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Sierra

ELECTION '88
The Candidates and the Environment

The Reagan Legacy

Ice Climbing Adventure

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VOL. 73/No. 6 NOVEMBER/DECEMBER 1988

Sierra

COVER: Test your strength, skill, and spirit against the elements this winter—go climb a waterfall. For more on ice climbing, turn to page 76.
Photo by Chris Noble.

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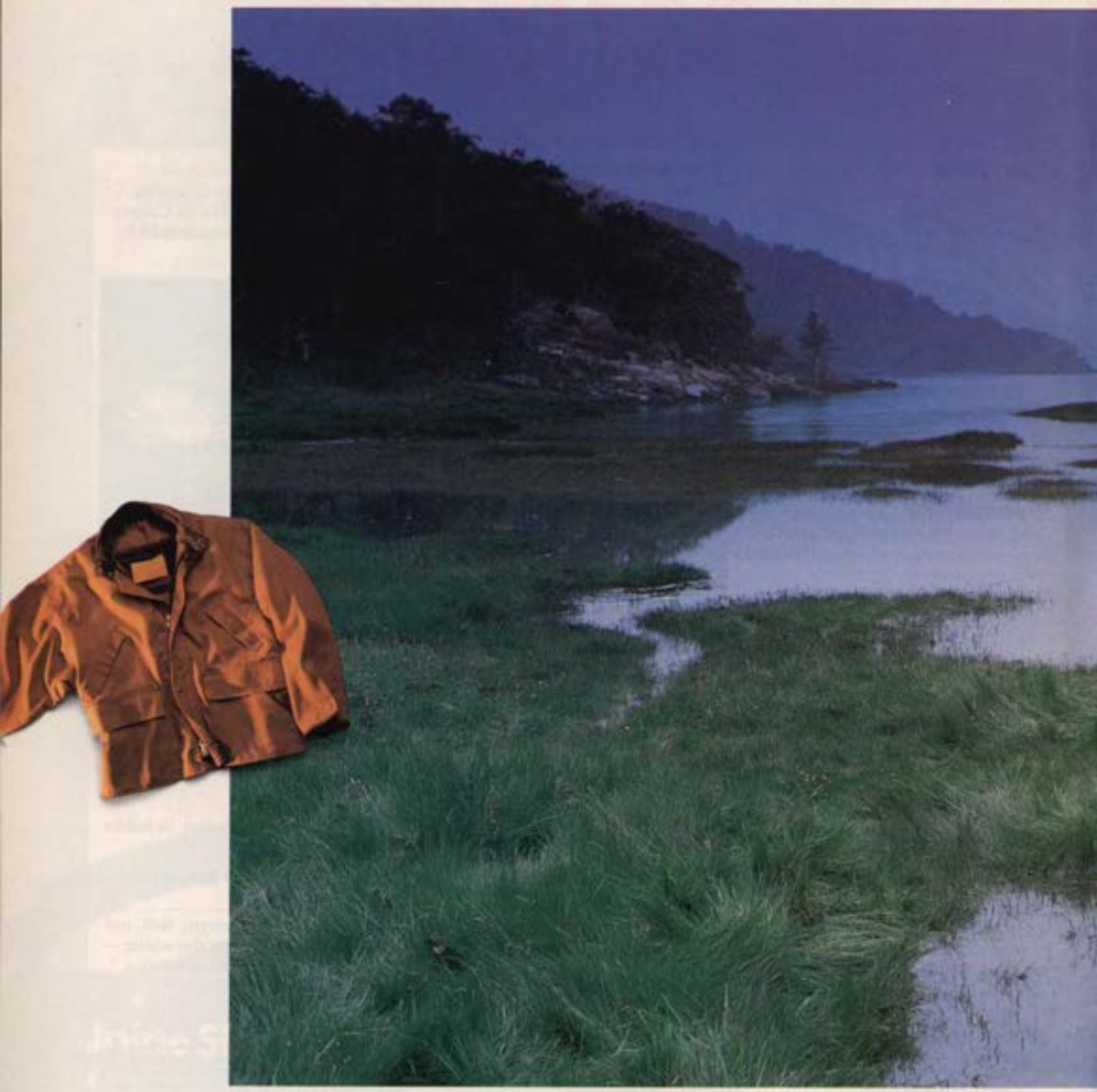

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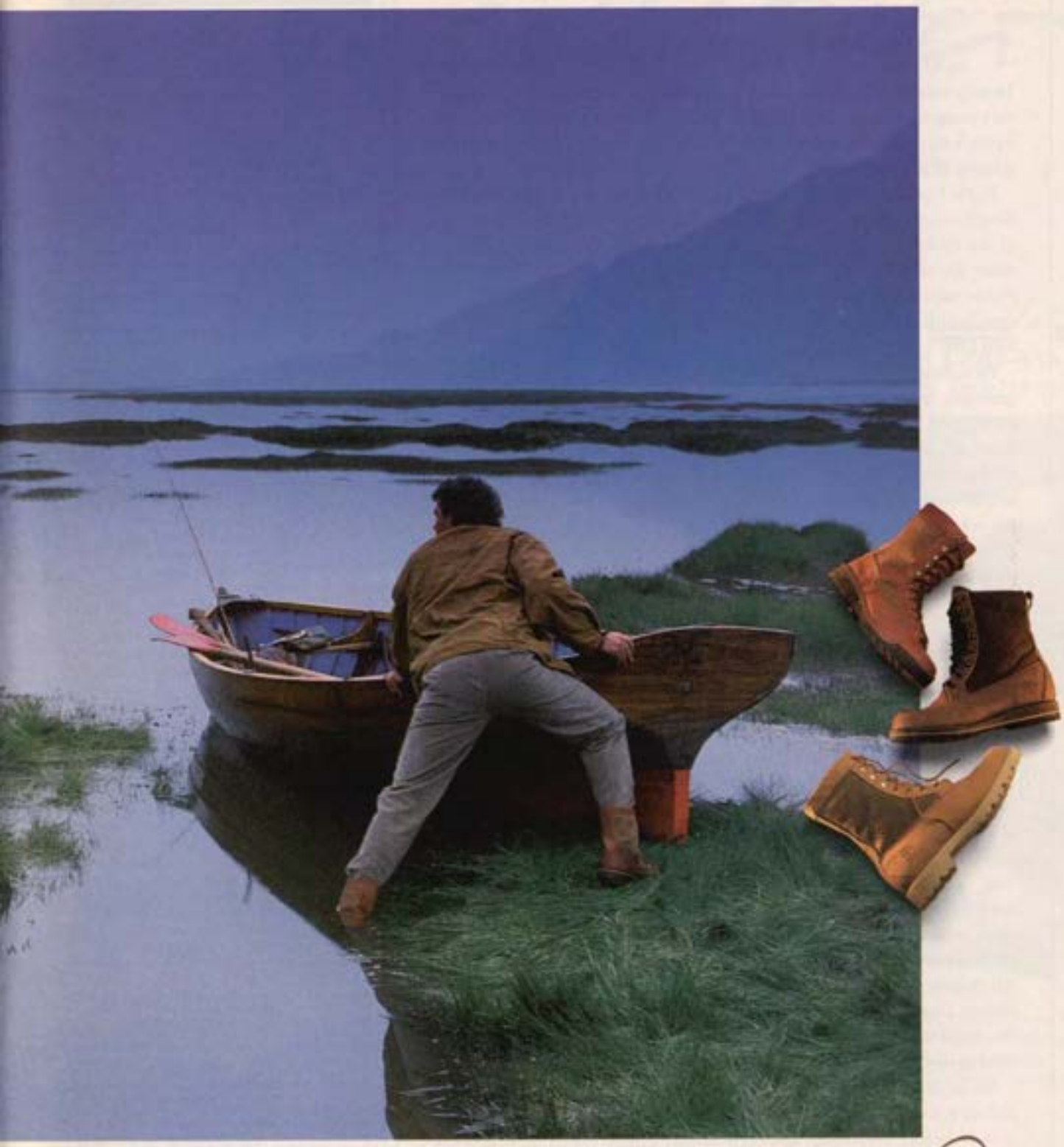

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Do Presidents Matter?

For nearly eight years, Ronald Reagan has been active—devastatingly so—in the environmental arena. (Some would argue that he has been equally *in*active, with equally devastating effects.) Praise be to the Twenty-second Amendment, he's finally riding off into Southern California's smog-dyed sunset, providing those who've fought him on a variety of fronts with an almost irresistible temptation to view next January 20 as the coming of an early spring.

But as Carl Pope notes in "The Politics of Plunder" (page 48), though the simple fact that environmentalists have not only outlasted Reagan's gallery of rogues but actually prevailed over them in several areas may indeed be cause for wonderment, soaring optimism in anticipation of the Great Prevaricator's departure is clearly premature—for the effects of his cavalier, even hostile attitude toward the environment will be with us for a long, long time.

Presidents *do* make a difference—by their actions, sometimes, but more generally by setting a political tone for the nation. When a president manages to alter the national mood as dramatically as Reagan did in his first term, it's tempting to regard his influence as all-pervasive. Yet in the environmental instance, Reagan's policymakers clearly overestimated the extent to which their constituents were willing to sacrifice basic quality-of-life concerns in pursuit of economic self-interest. Many who voted for Reagan in 1980 and 1984—Republicans and Democrats alike—parted company with him over the fundamental issue of environmental protection. The basic insight that it profits no society to expand its economy by befouling its nest was never lost sight of—except by the Watts, Burfords, and other radical ideologues who answered Reagan's federal casting call.

Now it's time to choose Ronald Reagan's successor. Suspecting that at no time during this aggressively substanceless campaign would the candidates spell out in detail their environmental agendas for the 1990s, the editors of *Sierra* asked them to do so for our readers—the nearly half-million politically aware, politically active members of the Sierra Club. We highlighted several themes for special attention, requesting that each candidate answer questions about how his administration would tackle a number of key problems, including oil exploration, air pollution, acid rain, ozone depletion, and the greenhouse effect. Michael Dukakis' and George Bush's answers to these questions—and their broader personal statements of environmental vision—begin on page 62. We have also provided synopses of their environmental records for comparative purposes. Each campaign has reviewed the Sierra Club/League of Conservation Voters summaries; though Dukakis' advisers proclaim themselves satisfied with the contents, the Bush campaign does not feel the Vice-President's record is fairly represented.

We've labored long to prepare this package of political material and deliver it to you before Election Day. We urge you to study these pages closely before you vote, and then—most important of all—hold the winner to his word come January 20.

