. Ossa (5,305 feet), Pelion Gap, Mt. Oakleigh, and down the Zig Zag track. On Kangaroo Island we travel by camel through spectacular Flinders Chase National Park where we'll camp. We should be able to see a variety of wildlife, including koalas, eagles, and penguins, as well as whales spouting offshore. At Kosciusko National Park in Australia's Snowy Mountains, we will hike between lodges, enjoying wildflowers and grand vistas. There will be an optional walk up Mt. Kosciusko (7,316 feet), the continent's highest. Camping gear is furnished.

[88535] Wander Down Under, New Zealand—February 24-March 18. *Leader, Vicky Hoover, 735 Geary St., Apt. 501, San Francisco, CA 94109. Cost: $2,055.* The spectacular and varied scenery and friendly people of New Zealand make for thrilling, joyous traveling. Optimum value for your 24-day tour is provided by alternating the intensive experience of three separate, four-day segments of backpacking with extensive intervals of car-camping. We'll visit both North and South islands for this faraway paradise of snowy mountains, deep-cut fjords and lakes, lush rainforests, unspoiled beaches, and unique native birds. The Milford Track will be one of our tramping ventures.

[88555] North Island Bike Tour, New Zealand—April 10-23. *Leader, Don Lackowski, 2483 Caminito Venido, San Diego, CA 92107. Cost: $2,315.* This moderate bicycle tour of two of New Zealand's most scenic and historic areas, the Volcanic Plateau and East Cape regions of North Island, features mountain lakes and sea shores, hot springs, world-class trout fishing, and Maori culture. Comfortable motel accommodations, meals served in dining facilities, and a van to carry our luggage are included. Ample free time is also provided.

[88685] Australia's Northern Territory Wilderness—August 29-September 18. *Leader, Pete Nelson, 5906 Dirac St., San Diego, CA 92122. Cost: $2,160.* This wildlife-oriented safari begins and ends at Alice Springs near the geographical center of Australia. Our travels take us from the desert outback to the ocean at Darwin, with emphasis on tropical river camps. We will explore Kakadu National Park, the Arnhem Land escarpment, the Tanai Desert, outback cattle stations, colorful gorges and chasms, waterfalls, aboriginal rock-art sites, thermal springs, and eucalyptus forests. There will be time for wildlife viewing, swimming, and exploring. We will sleep bushman style under the stars and enjoy quality country fare with Australian wines.

Domestic Winter Trip

[88365] Adirondack Wilderness Ski Tour—January 30-February 5. *Leader, Larry White, RD #2, Tracy Creek Rd., Vestal, NY 13850. Cost: TBA.* With an expert guide, we will do a five-day traverse of the Siamese Ponds Wilderness Area. Our gear will be transported for us each day as we ski in one of the most remote sections of the Adirondack Park in New York State. Accommodations will vary from local inns to remote wilderness log cabins. The route will take us through virgin timber, across frozen lakes, and over a low mountain range. Distances will be eight to ten miles a day. This is a wonderful opportunity for the intermediate skier.

For More Details on Outings

Outings are described more fully in trip supplements, which are available from the Outing Department. Trips vary in size, cost, and the physical stamina and experience required. New members may have difficulty judging which trip is best suited to their own abilities and interests. Don't sign up for the wrong one! Ask for the trip supplement before you make your reservations, saving yourself the cost and inconvenience of changing or canceling a reservation. The first three supplements are free. Please enclose 50 cents apiece for extras. Write or phone the trip leader if any further questions remain.

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A Tale of Two Brothers

In Condor Country
by David Darlington
Houghton Mifflin, 1987. $15.95, cloth.

Tom Turner

AT AROUND 10 A.M. on Easter Sunday, as millions celebrated the renewal of life, the California condor became extinct in the wild. The last free bird, known to the Condor Recovery Team as AC-9, was snared in a cannon net and whisked away to join the other 27 surviving condors housed in the Los Angeles and San Diego zoos. Pete Bloom, the biologist who finally caught AC-9 after a chase that lasted nine months, admitted: "You look over the area of their last stronghold and feel awful hollow in a way, even though it's not like we don't have a good population in the zoos for breeding."

Indeed: You could almost hear Eben McMillan's howl of indignation.

Eben and his brother Ian—the main characters in *In Condor Country*—have lived in the great bird's domain all their 80-odd years, and they know it as intimately as anyone. They consider the captive-breeding experiment for condors that led to incarceration of the entire wild flock a dangerous gamble. [For more on the debate see "Too Late for the Condor?" January/February 1986.]

The McMillans' forebears—of the same line that produced the McMillan publishing house and British Prime Minister Harold—moved to south-central California in the mid-1800s. That was when that land was first put to the plow, and the early harvests were so heavy that plants collapsed of their own weight. But farmers wrenched too much from the land too fast, and it soon became difficult to raise profitable crops. Many farmers left. Eben, in retrospect, takes some of the blame for the deterioration of the land there, the gaping erosion scars that are a product of overenthusiastic agriculture.

Still, a stark and wonderful beauty remained. So did the McMillans.

Though both brothers dropped out of school after the ninth grade, they are accomplished naturalists and have conducted rigorous biological studies—mainly of condors—for the National Geographic Society, the National Audubon Society, and others. Theirs is a homespun sort of science, and neither Ian nor Eben is chary of drawing conclusions from his observations. "All of our problems are the result of our intelligence," says Eben. "Out of the houses of higher learning are coming the people who pollute the air and poison the soil. I think the animals that have been most successful in evolution have all been pretty dumb—reptiles, ants, bees."

The McMillans are central to *In Condor Country*, but they are by no means the only subjects, and neither are the condors. In fact, David Darlington has pulled off quite a feat in this book. The story line flits like a butterfly and weaves like a snake, back and forth in time, here and there in focus. It reads easily, is always interesting and entertaining, never bogs down.

Darlington is a gifted journalist, and he knows how to tell several stories at once. Woven in with the profile of the McMillans is a revealing history—both human and natural—of middle California. It's a story of how and why the state came to be infested so abundantly with eucalyptus trees of several varieties and of the disastrous effect on the ecosystem caused by the introduction of exotic plants and animals; how the Diablo Canyon nuclear power plant wound up where it is despite years of debate, protest, and lawsuits; profiles of the late condor biologist Karl Koford and Audubon Society founder George Bird Grinnell; and much more.

But in the end it is the McMillan brothers and *Gymnogyps californianus* that hold the book together. The McMillans fought the good fight against the captive-breeding proposals and

Utah Wildlands
by Stewart Aitchison
Utah Geographic Series
Box 8325, Salt Lake City, UT 84108
$24.95 cloth, $15.95 paper.

Sunset over Bull Pasture in the vast slickrock wilderness of the Dirty Devil River canyon, where petroglyphs remind wandering hikers of an ancient way of life. Utah conservationists are working to protect 250,000 acres of BLM-managed wildlands within the Dirty Devil canyon system, but face opposition from resource developers who would exploit the area for its uranium and tar-sand deposits.

lost. Now we must hope that the program will succeed, and that captive-bred condors released to the wild (should their habitat somehow be preserved) will still know how to be condors.

And we must hope for one more thing: that there will be McMillans to greet the birds on their return to condor country. The one is every bit as important as the other.

TOM TURNER *is staff writer for the Sierra Club Legal Defense Fund.*

Eight Satans, No Waitin'

Going Nuclear
by Leonard S. Spector
Ballinger, 1987. $29.95 cloth, $9.95 paper.

Ellen Winchester

KEEPING TRACK of proliferating nuclear arms is not easy even for arms specialists. Environmental generalists are so overwhelmed by the multifarious threats confronting our planet that they particularly need help to understand the one threat that, if unchecked, could render all the rest irrelevant. That help is at hand in *Going Nuclear*, the third volume in an annual series (the Carnegie Endowment Books) devoted to the spread of nuclear weapons. Its author, Leonard S. Spector, is currently director of the Nuclear Nonproliferation Project at the Roosevelt Center for American Policy Studies.