Jonathan F. King
Editor-in-Chief

Sierra

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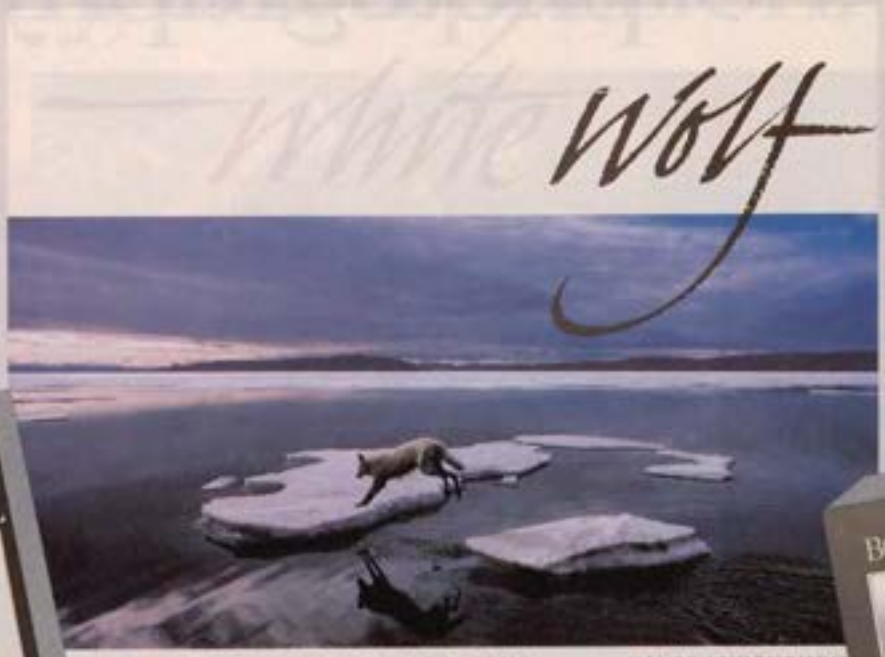

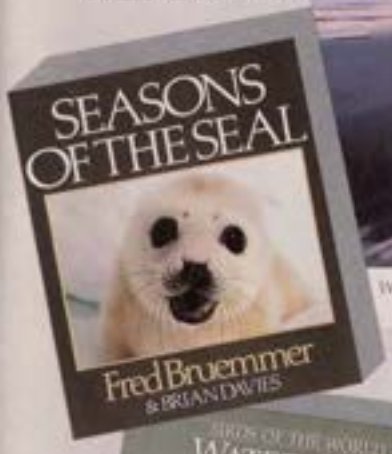

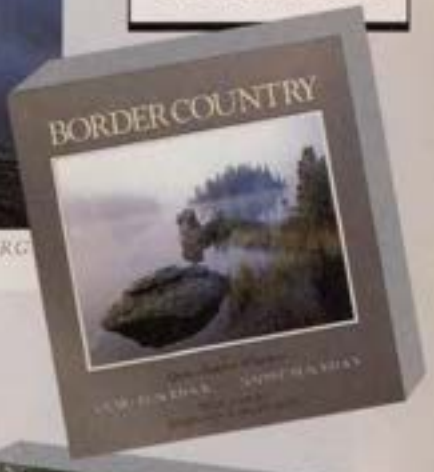

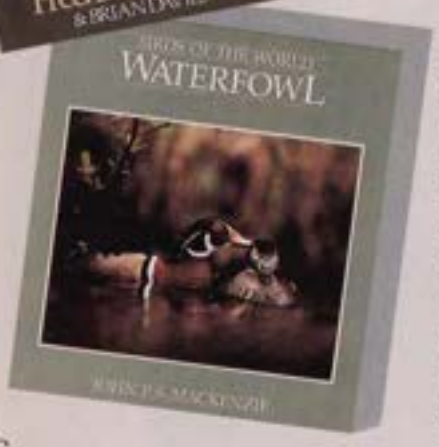

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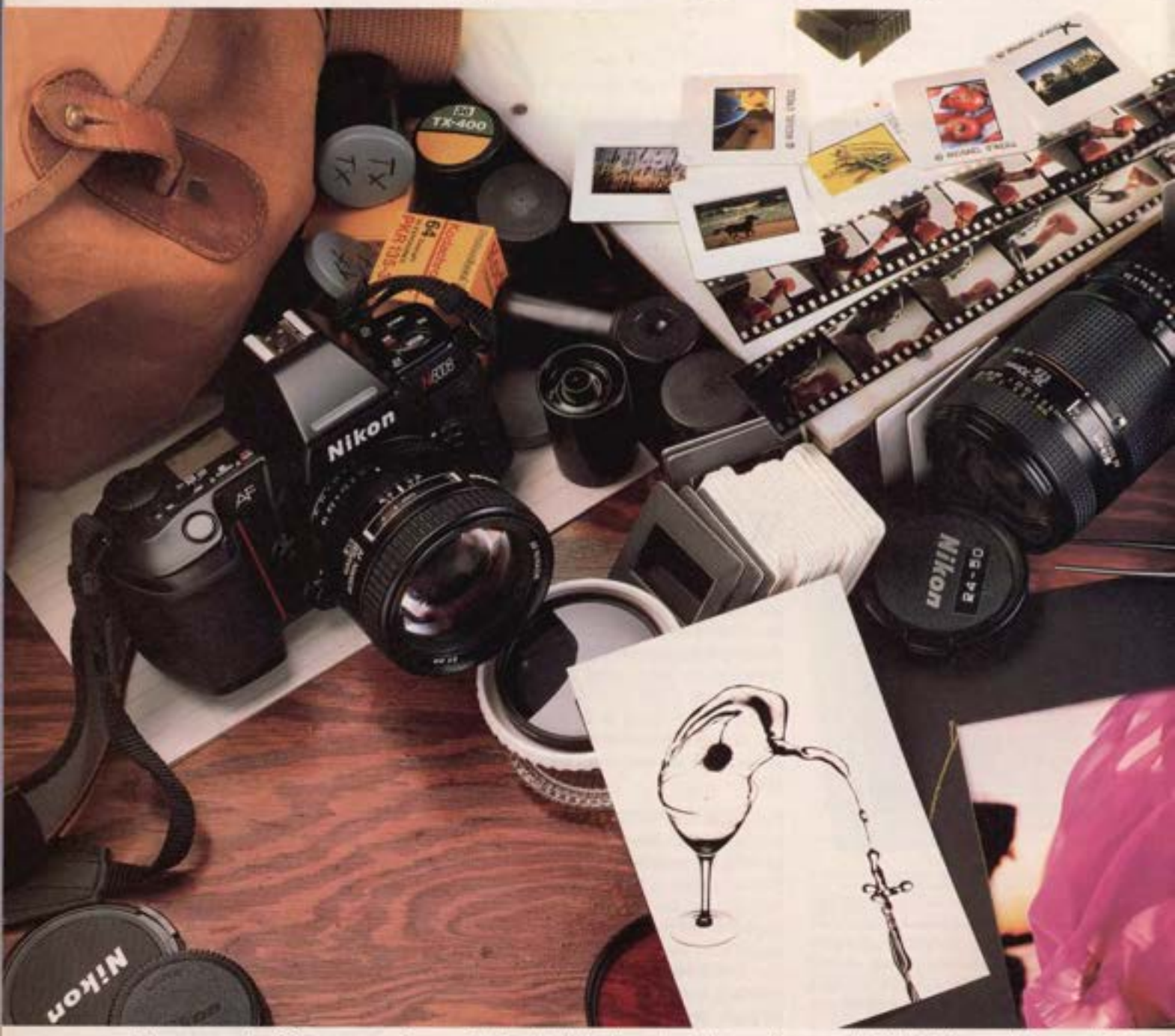

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LETTERS

LET THE SEA BE

Your two July/August articles about offshore oil drilling ("Afield" and "Priorities"), excellent as far as they went, addressed the issue in the very manner that the Interior Department has had in mind all along: by looking at the subject on a region-by-region basis. The public has been programmed to think similarly, which has in turn resulted in a syndrome hazardous to the health of us all: "No oil in *my* backyard—try somewhere else." This plays into Big Oil's divide-and-conquer strategy, which has thus far been successful.

Admittedly, there have been a number of year-long moratoria parceled out to different areas by Congress during the past decade. And yet this smoke-and-mirrors show has diverted attention from what is really at stake.

At immediate risk from offshore drilling are the nation's rich fisheries. The Georges Bank off the Massachusetts coast is the richest in the world. Is it appropriate to assume that it will merely be the fishermen from nearby Gloucester who should be concerned? Of course not: The Georges Bank fishery feeds the world. The same can be inferred for the incredibly rich fisheries off the coasts of California and Alaska, where salmon are still caught in great numbers.

The goal we should all be striving for is the posting of a stop sign in our ocean waters that would outlaw any more offshore drilling, that would prohibit toxic dumping and ocean mining. In other words, a stop sign demanding that the ocean be left just as it is, to be used as it has been traditionally used, by merchantmen and fishermen, by recreational and commercial divers, by gatherers of sea vegetables—but not by Shell, Exxon, and Occidental.

In Northern California we have given this stop-sign concept the name "ocean sanctuary." As *Sierra* pointed out, the sanctuary idea has been taken up by California Rep. Barbara Boxer (D) and Sen. Alan Cranston (D), who have introduced legislation to preserve select coastal areas. The sanctuary concept is an umbrella that could cover a host of other important issues, including coastal wetlands, sewage dumping, acid rain, and endangered species.

Ron Guenther, Conservation Chair
Sierra Club Redwood Chapter, Northern Area
Carol Grass, Co-chair
Coastal Conservation Committee
Sierra Club Mendo-Lake Group
Ft. Bragg, California

While one must applaud the stout fight of California conservationists against despoliation of the Pacific coastline, it should be recalled that the United States is perfectly ready to take oil from elsewhere in the world with little or no regard for environmental damage beyond its borders. Thus, we in Canada have the spectacle of our prime minister making much of an offer to help finance the Hibernia oilfield off the coast of Newfoundland on behalf of various oil companies, mostly American.

We North Americans cannot have it both ways. We must conserve such natural resources as oil or pass on a world even more spoiled than ours is now. Perhaps a new president may have a saner appreciation of the state of affairs than does the incumbent. How much longer do we have, anyway, before the damage becomes overwhelming?

David Macaree
West Vancouver, British Columbia

I agree that protecting our coastlines from oil drilling should be a goal of the Sierra Club, not only to prevent oil spills and pollution of those coastlines but also to reduce pollution of the air we breathe caused by the burning of fossil fuels. What bothers me is that the Club and other so-called environmentalist organizations fail to support a viable alternative for large-scale power generation that is environmentally safe.

Anyone who considers himself or herself an environmentalist should be in total support of nuclear power, which is the *only* large-scale energy source we have that has had virtually no negative impact on the public or on the environ-

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Our energy-hungry society will continue to grow. Nuclear power could provide for our energy needs if it were not for the economic and political barriers caused by anti-nuclear sentiment, and it could do so without destroying our environment. Other low-impact energy sources should be exploited to the maximum extent possible, but they can never meet our country's energy needs like safe, clean nuclear power.

J. Craig Pommert-Cherry
Cleburne, Texas

I noted with interest the juxtaposition of two "Priorities" articles in the July/August issue. "Love It or Lease It" bemoaned the proposed pillage of coastal areas in pursuit of offshore-oil-leasing programs and the unwillingness of the government to pursue renewable energy sources. "Letting the Rivers Flow" was equally fervent in favor of protecting fish-spawning grounds against the depredations of hydropower enthusiasts.

Both articles present reasonable arguments, but together they are unreasonable. An assessment of relative merits is required, along with a statement of how energy needs should be met—else *Sierra* and the Sierra Club appear simply to oppose everything.

Gabriel Goldberg
Chantilly, Virginia

COMMON SENSE PREVAILS

I noticed the story on New York's beautiful Letchworth State Park in your July/August issue ("Hot Spots") and thought your readers might appreciate some refreshing news.

I have been personally assured by the Army Corps of Engineers that its proposal to further dam the Genesee River at Mt. Morris has been cancelled. (I am the chair of the Senate's water resources subcommittee, and the Corps is answerable to me to no small degree.) The project would have flooded large portions of Letchworth Park upstream of the dam site, and was clearly unacceptable. I am glad to announce that common sense has prevailed—an all too uncommon thing.

Great credit is due the many New Yorkers who voiced their opposition to the project. But until just recently, this might not have been enough. In 1986 I and others in Congress sponsored the first major reform of the Corps of Engineers in 17 years. Since passage of that bill, all projects must have a local sponsor willing to bear a share of the project's cost; in the past this was not the case, and many dams were built notwithstanding a complete lack of local support. We have changed this. In the case of Letchworth Park, no local sponsor was forthcoming, and the idea was dropped—just as our bill envisioned.

Daniel Patrick Moynihan
U.S. Senate
Washington, D.C.

A TIME TO AMEND

Readers of Sarah Pollock's article on ecological restoration ("A Time to Mend," September/October) will be interested to know that there is indeed the kind of organization of ecological restorationists she indicates is so badly needed.

The Society for Ecological Restoration and Management, created in 1987, has members all over the United States as well as in Canada and several other foreign countries. Its purpose is to provide a forum for the exchange of information and views among those who are engaged or interested in restoration work and to bring this technology to the attention of the public.

Members include professionals from a variety of disciplines, as well as many of those "amateurs" who have played such an important role in the development of restoration technology. Members receive a twice-yearly journal, *Restoration & Management Notes*, and a quarterly newsletter.

In addition, the society is creating a directory of restorationists and restoration projects and is working with us here at the University of Wisconsin Arboretum on an electronic communications network and a technical data base dealing with all aspects of the subject.

We would be happy to hear from anyone interested in further information. Contact the Society for Ecological Restoration and Management at 1207 Seminole Highway, Madison, WI 53711; phone (608) 263-7889.

Bill Jordan III
Madison, Wisconsin

A couple of corrections are in order for "A Time to Mend." First, the caption beneath the photo of Daniel Janzen's cluttered living room/field lab in Costa Rica is all wet: Janzen's pioneering Guanacaste National Park restoration project involves re-creating a tropical *dry* forest, not a rainforest.

The distinction is significant for a variety of scientific reasons, but for conservationists, perhaps the most critical difference between the wet and dry forests of the tropics is the extent of destruction each has sustained. Whereas approximately half of Earth's original rainforests have already been destroyed [see "Questions & Answers," page 134], Janzen estimates that more than 98 percent of Mesoamerica's tropical dry forests (once as extensive as rainforests) have now disappeared. The Guanacaste project, then, clearly has an air of urgency about it.

The second correction concerns the statement that the Sierra Club has endorsed a proposal that the United Nations sponsor a 1992 conference on environmental restoration. At its last meeting, the Club's International Committee assessed the themes already competing to serve as the focus of a major U.N. environment-related conference in 1992 and decided against recommending a special emphasis on restoration. The Club's board of directors subsequently adopted a resolution calling on the Club to "participate in any United Nations conference in 1992 . . . in order to highlight the Sierra Club's priorities over its own 100 years, including wilderness preservation and restoration of degraded ecosystems."

Bill Mankin
Atlanta, Georgia

GRACE UNDER PRESSURE

Glaringly absent from your recent article on implementing the destruction of nuclear weapons under the INF Treaty ("Afield," September/October) was any mention of the role of the Reagan administration, whose strong defense policies led to the treaty. Is it so hard for you to give credit where credit is due? Let's be a little more gracious about admitting we were wrong.

Richard P. Sybert
Los Angeles, California

WOULD A FLASH CAPTURE THIS MOMENT OR RUIN IT?

Photo by Chuck Kuhn
© 1988 Pentax Corp.

The truth is, either approach would yield interesting results.

A flash would define facial features and allow a faster shutter speed.

Shooting without would preserve the subtleties of skin tone and mood.

Fortunately, one Program Autofocus SLR with a built-in flash leaves the choice of exposure up to you. The Pentax SF1.

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Did we shoot with the SF1's flash or did we shoot without it? Ask your Pentax dealer.

For best results use Kodacolor Gold.

PENTAX SF1

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Reagan's ROGUES

Take a stroll through our gallery of Ronald Reagan's environmental henchfolk, where you'll find some faces that arouse anger, some that stir pity, and some that will just remind you of what a long eight years it's been.

When Reagan asked John Crowell to oversee the U.S. Forest Service, Crowell was vice-president and general counsel for Louisiana Pacific Corporation, one of the largest purchasers of timber from national forest lands.

In his new role, Crowell proposed to double timber sales from the national forests, even though those forests already contained a huge backlog of sold but uncut and unpaid-for timber. Under Crowell the budgets for roadbuilding, minerals management, and timber-sales administration increased, while funds for soil and watershed protection and land acquisition dwindled.

Crowell told a reporter in 1982 that he believed the Sierra Club and the Audubon Society were "infiltrated by people who have very strong ideas about socialism and even communism." He later apologized. ■

COURTESY USDA

Assistant Secretary of Agriculture, 1981–85

DIANA WALKER/GAMMA-LIAISON

Director of the Bureau of Land Management, 1981–

A Colorado legislator who had sponsored an unsuccessful bill to turn federal lands over to the state, Robert Burford took charge of the Bureau of Land Management's 250 million acres of public land in 1981.

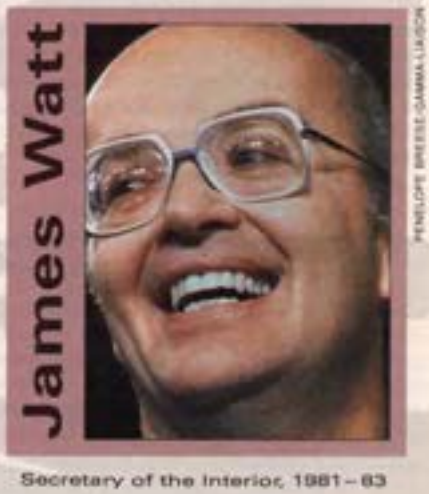
At the time of his appointment, Burford, a lifelong rancher, held grazing permits for 33,000 acres of federal land in Colorado—and had been involved in several confrontations with the BLM over unauthorized grazing and deteriorated rangeland.

While maintaining a low profile, Burford has worked to maintain the grazing subsidy for ranchers, scale back environmental programs on the lands in his domain, and increase industry access to wilderness areas. ■

Environmentalists knew they had no friend in James Watt long before he said that he didn't like to paddle and he didn't like to walk. As director of the Mountain States Legal Foundation, an industry-supported law firm, Watt had gained a reputation as a conservative ideologue opposed to federal intervention in natural-resource policy.

As Interior Secretary, Watt grew to be larger than life, formulating policies that left the most cynical environmentalists aghast: He tried to open established wilderness areas to mining and oil-and-gas leasing, sold federal coal at well below market value, and advocated a halt to the purchase of national parkland. In 1982 he announced a five-year plan to open a billion acres of the outer continental shelf to oil and gas exploration, a move that embroiled him in legal and congressional disputes for the duration of his stay at Interior.

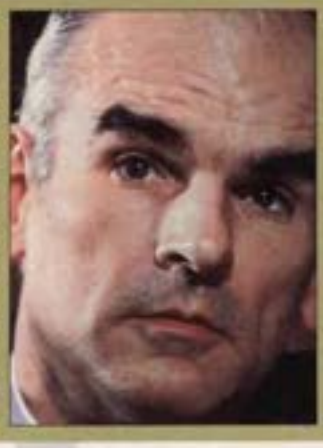
But it is rarely unpopular policy that compels a presidential appointee to leave office. Watt's consistently antagonistic behavior toward the public and Congress and his uncannily tactless language finally became too much of a political liability to the Reagan administration. With Senate passage of a resolution demanding his dismissal for "conduct unbecoming a Cabinet officer" imminent, Watt resigned on October 9, 1983. ■



PENELOPE BREESE-GAMMA-LIAISON

Secretary of the Interior, 1981–83

Donald Hodel



MARK S. BERNSTEIN UNLIMITED

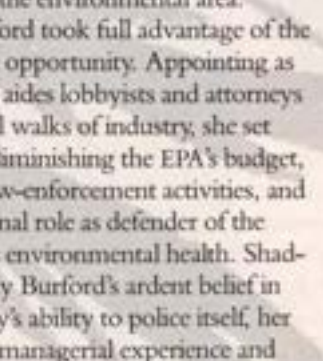
Deputy Secretary of the Interior 1981–82
Secretary of Energy, 1982–85
Secretary of the Interior, 1985–

Before Ronald Reagan brought him to Washington, D.C., Donald Hodel had already gained notoriety as the administrator of the Bonneville Power Administration (BPA). An avid advocate of all things atomic, Hodel had overseen the rise and demise of the Washington Public Power Supply System, a BPA-backed project to fuel the Pacific Northwest using nuclear energy. The plan ended in financial disaster, with the distinction of becoming the largest default in the history of the municipal-bond market.

From the number-two spot at Interior, Hodel moved up and over to the Energy Department, where he continued the agency's vendetta against renewable resources and energy conservation.

In his final position, as Secretary of the Interior, Hodel has continued—with more sophistication—many of James Watt's policies. He supported the leasing of the outer continental shelf; consistently recommended decreased budgets for the environmental work of the Bureau of Land Management; and became embroiled in a power struggle with William Mott, the conservation-minded head of the National Park Service. His only blatant Wattism was a suggestion that, if the ozone layer really is disappearing, we can best protect ourselves with hats and sunglasses. ■

Anne Burford



DEBRA BRACA BLACK STAR

Administrator of the Environmental Protection Agency, 1981–83

Anne Gorsuch Burford left her position as a key Republican legislator in Colorado to head the Environmental Protection Agency (EPA) because, she said, "I think this president has an enormous opportunity to change the way this government does business. And in no place is that opportunity more important or more relevant than in the environmental area."

Burford took full advantage of the Reagan opportunity. Appointing as her top aides lobbyists and attorneys from all walks of industry, she set about diminishing the EPA's budget, staff, law-enforcement activities, and traditional role as defender of the public's environmental health. Shadowed by Burford's ardent belief in industry's ability to police itself, her lack of managerial experience and skill, and numerous personnel scandals (during her brief tenure more than 20 top officials left the agency because of alleged misconduct), the EPA began to crumble.

Burford played out her final scene in Congress when, on President Reagan's orders, she refused to make available documents concerning the cleanup of hazardous waste dumps under Superfund. As the confrontation accelerated, the administration left Burford to fend for herself before a hostile House committee. On March 9, 1983, she resigned. ■

David Stockman

TERRY ASHE-GAMMA LIAISON

Director of the Office of Management and Budget, 1981–85

Wunderkind of budget-cutting conservatives and mastermind of environmental deregulation, David Stockman turned the Office of Management and Budget (OMB) into a household name.

As a member of Reagan's Task Force on Regulatory Relief, Stockman prepared a list of "burdensome" regulations and invited industry, government, and trade associations to add to it. When the task force finished its job in August 1983, it had revised or eliminated some 20 environmental regulations ranging from air-quality standards for the auto industry to pesticide registration.

Stockman's wielding of the budget axe became something of a Washington legend. He reduced the EPA's staff by 11 percent and proposed a 12-percent cut in its budget—before Anne Burford was sworn in as administrator. When Burford submitted a more severely reduced budget to the OMB in the fall of 1981, Stockman made additional cuts nearly twice as deep as those she proposed.

The budget director's sharp tongue, overconfidence, and single-mindedness eventually alienated him from almost everyone in the power circles of Washington, D.C.—including the President. Stockman resigned in August 1985.