While the nuclear jousting of the two "great Satans" gets all the media attention, Spector reports that nations other than the United States and U.S.S.R. are quietly engaging in smaller, regional nuclear arms races. Complicating the danger is the habit of the two primary contestants of giving greater weight to immediate gains for one side or the other than to securing leverage against proliferation.

The nuclear arms race between India and Pakistan is a case in point. The two countries have fought several major conventional wars since their independence in 1948. Recently, Pakistan's President Zia publicized his country's clandestine nuclear progress (what some have called "the worst-kept secret in Asia") by flatly declaring that Pakistan can build a bomb whenever it wishes. India, though possessed of far more sophisticated nuclear capacity, maintains a public policy of pursuing international nuclear disarmament. But as tensions on the subcontinent rise, Spector believes the risk of a change in Indian policy—and hence a nuclear confrontation—is very high.

While India looks to the United States to limit Pakistan's nuclear provocation, the U.S. worries about offending its conduit of arms to Afghan guerrillas and the host to Afghanistan's millions of refugees. American assistance to any nation acquiring unsafeguarded nuclear-enrichment technology is prohibited by law, but for the last seven years that law has been waived to permit billions in aid to go to Pakistan.

ROD MILLAR

Similar difficulties confront activists hoping to expand Utah's federally protected wilderness areas, not just on the Colorado Plateau but around the state.

This colorful book is the third in the Utah Geographic Series. (Several of its 360-degree panoramic photographs, like the one above, were taken with a Model 120 Hulcherama camera.) The detailed text and more than 90 photographs celebrate the state's 15 existing wilderness areas and show why so many other outstanding wild places are deserving of preservation. ■

Nonproliferation's only defender in Congress this time around seems to be Sen. John Glenn (D-Ohio), who insists aid should cease if the President cannot certify that Pakistan does not possess a nuclear device and that it has stopped producing weapons-grade nuclear material. Neither India nor Pakistan is signatory to the Nuclear Nonproliferation Treaty, which would bring International Atomic Energy Agency (IAEA) inspection and safeguards to all their nuclear facilities. (Also nonsignatories to this treaty are the other emerging nuclear states: Israel, South Africa, Brazil, and Argentina.)

Now that Pakistan has admitted what all the world suspected, another shoe has still to drop. In June 1986 the U.S.S.R. warned Pakistan, its southern neighbor, against developing nuclear weapons. Spector suggests the Soviets might respond to Zia's achievement by taking out the Kahuta enrichment plant with an air strike, the way Israel disposed of the Osiraq research reactor in Iraq. Anything of the sort would not play well in the United States.

Israel's nuclear developments are also acutely troubling. It has become a sixth nuclear power without protest from the United States. Spector believes Israel may possess more than a hundred bombs, some of which may employ a fusion booster. Since no testing has been reported, Israel presumably has relied on computer simulations rather than bomb testing, a development with sinister implications for arms monitoring. It also has deployed short-range Jericho II missiles capable of carrying nuclear warheads. At a time when Syria seems virtually to be annexing Lebanon, provocations for preemptive Israeli adventures may arise in the near future.

The rest of the Middle East does not yet appear to have nuclear-weapons capability. Khadafi's bizarre deals have not panned out, and although Khomeini inherited an extensive nuclear infrastructure from the Shah, the financial drain of the war with Iraq seems thus far to have prevented Iran from following the Pakistani example. But if the war continues much longer, Khomeini might squeeze out the necessary funds for nuclear weapons development.

The problem of nuclear inheritance, a

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dreadful estate handed down from one regime to another (already illustrated by Iran), is a particular theme of *Going Nuclear*. We may witness the phenomenon soon in India and Pakistan, where insurgencies threaten the existing governments. In South America, with democratic governments established in both Brazil and Argentina, nuclear rivalry has eased for the moment. The two countries have even negotiated a mutual inspection agreement. However, both have extensive nuclear capabilities and ambitions, and both consider IAEA safeguards an intrusion on national sovereignty, an attitude that has hardened over the years, according to Spector. And both have growing political unrest, with military men peering suspiciously over the shoulders of civilian presidents.

In South Africa, where radicals of either the right or the left, white or black, could seize power in the apparently inevitable chaos ahead, 15 nuclear weapons are presently available for misuse, Spector theorizes. South Africa has abundant uranium supplies and unsafeguarded enrichment plants that provide it with weapons material. It also has several kinds of combat aircraft capable of delivering the weapons.

A reader of this book who skips the final chapter, "Controls and Safeguards," will be left with the notion that IAEA safeguards are a fail-safe mechanism for preventing nuclear wrongdoing. Sadly, as Spector ultimately makes clear, a kind of iron law of regulation prevails here as elsewhere: The budget is never sufficient for an inspection force large enough to achieve the purpose of the regulation. For political reasons, unannounced inspections are seldom possible. Prosecutions are few, and guilty hands are scarcely slapped.

Spector points out that so far neither nuclear weapons nor the material required to make them appear to be obtainable in the clandestine nuclear marketplace—so the IAEA must be doing something right. But the growing stockpiles of plutonium and enriched uranium behind doors closed to inspection make clear that merely guarding peaceful nuclear materials against diversion is not enough. It seems very likely that only renunciation of nuclear arms by the big powers—and their insistence

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Stalking the Wild Wyethia—Wildflower Seminar (7/24-26)
Clair Tappan Family Week* (7/29-8/4)

August

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that everybody else do likewise—will end the danger of smaller nations dragging bigger ones into unanticipated nuclear confrontations. In shaping the political decisions that could make this happen, alert environmentalists can make a difference.

ELLEN WINCHESTER *advises the Sierra Club's Committee on the Environmental Impacts of Warfare on proliferation issues.*

BRIEFLY NOTED

If you'd like to introduce your children to hiking, horse packing, cross-country skiing, canoeing, or trekking, Barbara J. Euser's ***Take 'em Along*** is for you. This mother of two daughters was an instructor at the Colorado Outward Bound School for five years, and her book is full of helpful hints for sharing the wilderness with your kids. It's $11.95 in paper from Cordillera Press (P.O. Box 3699, Evergreen CO 80439). . . . In the same spirit, ***Utah! A Family Travel Guide***, new from Wasatch Publishers (4647 Idlewild Road, Salt Lake City, UT 84124; $8.50 ppd.), is a nearly complete travel planner for the family with two days or two months to spend in this fabulous region of deserts, mountains, and canyonlands. . . . A third edition of Jeffrey P. Schaffer's definitive trail and natural-history guide to ***The Tahoe Sierra*** is now available from Wilderness Press ($15.95, paper). New listings include route information on the Tahoe Rim Trail (now under construction; see page 79 of this issue). . . . John McKinney describes 75 hikes between Santa Barbara and the Mexican Border in his ***Day Hiker's Guide to Southern California*** ($10.95 + $2 tax and shipping from Olympus Press, P.O. Box 2397, Santa Barbara, CA 93120). . . . ***The Earth Is Our Mother***, by Dolan H. Eargle, Jr., offers the reader both a history of California's Native Americans and a travel and study guide to reservations, museums, and historic sites. The book is $11.95 + 95 cents shipping from Trees Company Press (49 Van Buren Way, San Francisco, CA 94131). . . . Peter Wild has produced the second volume in his series on seminal American conservation leaders, ***Pioneer Conservationists of Eastern America*** ($14.95 from Mountain Press Publishing Co., P.O. Box 2399, Missoula, MT 59806). ■

The Master Trailbuilder of Lake Tahoe

John Patrick Jeffries

"LET ME SEE your hands," demands Bill Tisher of an unsuspecting visitor to his Lake Tahoe home. "Yeah, we have a tool that'll fit you," he says, laughing only half in jest.