—Susan Peters and Annie Stine

MARK PERLSTEIN

I WANT MY DAM T.V.

Move over, Madonna: Here come the dam builders.

Proponents of the Clavey River Project, an ambitious hydroelectric scheme in Northern California, are producing an hour-long videotape that depicts the river basin now and, using computer graphics, as it will look when completed—with dam, campgrounds, and roads all in place.

"You can debate the effects of changes in river flow

ad nauseam, but seeing them on film clears it right up," says John Mills, director of the project.

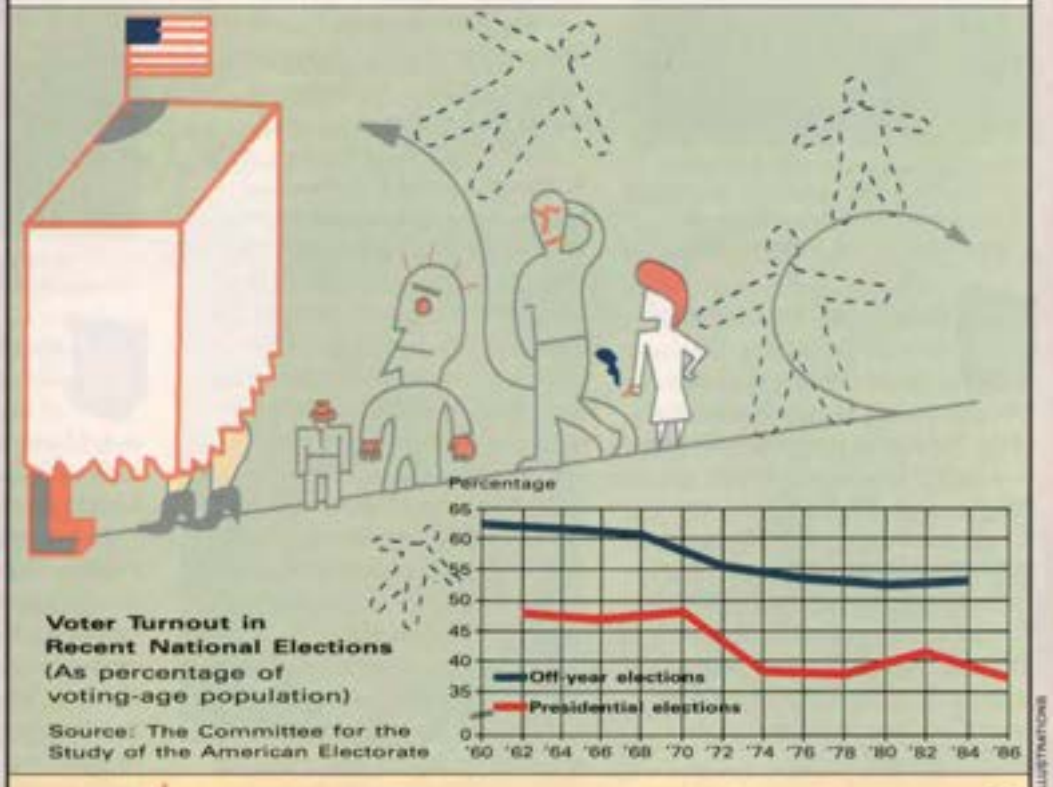
Mills believes that environmental-impact videos could be useful tools for evaluating many large projects, including power stations and timber sales.

"People tend to react to what they *think* is going to happen," Mills says. "With video, they can see that what they thought was a problem is in fact something they can live with."

Conservationists, however, don't intend to live with a dam on the Clavey; they're working to include the river in the Wild and Scenic River System.—***A.S.***

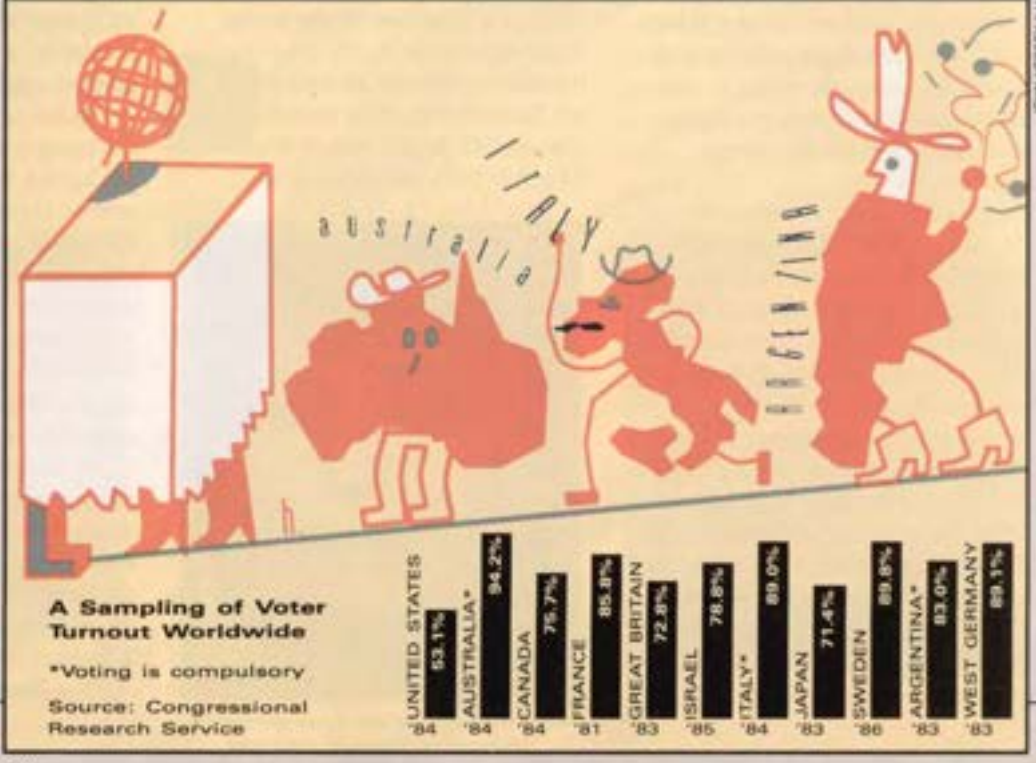
Americans Struck by Ballot-Box Blahs

The voting vigor of Americans has been flagging since 1876, when almost 82 percent of the nation's eligible electorate cast their ballots for either Rutherford B. Hayes or Samuel J. Tilden. (Republican Hayes lost the popular vote but won by a single electoral vote.) Come this Election Day, it's probable that at least four of every ten Americans of voting age will choose to boycott the booth. Their reasons, according to recent studies, include disenchantment with the candidates, the decline of political parties, and the overwhelming belief that, whoever wins, life will continue unchanged.



Voter Turnout in Recent National Elections
(As percentage of voting-age population)

Source: The Committee for the Study of the American Electorate



A Sampling of Voter Turnout Worldwide

*Voting is compulsory

Source: Congressional Research Service

JOHN HERSEY ILLUSTRATIONS

There is a concept I love to contemplate because it is simple, beautiful, and true: that growing, harvesting, preparing, presenting, and eating foods from the garden are all phases of the same activity. Each step is part of the satisfying process of partaking of the earth's bounty.

—Rosalind Creasy

MARK MATCHO

Vegetable Fritters

Traditional fritters are made with fresh sweet corn that is mature but not doughy (delicious!), but you can also make excellent fritters with other vegetables, such as zucchini, minced green beans, grated broccoli, asparagus, carrots, or winter squash. You might need to vary the amount of flour used slightly in accordance with the moisture content of the vegetables.

SERVES 4

3 cups scraped sweet corn or other vegetables
2 eggs, separated
1/4 teaspoon salt
1 to 2 tablespoons flour
Approximately 1 tablespoon oil or butter

Recommended additions: choose from black or cayenne pepper, minced fresh hot or sweet peppers, minced fresh herbs, grated sharp cheese, minced ham or clams, minced onion or shallots.

Mix vegetables with egg yolks in a medium bowl; add salt and flour. Add chosen additions. Beat egg whites stiff and fold into vegetable mixture. Drop by spoonfuls into hot oil or butter in skillet or on griddle, browning on each side, 3 to 4 minutes per side. Serve as a side dish or for breakfast or dessert with maple syrup (for the latter, omit additions).

MANATEES ON COLLISION COURSE

A speeding citation in Florida can cost up to $500 and two months in jail—if the offense is a wet one. To protect the endangered manatee, the slow-moving sea cow that inhabits the state's waterways, the Florida Marine Patrol is coming down hard on heavy-footed boaters.

Only 1,200 manatees are left in the United States. While some stray as far west as Louisiana and as far north as Virginia, Florida is their only regular residence. Manatees generally stay offshore for most of the year, but they prefer warm, inland waters during the winter months. Because they are mammals, they must frequently surface for air—which is when they are most vulnerable to fatal encounters.

Some 650,000 boats are registered in Florida, outnumbering the manatees 541 to 1. Thirty-nine manatees were killed by boats in the state last year, up from 16 in 1980. This year's toll was 34 by the end of August.

Manatees now have only one roped-off area where they are completely safe from boaters. At 19 other sites, signs warn boaters to proceed at idling speed. Last year the Marine Patrol issued 187 citations to speeders in these zones; so far this year the patrol's helicopters, planes, and boats have apprehended 154 offenders.

Florida officials, who hope to establish more manatee sanctuaries, have in the meantime set up a hot line for reporting manatees in distress. Anyone who is aware of an injured or harassed animal should call 1-800-342-1821, and the Marine Patrol will get on the case. —***Philip Bulman***

KENNAN WARD/OSK PHOTO

Invasion of the Parks

When George Moore received permission in 1908 to establish a 1,600-acre game reserve in the Great Smoky Mountains of North Carolina, the financial adviser lost no time. Within two years he had imported and released on his land animals from all over the world, including 14 wild boars from Russia. Today Moore's preserve is part of Great Smoky Mountains National Park—and the progeny of his boars are a major threat to the park.

GEOFF MANASSE/WILDLIFE PHOTOBANK

From the Brazilian pepper tree in the Florida Everglades to mongoose hordes in the Virgin Islands, nonnative species of plants and animals that have invaded or been introduced into park ecosystems are now upsetting nature's delicate balance. A draft assessment of park resources completed by the National Park Service in March lists the intrusion of so-called exotics as "the most widespread biological management problem" the agency faces today.

"Non-native invasions are an almost impossible management situation, as the species get pretty far along before the problem is even recognized," says George Kyle, assistant chief of public affairs for the National Park Service.

Exotic species can cause drastic damage to park ecosystems. Mountain goats in Washington's Olympic National Park, for example, trample native vegetation, scarify soil, and cause erosion. The Canadian thistle, a shrub that has inundated Rocky Mountain National Park, disrupts native species too delicate to compete.

Although some of these problems occur naturally, according to Kyle the most destructive invaders have been released by human beings. The mongoose was imported to the Virgin Islands intentionally to mitigate another furry nuisance, the rat, while the Brazilian pepper tree was brought to the Everglades as an ornamental plant.

Since publication of the assessment, the Park Service has employed an additional

ART WOLFE

25 people in the areas of natural-resource management and research, some to address this specific problem. "Exotics will be with us forever," says Kyle, "but with increased funding, research, and personnel, we hope to control them better than we have in the past."

—Andrew Hultkrans

FLASHBACK

RICHARD CHILES COLLECTION, COURTESY NATIONAL PARK SERVICE

A drive through the redwoods, circa 1900. More than 100,000 acres of *Sequoia sempervirens* are now protected within Redwood National Park, which celebrates its 20th anniversary this year.

SCORECARD

Before the 100th Congress came to an end in October, members of the House and Senate approved a number of environmental laws.

■ After three years of negotiation, Congress reauthorized the ***Endangered Species Act*** in August, significantly increasing funding for the protection of endangered animals and plants. In one of its most contentious provisions, the five-year reauthorization delays until May 1989 a requirement that shrimp fishermen use special devices to keep sea turtles from becoming entangled in their nets.

■ The fiscal year 1989 ***Interior Department appropriations bill***, approved in September, dedicates $11 million to the purchase of land in the Santa Monica Mountains National Recreation Area in Southern California and imposes a one-year moratorium on oil exploration off the coasts of Northern California, Massachusetts, and Florida.

■ In its effort to overhaul the nation's pesticide policies, Congress in September approved the ***Federal Insecticide, Fungicide, and Rodenticide Act of 1988***. The legislation addresses only registration of older pesticides, reregistration fees, indemnification for unused stocks of banned pesticides, and storage and disposal of banned pesticides. Left unsettled are such issues as pesticide residues on food, groundwater protection, requirements for exported pesticides, and review or cancellation of a registered pesticide.

■ Questions of nuclear liability were partially answered in August when Congress amended and reauthorized the 1957 ***Price-Anderson Act***, which limits the liability of the nuclear industry in case of an accident at a nuclear facility and sets up a system to compensate victims. Coverage had been $700 million per single accident; the new law raises that to $7 billion.

MARK MATCHO

SIERRA CLUB SALUTES CONGRESSIONAL HEROES

"You are the clean-air champions," Sierra Club President Richard Cellarius told the members of Congress gathered on the steps of the U.S. Capitol. "And our air needs champions."

Two hundred twenty members of the House of Representatives were awarded medals by the Sierra Club on September 15 for their efforts to bring clean-air legislation to a vote this year. The lawmakers were honored for having signed a letter sponsored by Reps. Bruce Vento (D-Minn.) and William Green (R-N.Y.) that urges their House colleagues to take swift action on five air-pollution problems.

"Our goal is clear," Rep. Green said in his address to the crowd of clean-air activists. "People should not fear the air they breathe. Let's clean our air. Let's start now."

R. SACHS/CONSOLIDATED NEWS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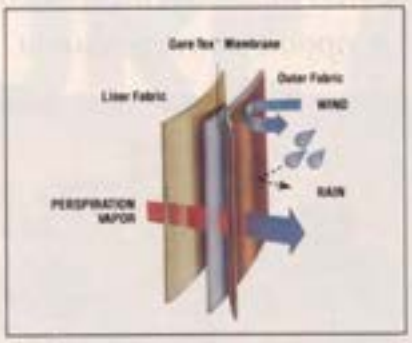

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CLEAN WATER

Runoff Runs Amok

Keeping chemicals down on the farm is just one of the challenges facing regulators trying to control nonpoint-source pollution.

WILLIAM CONE

Julie St. Onge

A JUNE THUNDERSTORM moves up the Hudson River Valley in New York State. Heavy rains send streams of water gushing through the streets of the densely populated cities crowding the river's southern shores. To the north, muddy rivulets flow over cultivated fields in the state's rich farming regions.

A few hours later, the air is fresh and the view sparkling. Fields, lawns, and paved surfaces have been cleansed of fertilizers, oil, animal wastes, and assorted debris. But the materials have not vanished; the rain has simply swept many of them into the river or channeled them into groundwater.

The region's environmentalists have long been aware that agricultural and urban runoff is contaminating the Hudson. But many didn't realize that the amount of toxic pollutants surpasses that discharged by municipal sewage-treatment plants and manufacturers.

In 1987 Inform, a research group based in New York City, confirmed the higher levels of lead, mercury, and many other toxic substances deposited in the river by runoff. For example, it found that agricultural and urban runoff contributed an astonishing 182,000 pounds of lead to the river per year in the 150 miles between Troy and Manhattan, while municipal treatment plants and factories discharged about 240 pounds.

The problem is not confined to the Hudson. Runoff from abandoned mines has polluted streams in the Rockies with lead, copper, cadmium, and other metals. Health officials suspect the runoff also may be the reason that children living in mountain communities have high levels of lead in their blood. In agricultural areas, water supplies are regularly contaminated with chemicals that wash off the land when it rains.

The degradation caused by runoff from rain and melting snow is known as nonpoint-source pollution—a general term for pollutants that are not released directly (for example, from the end of a pipe) into a body of water. The five major contributors to nonpoint pollution are farms, urban areas, construction sites, mines, and forests where logging is conducted. The contaminants include everything from sediments and pesticides to spilled solvents and asbestos brake linings.

In 1985 the Association of State and Interstate Water Pollution Control Administrators reported that runoff threatened or impaired 41 percent of surveyed river miles, 53 percent of lake acres, and 28 percent of estuary acres. It also documented serious problems of ground-

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water contamination associated with nonpoint sources.

Part of the nonpoint problem is technical: It's hard to root out a problem when the root is hard to find. As Jonathan Scott of the Clean Water Action Project explains, "When you talk about nonpoint pollution, you are literally talking about almost every human activity. The problem is so far-reaching that the solution is very difficult."

Methods for controlling nonpoint-source pollution are known as "best management practices" (BMPs). Common BMPs for agriculture, the most widespread source of nonpoint pollutants, include reduced use of farm chemicals and an assortment of methods to prevent soil erosion.

Persuading farmers to adopt BMPs is "not an easy project," according to Robert Thronson, an environmental engineer with the Environmental Protection Agency. "You're asking people to change the way they've been doing things for several decades." Moreover, an individual response to a regional problem may be inadequate. Thronson says if one farmer cooperates by installing expensive terraces, he may find that his land suffers and becomes waterlogged because his neighbor uphill is doing nothing to control runoff.

To muddy matters further, many nonpoint controls are part of voluntary programs established to control soil losses or to improve farm productivity. Thus, programs often target areas that don't have serious water-quality problems and ignore those that do.

Nevertheless, state and regional interest in regulation of runoff of all kinds is increasing. Wisconsin, Minnesota, and Washington's Puget Sound region have developed thorough sediment-control programs, and Florida has enacted model regulations for storm-water discharges. But these efforts make only a dent in eliminating what amounts to half of the country's water pollution.

Since passage of the Clean Water Act in 1972, the federal government's efforts to control water pollution have focused on discharges from industry and municipal sewage-treatment plants. When amendments to the law were enacted over President Reagan's veto in early 1987, however, Congress gave

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In a den high in Montana's Blackfeet country, a grizzly and her cub settle down for a long winter's nap.

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notice that it wanted to change course.

Section 319 of the Clean Water Act requires states to prepare reports assessing areas that haven't met the act's water-quality standards or goals because of nonpoint-source pollution. In addition, the states must develop a management program to address the problem.

But the act has as many leaks as an aging septic system. The deadline for submission of both documents to the EPA was August 4, with no penalty for states that fail to comply. By late August, 36 states had responded, but most plans were still in draft form and few proposed strict regulations.

The 1987 act also extended the EPA's deadline for requiring cities of more than 100,000 people to control storm-water discharges. Already, the EPA's storm-water rules are almost a year late. In addition, the agency proposes to regulate only incorporated municipalities, exempting other local governments.

Despite the delays, most observers agree that the EPA's efforts have been crippled by a shrinking budget and not by bad faith. In 1987 Congress authorized $400 million to help states implement their nonpoint management programs. But as Bob Adler, senior staff attorney for the Natural Resources Defense Council, points out, "Congress has been sending mixed messages to the states. They authorized $400 million, but so far they haven't appropriated a dime." This year's proposal to spend $25 million of the $100 million budgeted for 1989 never even reached the House floor.

"The irony," Adler says, "is that Congress has spent $45 billion over the past 15 years to build sewage-treatment plants, but precious little to control nonpoint-source pollution—which the EPA and the states agree is half of our water-pollution problem."

While cleaning up nonpoint pollution presents technical challenges, most observers agree that the biggest obstacle is political: Nonpoint pollutants will flow unabated until states comply with Section 319, strict regulations are adopted, and Congress puts to work the money it has committed to controlling runoff.

JULIE ST. ONGE *is a writer in Stamford, Connecticut.*

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A Tall Tale of Too Few Trees

Private timberlands lie fallow, and logs float to Japan. Yet the timber industry insists it needs to cut the public's oldest trees.

DAVID HATANAKE APERTURE PHOTOGRAPH

There's no shortage of logs at export docks: A ship bound for Japan loads up in Washington.

Keith Ervin

AN ERA IN PACIFIC NORTHWEST logging history will end next year when the Weyerhaeuser Company closes its 60-year-old sawmill at Snoqualmie, Washington. The firm says the mill can no longer get enough of the big old-growth trees that its 70-inch saw was built to cut.

The Weyerhaeuser mill is not the only one in Washington that has recently run out of raw material. Two hours away, on the Olympic Peninsula, Dahlstrom Lumber Company has closed because it can't buy enough logs, large or small. Summit Timber Company, which used to rely solely on the woods around its Darrington mills, now carts trees over the rugged Cascade Range from sites up to 200 miles away.

Faced with an apparent shortage of logs in the Pacific Northwest, timber-industry executives are using their considerable political and economic clout to lobby for state and federal timber sales that would carve the nation's last virgin forests into ever smaller, ever more isolated stands. Because private industry

has cut most of the old growth on its own lands, unlogged public lands have become the loggers' last frontier. When scientists and conservationists warn about the impending loss of an irreplaceable ecosystem, the timber industry has a simple argument: It needs the public's old-growth timber to keep its mills alive.

But the economics of old-growth timber sales in the Northwest are not as simple as the industry implies. Two major factors complicate the situation: As the chainsaws rip through the primeval forests, logged-off but potentially productive private forestlands lie fallow; and while lumber mills scramble to get every stick of timber they can find, many of the best logs are sent to export docks.

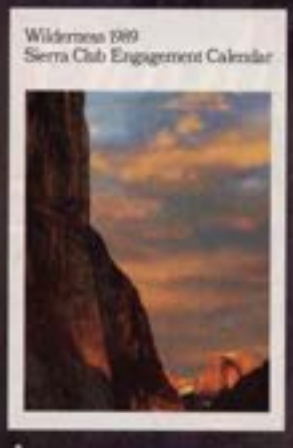
The current pressure on public lands started building decades ago when private lands were cut at rates that couldn't be sustained. The heavy logging of these lands and industry's failure to replant them before the 1940s are leading to what some observers call The Gap—a period during which private timber harvests will tumble while a second generation of trees reaches merchantable age. "Had there been more foresight in the 1920s and '30s," says Summit Timber official Jack Dickson, "we would have so much timber available now, it wouldn't be believable."

Even today, much of the productive capacity of privately owned timberlands —which supply a little less than half the timber harvested in Oregon and Washington—remains untapped. Dave Larson, an independent tree farmer, points to mile after mile of timberland south of Seattle where forests have grown up as commercially marginal alder rather than prized Douglas fir. "It just breaks my heart," he says. According to the Washington Department of Natural Resources, if all the state's private landowners replanted, fertilized, and thinned their trees, harvests would be boosted by an amount greater than all federal timber sales in the state.