"We have a tool to fit every hand" is the motto of the Tahoe Rim Trail Fund (TRTF). Tisher, president of the nonprofit organization for the past three years, should know. For most of this decade, Tisher has led the effort to construct a 150-mile-long ridgetop trail around this picturesque lake high in the Sierra Nevada. Scheduled for completion in 1990, the trail will permit hikers, backpackers, and equestrians to circumnavigate the Lake Tahoe basin.

Under Tisher's leadership, the TRTF has grown from a small committee of dreamers and volunteers into a well-structured organization with more than 1,500 members, including 350 volunteers who have actually worked on the trail. He's spoken to groups across the country and written with eloquence and humor to drum up support for the massive project. Thanks partly to his efforts, total donations since 1981 now run well into six figures.

At a broad-shouldered six foot six, the 67-year-old Tisher commands immediate attention. Pale blue-green eyes look out from beneath thick, high-arching eyebrows. As he talks—a forceful, raspy tenor—his powerful, long hands move about animatedly. On his left hand, he wears a gold and lapis lazuli ring shaped like Lake Tahoe.

Tisher grew up in Bangor, Calif., near the rugged Sierra gold country. "I always loved the outdoors. Of course, that's all there was," he muses. He learned to hunt, fish, and ride as a youth. After attending nearby Chico State (he starred on the college's championship basketball team), Tisher worked in the Bunker Hill gold mine, pushing ore cars—sometimes two at once—up and down the line.

In the mid-1930s Tisher joined Idaho's Fish and Game Department. A Forest Service job brought him to Lake Tahoe in 1955. An accomplished outdoorsman, he later was hired at a local sporting-goods store.

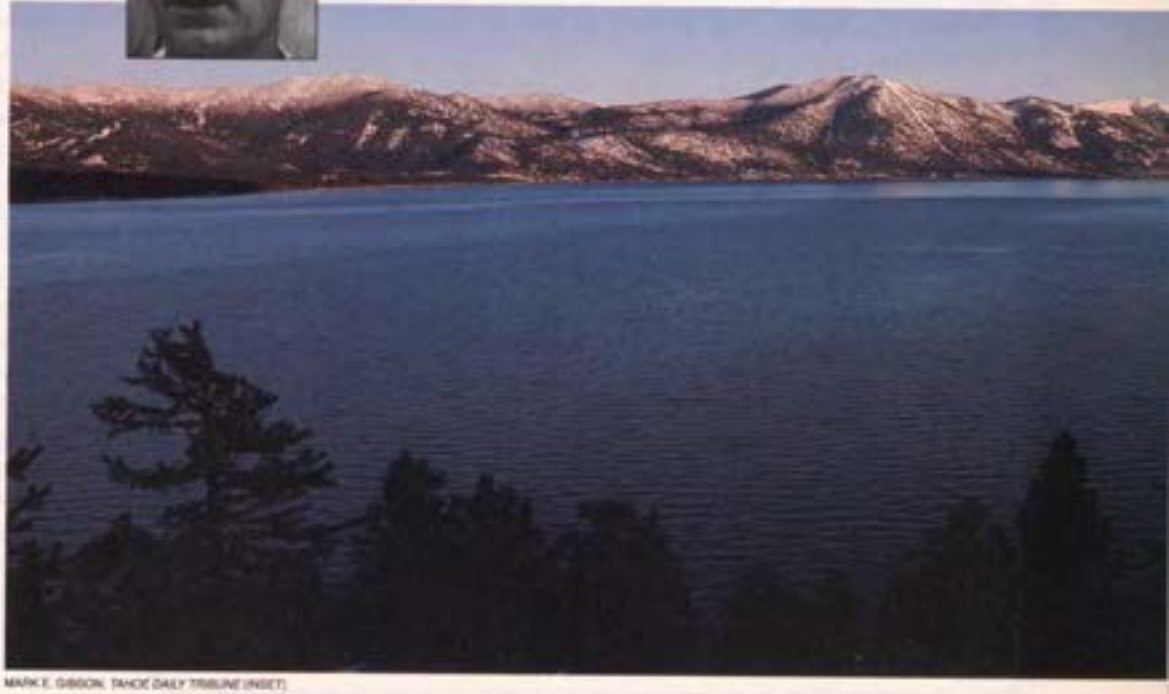
"That's when I first started writing," Tisher recalls. He began by producing a series of short articles and booklets for the store, then graduated to writing outdoor columns for the *Tahoe Daily Tribune* and the Oakland, Calif., *Tribune*. Among other things, Tisher is an expert on high-elevation gardening.

Then, in 1980, Glenn Hampton, recreation officer for the U.S. Forest Service's Lake Tahoe Basin Management Unit, approached Tisher with an idea: to build a continuous trail around the lake, sturdy enough for both hikers and equestrians to use. Tisher loved it. "I just about jumped out of my shoes," he wrote in the January 9, 1981, issue of the *Tahoe Daily*, presenting the idea to the public for the first time.

Tahoe is a patchwork—some might even say a crazy quilt—of competing jurisdictions and special interests; of different states, counties, parklands, wilderness areas, and small communities; of shops, chalets, and casinos. Its geological history is also diverse—showing signs of volcanic explosion, granitic uplift, glacial erosion, and more.

The Rim Trail will knit together these disparate elements. At present, some 500 miles of trails poke and prod around

"We have new enthusiasm, new direction, new challenges. If I sound delighted and excited, you are absolutely correct."



A 150-mile-long ridgetop trail will knit together Lake Tahoe's diverse and spectacular scenery.

MARK E. GIBSON, TAHOE DAILY TRIBUNE (INSET)

the lake and reach back into the mountains that encircle it. The TRT will link many of the major peaks of the Tahoe basin along a single path. It will include stretches of wheelchair-accessible trail and have seven trailheads with parking, display maps, free educational pamphlets, and rest rooms.

Roughly 50 miles of the Pacific Crest Trail are incorporated into the planned route (see map), but the remaining 100 miles will be new. To date about one quarter of the work has been done by volunteers.

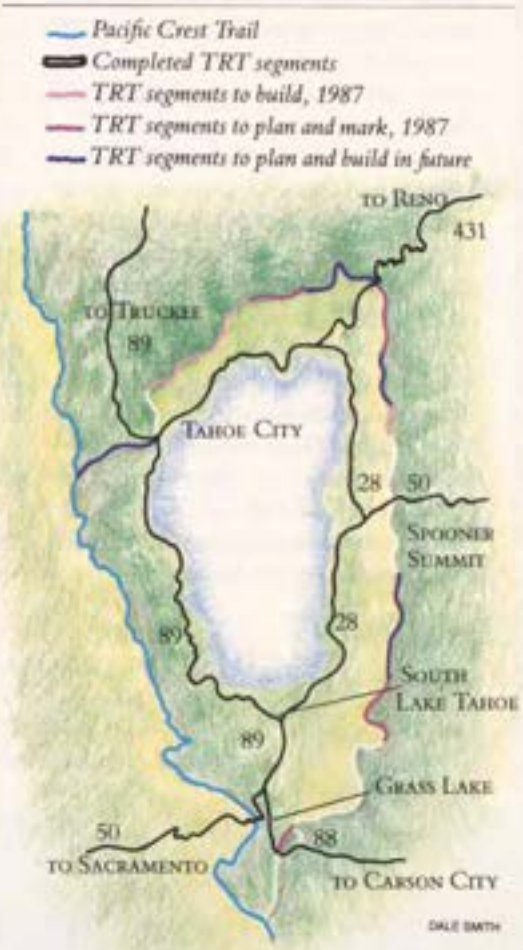
"There was no money available from the Forest Service or other agencies to do this," reflects Hampton, "so it had to be an all-volunteer effort. A lot of people thought it could never be done."

In 1981, Hampton formed a board of directors, including Tisher, to seek support. The fledgling organization established a trail route and guidelines for marking, evaluating, and building the pathway. Because the proposed trail would be used both by hikers and by horsemen, and would pass through some private property, the TRT had to be especially well planned and executed. Before any trail work actually began, however, Hampton retired from the Forest Service in 1983 and moved to New York. He nominated Tisher to succeed him as the TRTF's president.

"When I stepped in, we had a loose network of very energetic volunteers—a spectrum of talented folks from wilderness managers to local businessmen," Tisher recalls, "but nearly all of them had full-time jobs. It was clear that we needed at least one permanent coordinator on board and a solid organizational structure to steer the project."

In the first "formal" season of work—the summer of 1984—Tisher did the groundbreaking honors at a July ceremony. But only a couple of miles of trail around Grass Lake, just southeast of Tahoe proper, were actually completed that summer. "We made a number of mistakes that year," admits Tisher. "But as we staggered along, we got smarter, better. And holy sufferin' catfish, all along we've just had some outstanding people working their tails off for us."

Two developments helped the volunteers' productivity significantly. First, Vicki Raucci, a former board member of the Tahoe Regional Planning Agency, joined the effort. An environmental studies and planning expert with wide experience in parks management, she soon became the TRT's full-time project manager. With Tisher, Raucci put the organizational structure in place. (She and a part-time secretary are the only salaried personnel.) Second, Tisher's efforts to spread the word began paying off in print and TV coverage; slowly, cash and people trickled in.



Field work was divided into three regions that will eventually be linked: Grass Lake; Spooner Summit, the high point of U.S. Highway 50's ascent into Nevada's Carson Range; and Tahoe City, on the west shore of the lake. Tisher established area coordinators in these regions, which offer major entry points to the basin. "We wanted to make access easier, or closer, for people coming in to work," he explains.

The organization of the group was impressive—so much so that the Forest Service now offers it as a model for volunteer groups in other states. With Raucci, Tisher wrote the *Tahoe Rim Trail Volunteer Handbook*, a catalog of job descriptions and responsibilities that serves as an operational guide. A questionnaire given to new volunteers helps identify their interests. The information is then analyzed, distributed to the "action committee" heads, and recorded on a newly installed computer system. The project requires tremendous amounts of phone-calling and follow-up mail to keep it moving, especially during the "non-working" winter months. The TRT's off-beat newsletter, *Trail Blazer*, has proven to be an excellent communication tool.

To bring in cash and new volunteers, the TRTF sells annual memberships. (If you'd like to join or contribute in some way, write or call the TRTF, P.O. Box 10156, South Lake Tahoe, CA 95731; [916] 577-0676.) It also sponsors fundraising events to increase awareness of the project. Last summer, a "Funfest" in Squaw Valley included a ten-kilometer run, balloon rides, auctions, a raffle, and a host of games. The day's events raised $9,000. The sale of T-shirts, bumper stickers, even Rim Trail belt buckles—like the one Tisher always wears—helps fill the coffers.

Most significant, however, are a handful of special programs introduced in 1986. In the "adopt-a-mile" program, members pledge money or labor for a minimum one-mile stretch of the trail each year. A labor pledge can be for construction or for upkeep once the trail is built. So far, more people have pledged to maintain miles than there are miles available.

Cash contributions can be made via three other programs: "Contributors," for the general fund; "Gifts," for a specific purpose (such as computer supplies or trailhead facilities); and "Memorials." Raucci says several corporations have contributed, including Chevron, REI, and The North Face, among others.

Always busy, Tisher writes his hard-charging editorials, leads board or

membership meetings, and gives testimonials on the road, then cuts and paints stakes and hauls them up to mark trail segments in all three regions. He's spent days reviewing the trail's environmental impact with the Tahoe Regional Planning Agency, the Forest Service, and other agency representatives, getting the necessary approvals before actual work can begin. Where the trail as planned will cross private property, Tisher or his designate has to negotiate with the landowners, who for the most part have been cooperative.

Tisher tries to spend some time with the work parties, studying the trail-construction guide to ensure that the route is built to proper specifications. Work-party leaders direct crews of from two to 25 people, ranging in age from under 10 to over 60. They have to keep the crews moving but happy, check the work, and watch out for trouble. The trail-building season runs roughly from May through October, depending on snow, and a typical work day lasts from 8 a.m. to 4 p.m. When possible, back-to-back work days are scheduled, often on weekends. Tisher has also labored to smooth out any ruffled feathers along the way and to keep the TRT out of Tahoe's often bitter political and environmental conflicts.

"Bill has one interest in all of this: getting the trail built," states the project's founder, Glenn Hampton. "He'd like nothing better than for everyone possible—especially in the basin—to share in creating it, share in using it. The last person he's in it for is himself. In that sense, he's a driving force for unity, and that alone makes him special."

With 24 miles built so far, can the remaining 76 miles be finished by the 1990 target date? "It'll be tough," Tisher says. In 1985 he announced a goal of 20 miles for the trail-building season; his enthusiasm admittedly got the better of him. In 1986 he set his sights on a more realistic 15 miles—and nearly 12 miles were completed.

Despite that success, last year was a trying one for Tisher. He'd planned to resign after his second year as president, but a number of loose ends and the encouragement of key board members convinced him to stay on for a third term. He was then confronted with in-

ternal problems. A faction of the board and membership felt that a multiuse trail was inappropriate; they wanted a separate trail for equestrians.

"It was, in effect, a takeover attempt by a certain clique," comments Raucci. "The focus was the question of one trail or two, but the split went beyond that into issues of management and philosophy. Some people, for example, wanted *everything* to be donated, with no cash involved."

The debate was acrimonious, but a final vote of the membership this past winter reaffirmed the original multiuse concept. "Those people tried, and they lost," Tisher reflects on the battle, "and they've gone away. But they're all welcome back, provided they continue within the framework that's been established to meet our original goals."

In the end the flap produced a more unified core group, a more cohesive board of directors, and more motivated committees. A new hotline phone number will allow volunteers to obtain work-schedule information more conveniently. In early August, a week-long horse trip will take up to 25 workers into remote backcountry. "It'll be like a fancy pack trip," Tisher projects, "with snacks throughout the day for the workers and a real fine dinner every night."

Now approaching 70, Tisher is finally slowing down. This spring he and his wife of 40 years, Vivian, bought 17 acres outside of Salem, Ore., and Tisher stepped down as president of the TRTF. "There's lots of unfinished work, but the effort is in good hands," Tisher says. His successor is John Richardson, administrator of the Nevada Division of State Parks in Carson City, and until now Tisher's membership committee leader.

When asked how he feels about moving on, Tisher looks out the window and smiles, albeit a little sadly. "I'll truly miss this place," he says. "I've lived here nearly half my life. But I feel gratified. Down around Echo Summit there's a segment of the Crest Trail that I built, oh, 31 years ago that's going to be part of the Rim Trail. That's nice, isn't it?" ■

JOHN PATRICK JEFFRIES, *a freelance writer in San Francisco, wrote "The New Alchemy of Photovoltaics" for* Sierra*'s November/December 1983 issue.*

HALSTEAD HANNAH

A Budding Prairie Preserve

OSAGE COUNTY, OKLA.

THE TALLGRASS PRAIRIE seems a mere stepchild to the great American landscapes of forest, desert, seaside, and mountains. Few contemporary outdoor enthusiasts have even bothered to explore it.

Yet those who know the prairie well say it deserves higher esteem. John Madson, author of a natural history entitled *Where the Sky Began*, describes the prairie as a mysterious place with the power to both stir and quiet the soul.

Scientists studying this remnant of America's past offer their own form of high praise. They say the tallgrass, with its 300 bird and 80 mammal species, is one of the most biologically diverse ecosystems on the continent. They also note that the prairie is all but gone: only 3 percent of its original 400,000-square-mile domain remains.

The National Park Service has been discussing prairie preservation since the 1930s. Encouraged by conservationists, the agency now calls acquisition of some tallgrass-prairie acreage one of its highest priorities. The agency envisions a park with a buffalo herd, opportunities for hiking and horseback riding, and exhibits that explain the ecology of the prairie and the history of its cowboy and Indian inhabitants.