"Nonindustrial" private interests manage about one sixth of all the timberland in Oregon and about one fourth of that in Washington. Although a 1976 Oregon Department of Forestry report estimated that harvests on nonindustrial lands could be increased fourfold, production from these lands has not grown substantially in recent years. The nonindustrial forests, called collectively by a 1973 Nixon administration advisory panel "the listless giant of forestry," remain underused.

One significant reason for their sluggish performance is a U.S. Forest Service budget that is geared to sell public rather than privately owned timber. Funding for programs to provide technical advice and financial aid to owners of small parcels of timberland has dropped from $19 million to $9.7 million annually during the Reagan years, while the total Forest Service budget has risen well above $2 billion.

Not only are some lands underused, but forest owners are taking land out of production at an alarming pace. The Washington Department of Natural Resources estimates that during the next two decades 235,000 acres, or 4 percent, of the private forests in western Washington will be replaced by roads, utility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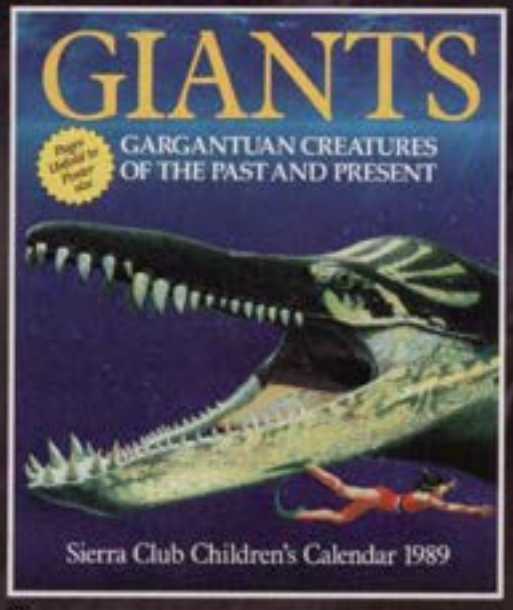
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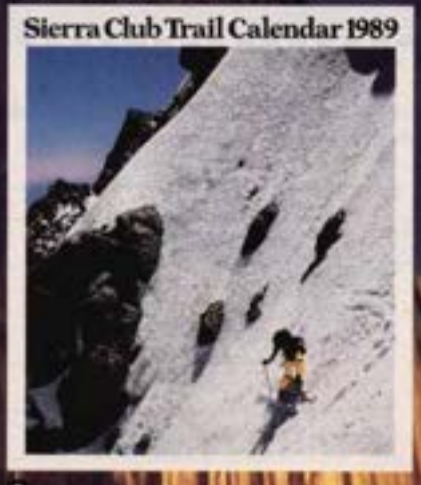

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corridors, and residential and commercial development. Five percent of the state's total timber base will be lost by the year 2030.

The timber industry, while trying to maximize old-growth cutting on public lands, has quietly allowed this prime tree-growing land to slip away; it is simpler and cheaper for them to cut the virgin forests on state and federal property than to try to keep private lands in production.

The profit motive also leads a few large firms, such as Weyerhaeuser and ITT Rayonier, to send raw logs overseas rather than process the wood in local sawmills. More than a third of the trees cut in Washington are shipped overseas without any local processing. That means not only logs but jobs are being exported to Japan, Korea, and China. "We're acting like a Third World country when we export our raw resources," protests Chuck Sisco, a biologist and forester who works for the National Audubon Society.

By law, most logs cut on federal lands must receive at least "primary processing" before they're sent overseas. But a 1984 U.S. Supreme Court decision struck down state laws banning the export of raw logs cut on state-owned lands.

Representative Peter DeFazio (D-Ore.) last year introduced legislation supported by the Sierra Club and other conservation groups that would enable states to reimpose export bans. Small sawmills unable to match the timber prices that Japanese buyers pay are promoting the bill, while large timber companies are opposing it. The House Foreign Affairs Committee has allowed it to languish, a victim of what DeFazio describes as a "tremendous, full-court press" by the major timber companies.

Conservationists believe that without some kind of export restrictions, pressure will build to increase cutting the old-growth groves in national forests. But environmentalists and their friends on Capitol Hill do not unanimously support a DeFazio-style bill. Some old-growth advocates favor a log-export tax, which would make domestic mills more competitive with foreign facilities. Whatever approach they favor, conservationists participating in these trade de-

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Increased production on private land such as this could take the pressure off old growth.

bates are convinced that the clamor for federal sales of old growth must be seen in the context of the total timber supply: public *and* private.

Northwest conservationists see a variety of tactics that could keep their region's timber economy healthy: nurturing and retaining private forestlands, encouraging timber production on private lands not owned by the timber industry, and exporting lumber rather than raw logs to the Far East. Making these adjustments would not be comfortable for the timber industry. But discomfort is a far cry from the impending collapse the industry has predicted.

KEITH ERVIN, *a Seattle freelancer, is writing a book about old-growth forests.*

POPULATION

Trial by Numbers

The population bomb we used to hear so much about has not been defused; in fact, the burst is yet to come.

Carl Haub

DURING A RECENT radio interview, the host introduced the subject of world population by saying: "Well, it looks like that population thing is back with us again. Hey, tell me, Mr. Haub—what happened?"

The answer, unfortunately, is nothing—except that the subject disappeared from public consciousness. Back in the 1970s, the "crisis" of rapid world population growth was a generally accepted fact. Mention it and listeners would gravely nod their heads and agree that "we" had a problem. Today, any such affirmation will draw only quizzical looks. "I thought that was under control" is a typical response. Far from it.

Last year about 90 million people were added to the world's population—more than in any previous year. Ten years ago the increase was 75 million; 20 years ago, 70 million. The Third World is not experiencing the declines in fertility that had been expected. As a result, most demographers now believe that future growth will be approximately 1 billion people every ten years.

Moreover, the most rapid growth is taking place in areas that can afford it

least—those regions of the world that are already plagued by deforestation, encroaching desert, scarcity of additional arable land, and food shortages. About half a billion people are seriously undernourished worldwide; two dozen countries actually saw their per-capita daily calorie supply decrease from 1965 to 1985. The United Nations Food and Agriculture Organization has projected that many countries (its estimates range from 36 to 64) will experience critical food problems by the year 2000. Even India, whose efforts to increase production have been hailed justifiably as heroic, has a lower food-grain output per capita than it did in 1900.

Today 1.2 billion people live in the industrialized countries, where birthrates are quite low. Population growth has virtually ended in Europe and, with the possible exception of the Soviet Union, will likely slow to a halt in the other industrialized countries, although immigration will continue to play a role in a few.

For the developing countries of Africa, Asia, and Latin America, however, the picture is very different. These nations now contain 3.9 billion people, and fertility levels of five, six, seven, or more children per woman are common.

China recently relaxed its rigid population-control program—and birthrates have risen.

The United Nations publishes a regular and widely used series of world population projections. These are not forecasts but rather "what if" exercises showing what different changes in birthrates would mean for population sizes in each country. The high series assumes the slowest decrease in birthrates and consequently the largest ultimate population; the low series—which few demographers believe is possible—is based on the other extreme.

Virtually all users of the U.N. projections abide by the medium series, a middle-of-the-road scenario positing

that if all countries of the world average about two children per couple by 2035, world population would reach a little more than 10 billion by 2100, when it would stabilize. In fact, however, current estimates suggest quite strongly that world population growth is actually following the high projection—approximately 1 billion people per decade—a rate that will boost the current population of 5 billion to 16 billion by 2100.

China and India have much to do with this faster rate. In the past two years, China's fertility rose from an average of 2.1 children per woman to about 2.4. In India family planning appears to have lost momentum, owing in part to some overzealous policies in the late 1970s. At present Indian women average 4.3 to 4.5 children, perhaps more; the projection for India made in the early 1980s called for 3.7. Many other developing countries (including Egypt, Zaire, Iran, and Burma) are not seeing the lower birthrates that projections typically assumed.

Why are there such discrepancies in the present pace of population growth? One major reason is probably the rather poor performance of demographers in communicating their findings. Understanding population growth does involve a few slightly abstruse statistics. For example, while it is true that the world's rate of population growth declined from 2.0 percent in the 1960s to about 1.7 percent today, the absolute number of people added each year continues to rise, simply because the base against which the rate is multiplied is now much bigger. This fact of basic arithmetic is often overlooked.

A more important reason for confusion is that we have all become to some degree inured to the steady march of "crises" on the evening news. How reassuring instead to hear that the crisis proclaimed by the population Cassandras of the 1960s and 1970s was just so much crying wolf. Or to listen to Julian Simon of the University of Maryland tell us that densely populated areas such as Hong Kong and Singapore are doing quite nicely, thank you, so Nigeria and Bangladesh therefore need not concern themselves with burgeoning numbers.

So successful, in fact, have been the purveyors of happy news that today many demographers shy from pointing to realities unless their remarks are couched in careful language. Population crisis? No one says that any more, for fear of being labeled some kind of neo-Malthusian. Further confusing the issue is the "birth dearth" recently given wide publicity by author Ben Wattenberg. (See "The Bomb Is Still Ticking" in "Books," January/February.) He correctly notes that very low birthrates are causing or will cause population decline in industrialized countries. But that notion is often mistakenly extrapolated to the whole world. Finally, some early predictions of global collapse of birthrates were too extreme.

World population continues to grow, regardless of its acceptability as a topic of conversation. Those of us in the wealthy minority of world society can afford to debate whether the situation is of crisis proportions—and then go home to a nice dinner. The less fortunate cannot. ■

CARL HAUB *is director of demographic analysis and public information for the Population Reference Bureau, Inc.*

INTERNATIONAL

An innovative financial mechanism has allowed several Latin American nations to protect irreplaceable natural resources while easing their onerous burden of debt.

Greenbacks for Greenery

Andrew N. Hultkrans

LATIN AMERICA'S DEBT CRISIS is fueling the destruction of tropical rainforests and the rapid consumption of other natural resources in the debtor nations. Impoverishment and indebtedness (in the form of outstanding loan agreements, mostly with U.S. institutions) have forced these countries to borrow heavily from the green reserves of their tropical forests in order to service their nearly unfathomable debt.

But a partial dissolving of the links between debt and deforestation has proven feasible under a variety of cooperative arrangements negotiated among conservation groups, debt-holding institutions, and governments in both North and Latin America. Though the strategies and mechanisms differ from case to case, the past two years have seen significant protection of rainforest areas in several countries effectively achieved for partial debt forgiveness. Many observers believe these so-called debt-for-nature swaps not only are useful in the short term but suggest that future debt-reduction strategies may involve a shift of focus from "micro" effects to overall resource policies.

The world's developing nations now owe on the order of $1.2 trillion to public and private lending institutions as well as governments and multilateral development banks. Latin America's share of that huge debt is estimated at nearly $400 billion. What little economic "progress" has occurred in that part of the world has come largely at the expense of the tropical rainforests: Countries afflicted by overpopulation, poverty, and debt have done little to oppose forest clearing for farming, grazing, mining, and lumbering because of the sorely needed income those resource-intensive activities generate.

Latin American nations have also begun to suffer the effects of reduced investment from abroad, in part because of lender skepticism regarding loan repayment. As employment opportunities dwindle accordingly, the poor people of these nations put increasing stress on the rainforests—the scattered, localized destruction by squatters and migrating peasants adding to the impact of the large-scale resource developers.