Local opposition and political infighting have blocked prairie proposals in the past, but now the politics seem to be changing. More than 100,000 acres of native prairie are up for sale in northeastern Oklahoma's scenic, rolling Osage Hills. These lands lie within what the Park Service has identified as the nation's best remnant of native prairie in a "park-quality" setting.

Another good sign is a joint effort by the Oklahoma congressional delegation and the Park Service to draft plans for a federal "prairie preserve" in the state. The preserve concept, first championed by Oklahoma Sen. Don Nickles (R), does not offer the full park protection conservationists originally had in mind, however. In the Osage Hills preserve status would not eliminate grazing or oil development.

Some national-park advocates have accused the Oklahoma delegation of trying to establish a "national cattle and

oil park." But Oklahoma conservation leaders, who want a proposal that can quickly gain statewide support, currently accept these compromises.

"Because of the willing sellers and the support within the delegation, there is a window of opportunity," says Sierra Club Regional Vice-President David Martinez. (The Club has recently set up an office in Tulsa, Okla., to help volunteers work on the issue.) "We can either establish a preserve now—or these ranches will be sold to private interests."

—Joan Hamilton

The Army's Giant Swampbuster

THE CLARION-LEDGER

The Yazoo Backwater Swamp: Much of this wetland area could be drained and cleared for agricultural development if a massive pumping project wins congressional approval.

THE YAZOO DELTA, MISS.

Floods are a way of life in the Yazoo Backwater Swamp, a remote, heavily timbered corner of Mississippi's mostly agricultural Yazoo Delta. High waters here inundate an average of 80,000 acres every year.

Since the U.S. Army Corps of Engineers began trying to tame the flows in 1941, the flooding danger seems only to have increased. With the swamp's natural drainages blocked by Corps-built levees, a flood in 1979 submerged 348,000 acres and lasted 41 days.

The Corps' latest scheme involves building a giant pump to help drain the swamp, lifting the water over the Corps' levee system, and putting it into the Yazoo River. This elaborate Yazoo Backwater Pumping Plant would cost taxpayers more than $100 million.

Opponents of the project, led by the Mississippi Wildlife Federation, say that building the pump would encourage the clearing and farming of marginal land and destroy valuable waterfowl habitat. The project could also cause a decline in water quality, they argue, because the swamp would no longer filter the region's silty surface water.

Project proponents say the pump is needed to help the area's 750 resident families. The Federation is mindful of those people, too, says Sam King of Jackson, Miss., a member of the group's Yazoo Pump Committee. To help them, the Federation wants the Corps to floodproof or, where owners are agreeable, relocate buildings in the floodplain. Where those alternatives won't work, King says the Corps should buy "flood easements" to compensate landowners whose risk of flood damage has been increased by Corps projects. The Federation also wants the Corps to buy and protect 33,800 acres of woodlands to mitigate the damage caused by the Yazoo levees. The total

cost of this alternative package, King says, would be about one third the cost of the pump.

Anti-pumpers won the first round when Congress passed the 1986 Omnibus Water Projects Bill. The new law requires local authorities to pay one fourth of the cost of all Corps water projects, a burden locals would be unable to bear in this case.

But House Appropriations Committee Chair Jamie Whitten (D-Miss.) introduced a bill this year requiring the Secretary of the Army to consider local requests for exemptions from these cost-sharing requirements. House passage of the measure in April breathed new life into the project. So site preparation for the pump continues, funded by earlier allocations.

Terre Male, director of affiliate services for the Federation, urges continued vigilance on the part of conservationists. "As long as it's not deauthorized by Congress," she warns, "it's not dead."

—Jim McCafferty

Sunken PCBs Taint the Housatonic

WOODS POND, MASS.

The Housatonic River once served as a sewer for western Connecticut and Massachusetts. A frothy, foul-smelling conduit of pollution, it collected wastes from sinks, toilets, paper mills, and factories all along its 153-mile course to Long Island Sound.

In recent years these discharges have been cleaned up, and the river has improved dramatically. Canoeists ride the Housatonic's rapids as fly fishermen pluck large brown trout from its pools, and picnickers grill hot dogs in the grassy parks along its banks.

Only one major task remains in the cleanup of the Housatonic: the removal of PCBs (polychlorinated biphenyls). For decades these long-lasting chemical compounds were used in a General Electric Company transformer-manufacturing plant in Pittsfield, Mass. While the company eliminated PCBs from its manufacturing process in 1977, these chemicals can still be found in the river's sediment. The biggest concentration lies behind a dam downstream from the Pittsfield plant. This site, called Woods Pond, and the riverbed upstream from it contain 250,000 cubic yards—about 20,000 large dump-truck loads—of PCB-tainted sediments.

The health effects of PCBs on humans are unknown, but the compounds have caused liver damage, reproductive disorders, and cancer in laboratory animals. Fish and game officials in Massachusetts and Connecticut advise against eating any fish from the river. Milk from cows that graze on the river's floodplain has also been declared unfit for consumption. In short, the river is not nearly as pure as it looks.

"Ask local residents about the river, and they're likely to grimace, wipe hands on pants, tell stories about fish with tumors, and neighbors who died of cancer," according to a grant proposal written by the Berkshire County Regional Planning Commission.

Public outcry over PCBs has quieted in the past five years as state and federal environmental agencies have studied various ways of solving the Woods Pond sediment problem. General Electric has proposed several solutions, among them dredging, routing the river around the pond in a concrete trench, covering the sediments with a stable mineral cap, and introducing PCB-eating bacteria.

Neil Kingsnorth, national director of Trout Unlimited and a member of its Connecticut Council, has remained patient with the long studies and discussions, saying that "the problem cannot be solved overnight."

George Wislocki, director of the Pittsfield-based Berkshire Natural Resource Council, fears that the number and the complexity of the alternatives will lead to public complacency, however. According to Wislocki, "There has been an unusual amount of foot-shuffling by the state and the EPA." Without prodding from the public, he warns, government agencies are likely to proceed at a snail's pace—or to avoid taking any action at all. *—Judy Fahys*

SIERRA NOTES

The Sierra Club Annual Dinner, held on May 2 at the Hyatt Regency Hotel in San Francisco, featured author Barry Lopez (*Of Wolves and Men, Arctic Dreams*) speaking on preservation of the Arctic National Wildlife Refuge and the California Desert.

Eight categories of honors and awards for 1987 were presented to Sierra Club volunteers, chapters, and groups, as follows:

- The Denny and Ida Wilcher Award (for outstanding work in membership development or fundraising) to the San Gorgonio Chapter for devising a series of new- and prospective-member meetings that resulted in the highest membership increase of any chapter in 1986.
- The Susan E. Miller Awards (honoring exceptional contributions by individual Sierra Club members to chapters) to John J. Kenny, Elden Hughes, and Calvin French.
- Special Service Awards (for strong and consistent commitment to conservation over an extended period of time) to Rose Strickland, Katherine Gregg, and James F. Curtis.
- Special Achievement Awards (for efforts of singular importance to conservation) to the Santa Fe Group of the Rio Grande Chapter, the North Carolina Chapter, and author Barry Lopez.
- The Francis P. Farquhar Award (for contributions to mountaineering) to Lotte Kramer for her lifelong devotion to mountaineering and exploration.
- The Walter Starr Award (honoring the efforts of a former Club Director) to Nathan Clark for continuing to lead with energy, insight, and perseverance.
- The William O. Douglas Award (for contributions in the field of environmental law) to Boyce Brown for more than 15 years of service to the protection of Hawaii's natural environment.
- The William E. Colby Award (the Club's highest award for service to the organization) to Lewis Clark for four decades of outstanding leadership.

Other awards, including the John Muir Award, the Club's highest honor for leadership in national conservation causes, will be presented at the **Second Sierra Club International Assembly** in Vail, Colo., which takes place July 2–5. On-site registration begins July 2 at 8 a.m. in Marriott's Mark Resort in Vail. Fees are $60 for Club members, $90 for nonmembers. Those under 18 may attend free.

The Fourth World Wilderness Congress has slated top Sierra Club representatives as speakers for its eight-day conference this year. The event will run from September 11 to September 18.

Michael McCloskey, Sierra Club Chairman, will be a featured speaker on opening day in Denver. He and the directors of the United Nations Environment Programme and the International Union for the Conservation of Nature will talk about the global wilderness inventory. On September 13, also in Denver, Michael Fischer, the Club's Executive Director, will speak on the commitment of America's nongovernmental organizations to worldwide conservation. The heads of several other major American conservation organizations will participate in this discussion. And on September 16, in Estes Park, Colo., Sierra Club Conservation Director Doug Scott will speak on the evolution of American public education in the conservation movement.

Many other speakers will cover a variety of topics throughout the eight days, and there will be numerous workshops and scientific symposia. Special courses are being offered prior to the congress, and additional cultural programs, scenic tours, and backcountry trips are available. All events are open to the public and will be held either at Currigan Hall in Denver (September 11–13) or at the Y.M.C.A. of the Rockies at Estes Park in Rocky Mountain National Park (September 14–18). For complete details, contact Fourth World Wilderness Congress, International Wilderness Leadership Foundation, Colorado State University, Fort Collins, CO 80523; (303) 491-5804.

The Discovery Channel is now broadcasting Sierra Club public service

announcements—at no cost to the Club. The channel, which broadcasts 18 hours of nature, history, science, and adventure programming to its 16 million subscribers each day, is donating at least 2,190 30-second spots (a commercial value of $876,000) to the Club during the 12-month period that began in mid-June. Each spot will be seen by approximately 150,000 viewers, with a cumulative total of more than 328 million over the year.

Four well-known personalities—Ed Begley, Jr., Lloyd Bridges, Shelley Duvall, and Morgan Fairchild—contributed their time and talents to taping the spots. The Discovery Channel and Platypus Productions, Duvall's own company, absorbed all production costs for the project. They were assisted in their efforts by Joanne Hurley, the Club's Director of Public Affairs, and Bob Hattoy, Southern California Field Representative.

The Western Publications Association honored *Sierra* with three Maggie awards at its annual banquet in Los Angeles on May 15. Maggies are presented each year to the best magazines in the association's consumer and trade divisions on the basis of nominations made by West Coast editors and art directors. *Sierra* won awards in the following consumer categories: Best Regularly Featured Department, Section, or Column ("For Younger Readers"); Best Special Interest Magazine; and, on the basis of the magazine's 1986 editorial and graphic redesign, Most Improved Publication (circulation above 50,000).

The new 1988 Sierra Club Calendars are now available for fundraising. Sierra Club chapters, groups, and activities sections with publications representatives have received sample sets and order forms. For assistance in starting a sales program this fall, contact Alan Weaver, Chapter and Group Sales Manager, Sierra Club, 730 Polk St., San Francisco, CA 94109; (415) 923-5616.

Ghost images in *Sierra*? Jeff Monte and Ted Hubbard found the image of a disembodied face on our May/June 1987 cover. It can be seen on the tree stump in the middle of the field. ■

Summer Is the Electric

WITHOUT WARNING, the stormy summer sky turns ghostly white. Jagged branches connect the earth and clouds in an eerie electric web, then disappear. Seconds later a resounding thunderclap warns you that the storm's center is just a few miles away.

Lightning is one of the most dramatic, dangerous, and yet common of all natural events. About 1,800 thunderstorms take place at any moment throughout the world, and lightning flashes hit Earth a hundred times each second. The humid tropics see more of these storms than any other region of the world. In the United States, Florida gets about 90 thunderstorm days a year, the Plains states about 45, and the West Coast an average of just three. Although thunderstorms are the most common sources, lightning can happen whenever there is tremendous energy in the air: during sandstorms, snowstorms, volcanic eruptions, and even rocket launches and nuclear blasts.

Electrical storms have always mystified people. The ancient Greeks thought lightning was hurled down at them by angry gods. Even back then, though, thinkers such as Socrates suggested that lightning was a natural event that could be explained by science. But it was only 250 years ago, in Philadelphia in 1752, that Benjamin Franklin flew a silk kite into a thunderstorm and drew sparks from a key attached to the kite to his bare knuckles to show that lightning acted just like electricity. After storing some of the lightning's

Season

Lightning is usually caused when wind, raindrops, and ice combine in a thundercloud to concentrate huge amounts of energy. Thunderclouds, called cumulonimbus, are giant weather factories that can be eight miles high and ten miles across. Thunderstorms develop easily in the hot and humid tropics, and in areas where tropical air (such as the moist air in the Gulf of Mexico) rises up to meet cool air (such as air flowing across the Great Plains from Canada). The largest thunderclouds look like huge cauliflowers. They contain millions of gallons of water and are topped by an umbrella of ice crystals. Inside, everything is a wild commotion of energy, with millions of volts of electrical potential.

DOUGLAS E. WALKER/MASTERFILE

Lightning can strike between a cloud and the ground, between clouds, or inside a cloud. Earth-to-cloud flashes are the most powerful and create the loudest thunder. They are examples of the familiar, many-branched fork lightning (above). Horizontal flashes (below) are the most common and the longest. They occur four times more often than vertical flashes, are up to 100 miles long, and appear as either fork lightning or the eerie glow of sheet lightning.

TONY STONE WORLDWIDE / MASTERFILE

DOUGLAS E. WALKER/MASTERFILE

DR. RICHARD E. ORVILLE/S.U.N.Y. ALBANY

A 23-foot-tall tree the instant it was struck by lightning. Lightning creates tremendous temperatures: A flash can reach 30,000 degrees centigrade (54,000 degrees Fahrenheit), five times hotter than the surface of the sun. Its explosive energy heats the air, creating shock waves that we hear as the crash and roar of thunder. You can estimate your distance from a thunderstorm in miles by counting the seconds between the flash and the thunder and dividing the result by five. If the lightning is very close, the thunder sounds like the sharp crack of a gun going off. If you are farther away, you will hear thunder's familiar rumble.

energy in a container called a Leyden jar, he returned to his laboratory and proved that the energy *was* electricity. (Franklin's thundercloud wasn't highly charged. Otherwise, he probably wouldn't have lived to finish his experiment.) Franklin later invented the lightning rod, which protects buildings from damage by carrying lightning's electricity through a cable into the ground.

Lightning is difficult to study because it is one of the fastest of all natural events —and also one of the most unpredictable. Scientists know that lightning is an electrical discharge from a thundercloud, and special cameras and measuring devices have given them a good idea of what happens when lightning strikes, but they still don't fully understand how lightning works.

Surprisingly, Earth plays an active role in the creation of lightning. Our planet normally has a negative electrical charge, but as a thundercloud passes over, the charge of the ground beneath the cloud becomes positive. Like poles on a magnet, the negative charge at the bottom of the thundercloud and the positive charge of the ground are attracted to each other. The earth's charge moves beneath the cloud like a shadow, climbing any tall objects—like a church steeple or a tree—that will bring it closer to the cloud. Millions (sometimes hundreds of millions) of volts of electrical potential develop between the cloud's base and the ground.

When the thundercloud's electrical potential becomes so strong that the air is no longer a good barrier, a spark (called the stepped leader) shoots down from the cloud, creating a jagged electrical "wire." Instantly, a spark from the earth leaps up to meet the downward spark. Together, they create the first lightning stroke, which actually moves from the ground up to the clouds. As the main stroke goes up, its blast lights up the branches made by the original sparks. (That's why we normally think that the main flash moves from the cloud to the earth.) All this can happen

at around 87,000 miles per second—almost half the speed of light. This sequence repeats (typically four times) to create a flickering lightning flash.