In recent years a secondary market wherein high-risk debts are sold at a discount (often quite substantial) has developed in response to lender concerns over repayment. Banks wishing to even out their risks and other entities seeking an investment foothold in Latin America have been the primary traders in these discounted debts, which they can then exchange for equity or investment privileges in the debtor nation.

So far, more than $6 billion in Latin American debt has been converted through these "debt for equity" exchanges. Unfortunately, the swaps not only perpetuate and magnify foreign influence over Third World nations, they also do little to slow the type of destructive development that has already placed these countries in environmental peril.

Despite their inherently negative aspects, however, debt-for-equity swaps have set an important precedent in the international financial community in terms of debt-restructuring and exchange programs, and paved the way for an innovative arrangement between the environmental and banking communities: debt-for-*nature* deals that exchange a commitment to conservation,

rather than real equity, for portions of foreign debt.

Thomas Lovejoy took an early conceptual step in this direction in October 1984, when he was vice-president for science at the World Wildlife Fund–U.S. In a *New York Times* op-ed piece that month, he made the first public suggestion that Third World debt might be converted into some form of support for conservation projects: "Under the best of circumstances, debtor nations find it hard to address critical conservation problems because of multiple social needs. Stimulating conservation while ameliorating debt would encourage progress on both fronts."

The actual shaping of a mechanism whereby Latin American debt might be forgiven in exchange for conservation guarantees was begun in the summer of 1986 by Barbara Bramble, director of the International Division of the National Wildlife Federation, and Alan Weeden of Connecticut's Frank Weeden Foundation, when they first learned about the existence of the secondary market for discounted loans. At pennies on the dollar, they realized, substantial portions of a country's indebtedness could be acquired for relatively small amounts of money—the kinds available to conservation groups and charitable foundations as well as to commercial lenders. From there it followed that conservation organizations and debtor governments might strike bargains whereby newly purchased debt could be forgiven in exchange for commitments of equivalent sums in local currency to a conservation fund.

The first debt-for-nature swap was announced in July 1987. The Weeden Foundation provided Conservation International (a new organization started by former staffers of The Nature Conservancy) with $100,000—enough to purchase $650,000 worth of Bolivia's foreign debt, then selling for 15 cents on the dollar, from a Swiss bank. (Citicorp Investment Bank served as CI's agent in the secondary market.) In exchange the Bolivian government agreed to provide maximum protection for the Beni Biosphere Reserve, home to 13 of Bolivia's endangered species, and to increase by 3.7 million acres the adjacent protected areas. In addition, the government committed $250,000 in local currency to manage the Beni reserve and its expanded buffer zones on a sustainable basis, with special attention to the traditional way of life of the nomadic Chimane people, who live within the reserve. A Bolivian national commission that included biologists, environmentalists, and local officials was formed to administer the new conservation programs, and U.S.-based Conservation International agreed to designate a local institution as its representative.

Improvements to the technical mechanism employed in the Bolivia swap were realized three months later, when Ecuador's leading conservation organization, Fundación Natura, secured an agreement with the government's monetary board to offer up to $10 million in external debt in exchange for interest-bearing bonds issued in local currency. Based on a proposal by Roque Sevilla, Fundación Natura's president, the program differed from the Bolivian model in two important respects. Whereas the Bolivia deal was conceived of and engineered by a U.S. organization, drawing some negative, nationalistic press in Latin America, the Ecuador swap was initiated and engineered by a local, nongovernmental conservation group. Moreover, rather than agree to allocate local currency in cash for the conservation projects, a method that has drawn some criticism for its inflationary potential, Ecuador issued monetary-stabilization bonds that mature over nine years, with the market-based interest on the principal available for project funding.

The World Wildlife Fund–U.S. was the first taker, purchasing $1 million in Ecuadoran external private debt at 35 cents on the dollar. The funds were then converted into local-currency bonds at the full face value of the debt note and turned over to Fundación Natura, which will use the principal of the matured bonds as an endowment, while the interest (31 percent in the first year) is allocated to a variety of ongoing conservation programs.

Costa Rica, a nation with an admirable system of protected natural areas but little cash to support it, engineered a swap of its own in 1987. The Central Bank of Costa Rica, acting on a proposal by the Minister of Natural Resources, Energy and Mines, Dr. Alvaro Umaña, approved a full-scale debt-conversion program that allowed Costa Rica's National Parks Foundation to trade up to $5.4 million in external debt for local-currency bonds redeemable at 75 percent of face value. These bonds would mature over a five-year period and bear 25-percent interest per year, providing financing for conservation projects.

Umaña, who made a public plea on behalf of debt-for-nature swaps in a March 1987 issue of *The Wall Street Journal*, cited foreign debt pressure and rapid deforestation in his country as "interrelated and inseparable" and predicted that unless innovative measures such as debt-for-nature swaps are enacted, "there will be no progress in vital areas [including] conservation, education, and health."

Many donors responded to Umaña's appeal. In February 1988 the Fleet/Norstar Financial Group of Providence, Rhode Island, announced a donation of $254,000 of Costa Rican debt to Nature Conservancy International, which would convert the donation to Costa Rican bonds valued at $190,000. Both principal and interest will fund land-acquisition and land-management programs for the 25,000-acre La Selva Protected Zone. Other donors soon pledged more than $5.4 million, surpassing the ceiling established when the program was authorized. The government may soon expand the program with a new ceiling of $50 million.

An Internal Revenue Service ruling in late 1987 was intended to make the notion of donating debt more attractive to U.S. banks. The ruling permits a charitable deduction equivalent to the fair market value of the donated debt, one indicator of which is its discounted price; the balance of the face value is

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deductible as a business loss. The latter provision has likely contributed to the minimal effectiveness of the market-value incentive, given that so far only one commercial lender has donated a portion of its debt holdings to conservation efforts since the IRS issued its ruling.

The conservation community welcomed the ruling as a step in the right direction, even though it didn't resolve a number of tax and accounting questions that still discourage debt donation. For example, even under the most liberal interpretation of the ruling, a bank may claim a charitable deduction only if it is donating debt to a U.S.-based organization, and only if that organization retains primary control over the funds and the funded activities in the debtor nation. Hence, U.S. banks cannot claim a deduction for donations of debt directly to programs under way in Ecuador and Costa Rica, for these programs are financially and administratively controlled by local entities. The internal political problems associated with perceived foreign control of domestic resources are a further disincentive.

Conservationists in the United States are careful to de-emphasize the extent to which involvement of U.S. interests in debt-for-nature swaps perpetuate North America's economic domination of cash-poor, resource-rich Third World nations. "It's not Yankee coming down and saying, 'This is what you do,'" maintains Deborah Burand of Conservation International. "We're coming in as a resource base for a local nonprofit group to draw off of. We're helping them understand how to protect their forests, not just put a fence around them. We don't 'know better,' but we do have access to information that can help people make informed decisions." Kathryn Fuller, executive vice-president of the World Wildlife Fund, echoes Burand's sentiments, calling the swaps "a purely local initiative" and emphasizing that they must be local to succeed.

The swaps have also been criticized as inflationary actions that pour large amounts of currency into economies unable to absorb them. But in Ecuador and Costa Rica, donations were converted not into cash but into interest-bearing bonds, which have negligible inflationary impact. "People are using the proceeds as a long-term stream of income," Burand points out, "not just as a big capital hit thrown into the local economy."

A tougher dilemma involves the multitudes of migrants, squatters, and subsistence farmers who live in and rely on rainforest lands for their support. Though in many instances these people have had a devastating effect on local habitats, their displacement by conservation and preservation efforts poses an ethical problem comparable to that stemming from profit-motivated development projects.

This dilemma is especially difficult to resolve, yet conservation groups involved in debt-for-nature programs have made the welfare of these people a priority. "The only way to prevent the erosion of the remaining tropical forests by resource-hungry, fuel-hungry people," says Randall Curtis of Nature Conservancy International, "is to provide viable economic alternatives both within and on the periphery of these forests."

To preserve rainforests while simultaneously providing resources for local subsistence farmers, conservation groups in Latin America and the United States have employed a "strategy of concentric circles" in their preservation programs. "The areas that constitute a unique and special ecosystem receive full protection from any use other than recreation, tourism, and research," Curtis explains, "but around them you have multiple-use buffer zones that allow many different levels of economic use." The World Wildlife Fund has established a Wildlife and Human Needs department to integrate the welfare of squatters and farmers into its debt-for-nature programs. Farmers are taught how to use forest lands and resources sustainably and are given employment opportunities in park facilities.

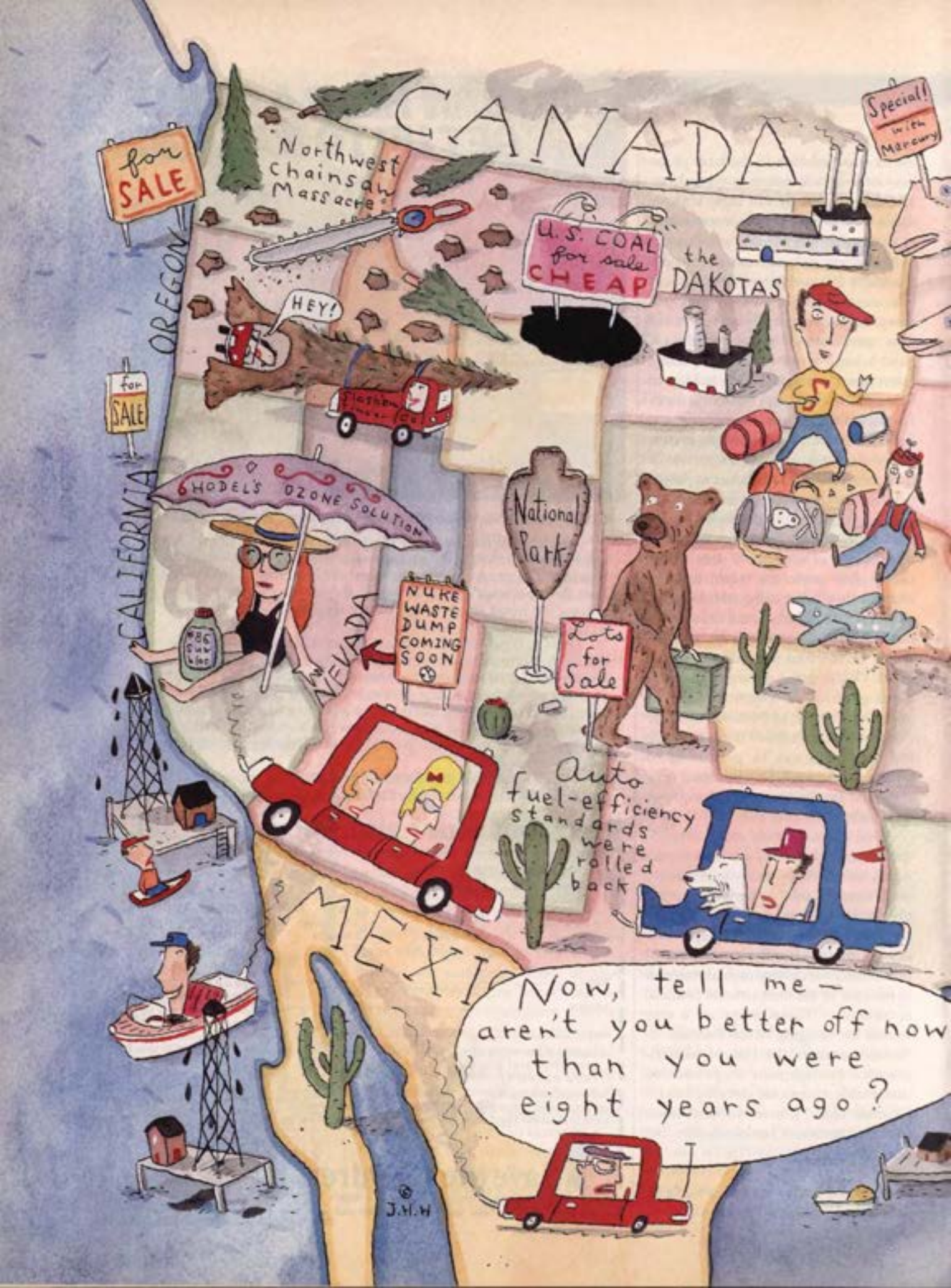
Even the strongest boosters of debt-for-nature swaps don't regard them as

the ultimate solution to the twin problems of debt and resource exhaustion. The debt total is far too high, and the ability of the conservation community to absorb funds efficiently too limited. Furthermore, many observers consider it unlikely that multilateral development institutions such as the World Bank will ever play a significant role in this form of debt restructuring—and that closes off quite a large window of opportunity, given their prominent role as holders of Third World debt (especially in Africa). Finally, debtor nations have only limited funds to commit to such swaps, even at heavy discounts from the face value of their debts, and must still elect to pursue debt-for-nature strategies in the face of competing equity-based offers.