There are many quirky variations to lightning. A "bolt from the blue" occurs when a long horizontal flash suddenly turns toward the earth, many miles from the storm. "St. Elmo's Fire," often seen by sailors and mountain climbers, is a pale blue or green light caused by weak electrical discharges that cling to trees, airplanes, and ships' masts. "Pearl lightning" occurs when flashes are broken into segments. "Ball lightning" can be from an inch to several feet in diameter. Pearls and balls are often mistaken for flying saucers or UFOs, and many scientists believe they are only optical illusions, or related to St. Elmo's Fire. Satellites with optical sensors have discovered "superbolts," a thousand times brighter than average.

Without lightning, Earth would lose its electrical charge in less than an hour. Lightning returns to the planet much, if not all, of the negative energy it loses to the atmosphere. Lightning also converts nitrogen to an oxide that falls with rain to fertilize soil. It starts wildfires that clear underbrush and allow new plants to grow. Nearly half the fires in forests are started by lightning.

Except for floods, lightning is North America's most deadly weather-related event. In the United States, an average of 150 people die and 250 are injured by lightning each year. If you spend time outdoors, you must learn to avoid being a target for lightning. During a thunderstorm, stay away from peaks, ridges, water, and tall, isolated objects such as trees that become natural lightning rods. Also avoid tents, small buildings, and shallow caves. Deep valleys or dense stands of shorter-than-average trees are best. If you can't find shelter, make sure your shoes have no metal in them, and crouch low to the ground on the balls of your feet. (It's better to be soaked than shocked.) When people are hit by lightning, they get severe shocks and may be burned. But they don't carry an electrical charge after they've been hit. You can give them first aid as soon as it's safe to approach them. ■

REED MCMANUS *is an associate editor of* Sierra.

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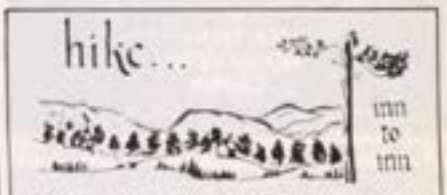

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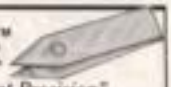

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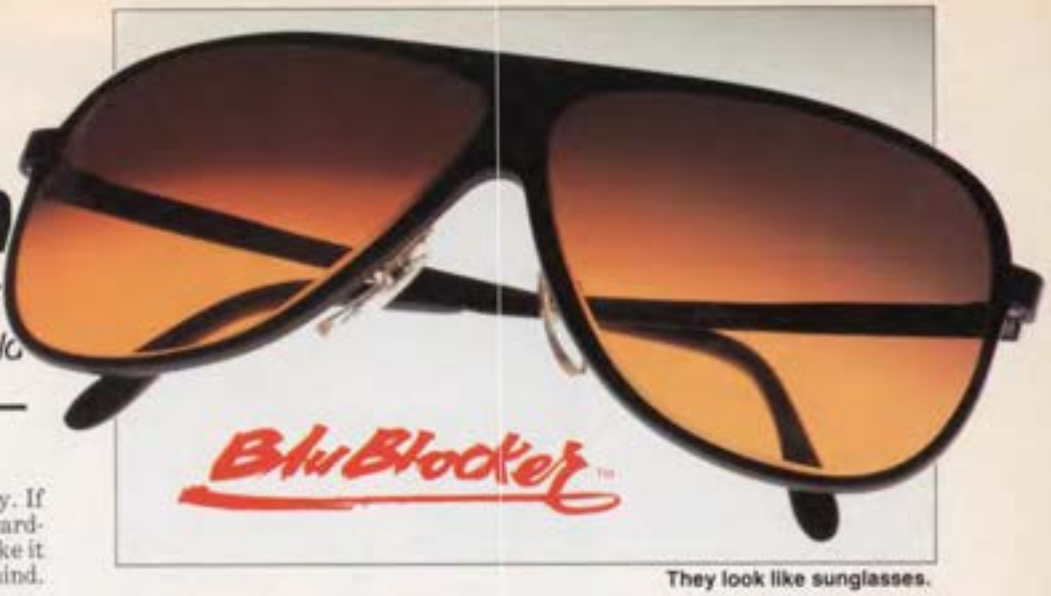

They look like sunglasses.

By Joseph Sugarman

I am about to tell you a true story. If you believe me, you will be well rewarded. If you don't believe me, I will make it worth your while to change your mind. Let me explain.

Len is a friend of mine who has an eye for good products. One day he called excited about a pair of sunglasses he owned. "It's so incredible," he said, "when you first look through a pair, you won't believe it."

"What will I see?" I asked. "What could be so incredible?"

Len continued, "When you put on these glasses, your vision improves. Objects appear sharper, more defined. Everything takes on an enhanced 3-D effect. And it's not my imagination. I just want you to see for yourself."

COULDN'T BELIEVE EYES

When I received the sunglasses and put them on I couldn't believe my eyes. I kept taking them off and putting them on to see if indeed what I was seeing was indeed actually sharper or if my imagination was playing tricks on me. But my vision improved. It was obvious. I kept putting on my cherished $100 pair of sunglasses and comparing them. They didn't compare. I was very impressed. Everything appeared sharper, more defined and indeed had a greater three dimensional look to it. But what did this product do that made my vision so much better? I found out.

The sunglasses (called BluBlockers) filter out the ultraviolet and blue spectrum light waves from the sun. You've often heard the color blue used for expressions of bad moods such as "blue Monday" or "I have the blues." Apparently, the color blue, for centuries, has been considered a rather depressing color.

For eyesight, blue is not a good color too. There are several reasons. First, the blue rays have one of the shortest wavelengths in the visible spectrum (red is the longest). As a result, the color blue will focus slightly in front of the retina which is the "focusing screen" in your eye. By blocking the blue from the sunlight through a special filtration process, and only letting those rays through that indeed focus clearly on the retina, objects appear to be sharper and clearer.

The second reason is even more impressive. It is harmful to have ultra-violet rays fall on our eyes. Recognized as bad for skin, UV light is worse for eyes and is believed to play a role in many of today's eye diseases. In addition, people with contact lenses are at greater risk because contacts tend to magnify the light thus increasing the sun's harmful effects.

SUNGLASS DANGER

Finally, by eliminating the blue and UV light during the day, your night vision improves. The purple pigment in your eye, called Rhodopsin, is affected by blue and ultraviolet light and the eyes can take hours to recover from the damage.

But what really surprised me was the danger in conventional sunglasses. Our pupils close in bright light to limit the light entering the eye and open wider at night like the lens of an automatic camera. So when we put on sunglasses, although we reduce the amount of light that enters our eyes, our pupils open wider and we allow more of the harmful blue and ultraviolet light into our eyes.

DON'T BE CONFUSED

I'm often asked by people who read this, "Do those Blu-Blockers really work?" They really do and please give me the opportunity to prove it. I guarantee each pair of BluBlockers to perform exactly as I described.

BluBlocker sunglasses use ophthalmic-quality CR-39 lenses with a hard anti-scratch coating. Over 85 percent of all doctors' prescriptions are now filled with CR-39. I have taken no shortcuts.

The black, light-weight anodized aluminum frame is one of the most comfortable I have ever worn and compares with many of the $200 pairs you can buy from France or Italy.

The weakest link in any pair of glasses is the hinge. So I have designed a screwless precision two-way tension hinge that not only bends when you close the pair, but is spring-loaded to bend outward too. You get a completely flexible frame that will comfortably contour to your face.

I also have two other exciting models. One is a clip-on pair that weighs less than one ounce and fits over prescription lenses and the second is a precision-molded plastic frame that looks identical to the aluminum model but without the tension hinge. All models include a padded carrying case and my personal one-year no nonsense limited warranty.

I urge you to order a pair and experience your improved vision. Then take your old sunglasses and compare them to the BluBlocker sunglasses. See how much clearer and sharper objects appear with the BluBlocker pair. And see if your night vision doesn't improve as a direct result. If you don't see a dramatic difference in your vision—one so noticeable that you can tell immediately, then send them back anytime within 30 days and I will send you a prompt and courteous refund.

DRAMATIC DIFFERENCE

But from what I've personally witnessed, once you wear a pair, there will be no way you'll want to return it.

Pilots, golfers, hunters, athletes and anyone who spends a great deal of time in the sun, who drives a car or who just wants to protect their vision—all will find BluBlocker sunglasses indispensable.

Our eyes are very important to us. Protect them and at the same time improve your vision with the most incredible breakthrough in sunglasses since they were first introduced. Order a pair or two at no obligation, today.

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QUESTIONS & ANSWERS

Now that climbers are allowed back on Mount St. Helens, what are the chances of another eruption? Are restrictions on climbing in effect? (Paul Mores, Boulder, Colo.)

A daily posting on the bulletin board at Yale Park Information Station, entry point to the Mount St. Helens National Volcanic Monument, advises climbers whether the risk of eruption is low, moderate, or high. For the time being, at least, the state of Washington and the U.S. Forest Service feel the risk is quite low. The U.S. Geological Survey regularly monitors volcanic activity on the mountain and is able to predict eruptions there two to three weeks before they occur. The last significant activity on Mount St. Helens was in October 1986, when a new lobe appeared on the crater's lava dome.

The Forest Service is limiting the number of climbers on the mountain, however, to one hundred per day through the end of October. When the crater floor is covered with snow, climbers will be allowed inside it, but access to the crater is restricted from the middle of June through the summer months because the USGS maintains sensitive equipment there. The Forest Service also warns that peering over the volcano's unstable cornice to look into the pit is extremely dangerous.

Climbers may register to climb the mountain in person, on a first-come, first-served basis, at Yale Park or in advance by mail. Informational brochures and applications for advance reservations may be obtained from Mount St. Helens National Volcanic Monument, Route 1, Box 369, Amboy, WA 98601; (206) 247-5473.

I recently visited a village in the Colombian highlands where I observed the people cooking with charcoal and wood in completely unventilated kitchens. Is this a safe way to cook? (Martha Doray, Hanover, N.H.)

Indoor pollutants are a serious problem in much of Asia, Africa, and Latin America. Many residents of these continents use organic fuels like charcoal, firewood, dried dung, and agricultural wastes not by choice but by necessity. When these fuels are burned inside dwellings—for cooking, space heating, or boiling water—over time high levels of toxic pollutants can accumulate, including particulate matter, hydrocarbons, and carbon monoxide.

If these pollutants are not vented properly (and most huts have no chimneys), they can cause heart and lung diseases and certain types of cancer. The World Health Organization has found an increasing number of Third World people suffering from a variety of debilitating and fatal diseases, all linked to prolonged exposure to the combustion of biomass.

Anything new on the snakebite scene now that cut-and-suck is no longer the treatment of choice? (Dick Perkins, Lafayette, La.)

A new cure for some kinds of poisonous snakebite may be as close as the spark plugs in your car engine or outboard motor. The treatment, which has become a standard folk remedy in some South American jungles, originated with a midwestern farmer allergic to bee stings. After being stung by a bee and accidentally running into an electric fence, the farmer suffered none of the severe reactions he expected to.

A missionary-physician based in Ecuador saw a report about the farmer in an Illinois newspaper and met with surprising success upon trying the remedy on snakebite victims in his Quito clinic. Of 34 patients he treated for venomous snakebite within 30 minutes of being bitten (by applying a high-voltage, low-amperage, direct-current shock to their wounds), none developed life-threatening medical complications.

The source of the bites wasn't always known in these cases, but most were thought to have been from pit vipers similar to the water moccasins and copperheads of North America, whose venoms generally damage the tissue around the bite and can lead to amputation. It remains unclear whether the treatment works on the poison directly or on the patient's ability to fight it. It's also not known if it can be effective against venoms that attack the central nervous system (such as those from cobras and sea snakes). The remedy has been effective, however, in treating the bites of ants and sea scorpions. ■

NICHOLAS WILTON

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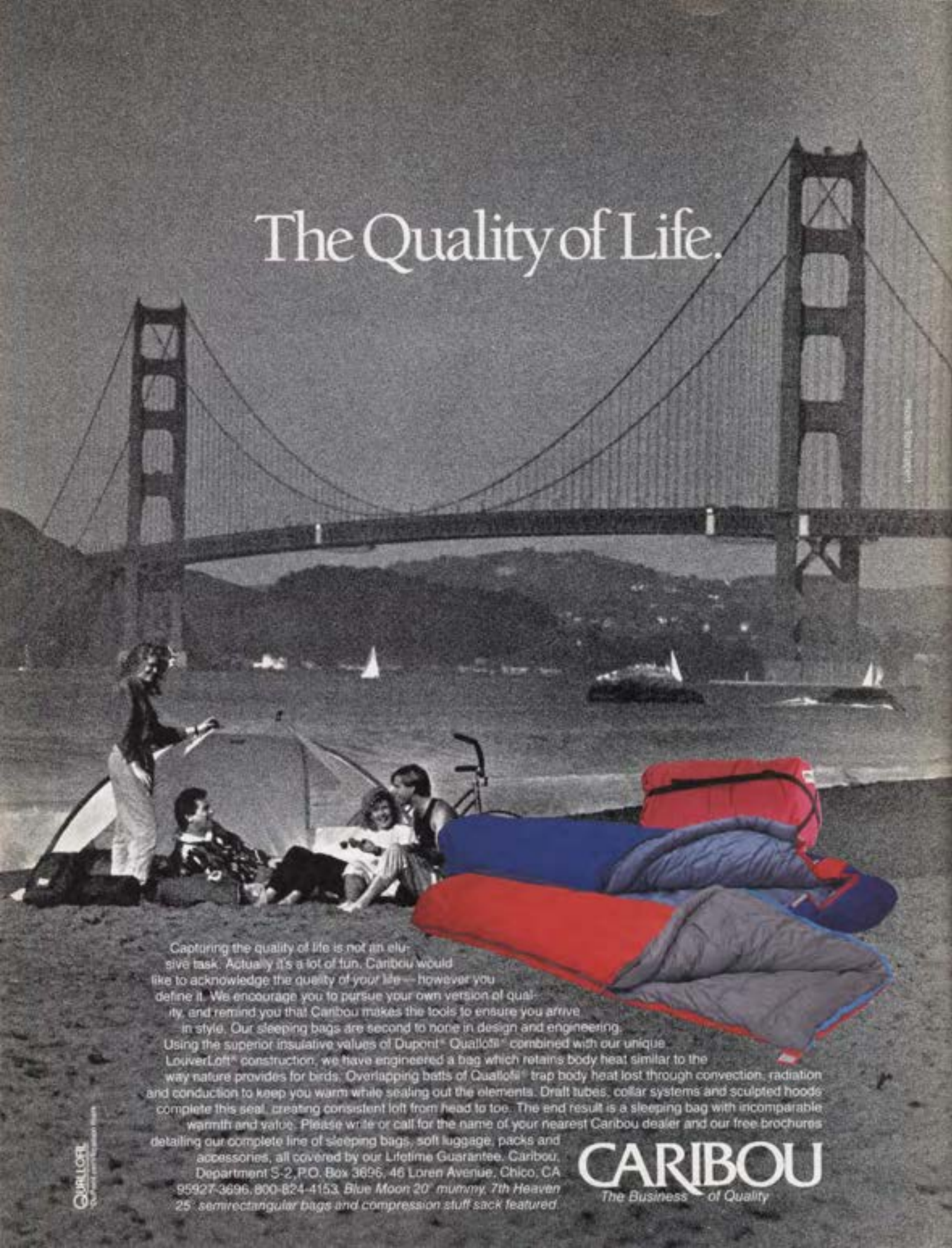

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