But even if debt-for-nature swaps by themselves fail to make a dent in the overall debt crisis, it's hoped that the example they've set will establish a precedent for a more substantial debt-settlement agreement mediated by governments or the International Monetary Fund. "We're going to try to facilitate direct government-to-government negotiations," says the National Wildlife Foundation's Bramble. "We're advocating that countries be permitted to qualify for debt relief by initiating conservation investments and changes in their natural-resource policies."

Given the minuscule effect debt-to-nature swaps have had on the international debt crisis—and the relatively small bandage they've been able to apply to the gaping wound of tropical rainforest destruction—perhaps their key contribution will be an increased prominence for environmental concerns in the eyes of the international financial community. "These swaps are a new vehicle for bringing to the attention of decision-makers the role of natural-resource management in promoting sustainable economic development," Bramble says. "Conservationists never had the attention of bankers before, but now they do." ■

ANDREW N. HULTKRANS *researched debt-for-nature swaps as a* Sierra *intern.*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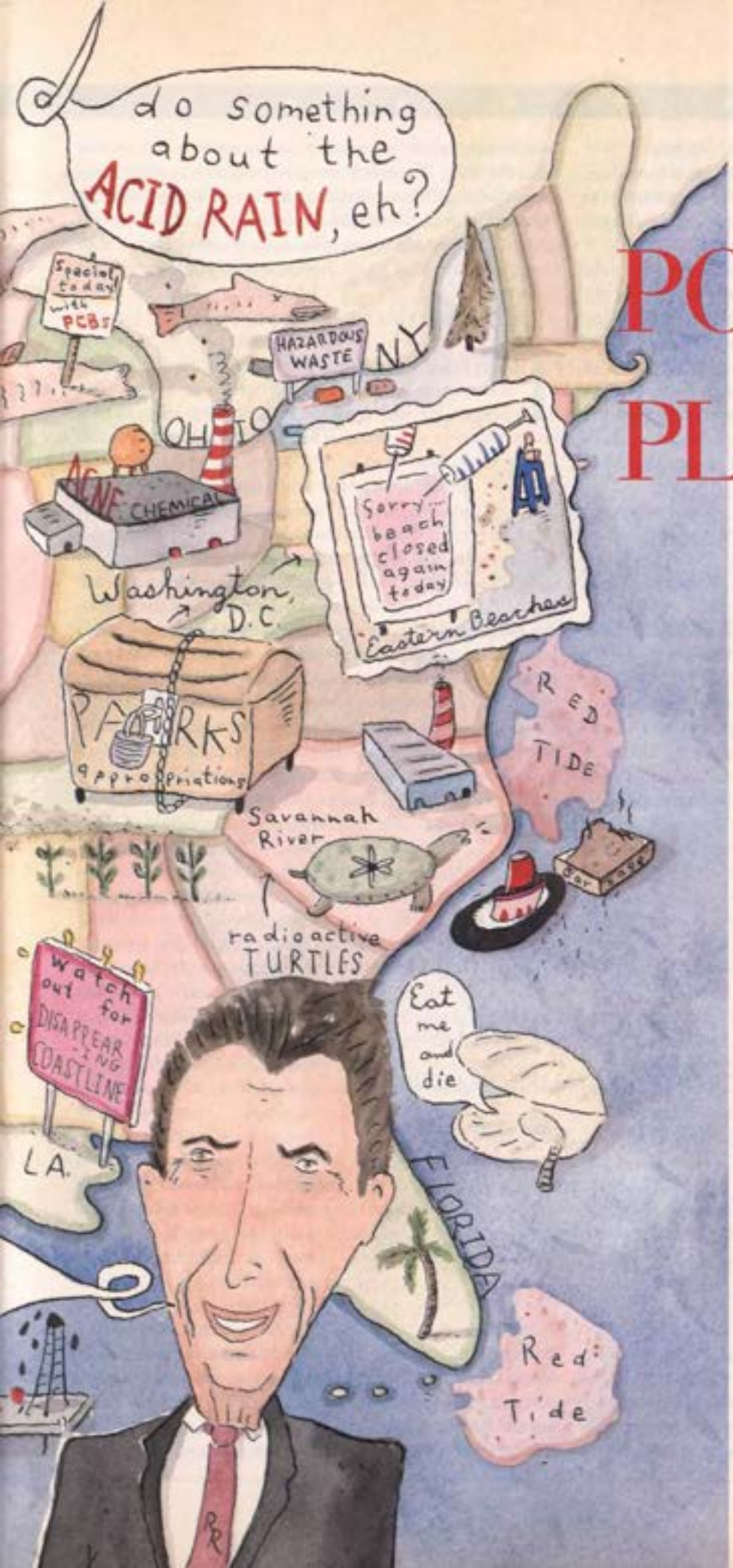


The POLITICS of PLUNDER

After eight years of Ronald Reagan, the environmental movement finds itself stronger than ever—though the nation bears battle scars that will take decades to heal.

AT HALF PAST FOUR ON ELECTION DAY, 1980, Sierra Club volunteers and staff gather around a borrowed television set at the Club's San Francisco headquarters to watch the returns.

For the first time the Club has conducted a major voter-education drive. It's been a discouraging effort. Republican presidential candidate Ronald Reagan has barnstormed the country, attacking the Carter administration and even its Republican predecessors for turning environmental agencies over to "extremists." He has made some outlandish statements, ranging from a promise to invite the steel and oil industries to rewrite the EPA's regulations to a charge that 80 percent of the nation's air pollution problems are caused by chemicals released by trees. Despite growing controversy over Reagan's reactionary environmental stands, polls indicate that

BY CARL POPE

Illustration by Jessie Hartland

he is likely to defeat the incumbent, Jimmy Carter.

Groans fill the room as soon as the television is turned on. Even though the polls will remain open for several hours in the far West, the networks are already proclaiming Reagan the winner.

Spirits slump further as the Senate and House results pour in. In state after state, senators who have fought for the environment are being upset by their opponents. Among the losers are John Culver of Iowa, a leader of the fight to clean up hazardous waste dumps; Gaylord Nelson of Wisconsin, one of the initiators of Earth Day; George McGovern of South Dakota, the environmental conscience of the Senate Agriculture Committee; and John Durkin of New Hampshire, a staunch advocate of energy conservation and renewable energy resources.

A little later, Frank Church of Idaho, one of the Senate's leading proponents of wilderness, is narrowly defeated by Steve Symms, a virulent advocate of public-land exploitation. By seven o'clock only a scattering of sorrowful Sierra Clubbers remain at the election-night party.

The next morning it is clear that very few pro-environment candidates have managed to claw their way to the top of the Reagan avalanche. Representative Morris Udall, chair of the House Interior Committee, is reelected, as are most of the other key environmental players in the House. Of the environmental leaders in the Senate facing strong 1980 challenges, only Alan Cranston of California wins a decisive victory. Senator Gary Hart of Colorado wins, but barely.

Reagan's coattails are so long that the Republicans finally wrest control of the Senate from the Democrats. The new chair of the Senate Energy Committee, with jurisdiction over the nation's public-land and energy resources, is Symms' ideological soulmate and fellow Idahoan, James McClure. The new head of the Senate Agriculture Committee is arch-conservative and wilderness foe Jesse Helms of North Carolina.

"The end of the environmental movement" is proclaimed by NBC News (along with the demise of feminism and civil rights). Mainstream Republicans who served on the staffs of environmental agencies under presidents Nixon and Ford, some of whom worked for Reagan when he was governor of California in the late 1960s and early '70s, are passed over for jobs. By Inauguration Day environmental policy is firmly in the hands of the "sagebrush rebels"—abrasive, conservative ideologues from the West. The rebels' antigovernment bias is strongly supported by Office of Management and Budget (OMB) Director David Stockman, a former Republican congressman from Michigan who only months earlier told Congress that toxic waste dumps are not a proper federal concern.

The Reagan Era has begun.

Today environmentalists are breathing slightly easier, and counting the few days left in Reagan's reign. The Sierra Club has moved to larger headquarters, a necessary response to a membership that soared from 180,000 during the Carter years to 480,000 in September of 1988. Ironically, Ronald Reagan has motivated far more people to join the Club and other environmental organizations than all of his predecessors combined.

Reagan, in effect, has reinvented the national environmental movement. He has done so with appointments and policy initiatives that have offended and alarmed the American people—efforts consistent with the President's general hostility toward activist government and his unlimited faith in private economic institutions. But it is one thing to promise to get the government off the taxpayers' backs. It is an altogether different proposition—and an unacceptable one to most Americans—to relieve polluting industries of the burden of complying with environmental laws. It's one thing to extol the virtues of free markets; it's another to extend that principle *ad absurdum*, offering to sell national parks to geothermal companies or amusement-park operators.

IT'S CLEAR THAT THE PAST EIGHT YEARS HAVE NOT TURNED OUT AS ENVIRONMENTALISTS FEARED; NOR HAVE U.S. BUSINESSES REAPED THE RICH HARVEST THEY ANTICIPATED.

★

For nearly eight years the American people have been confronted with a difficult choice. In the White House a charismatic political leader has made taxpayers an appealing promise of limited government. A majority of voters have felt that Reagan and his economic programs fit well with their values of personal freedom and achievement. At the same time, in the EPA, in the Department of the Interior, in the OMB, and elsewhere in the federal bureaucracy, Reagan's zealous and often hard-edged political appointees have openly displayed their contempt for the environmental values and programs that have long since become an accepted part of American life.

The public's reaction has been to support Reagan as a

person, but to make sure that his anti-environmental ethic is not translated into concrete policy. Citizens demanded and got the ouster of Interior Secretary James Watt, EPA Administrator Anne Burford, and EPA Assistant Administrator Rita Lavelle—the first generation of Reagan's hard-line appointees. They joined environmental groups and told pollsters that their commitment to those issues was stronger than ever before. In 1984 they elected a Congress that stopped virtually all of Reagan's anti-environmental initiatives.

Faced with this formidable resistance, the Reagan administration gradually abandoned the environmental front. By the middle of Reagan's second term his administration's new initiatives were far closer to the mainstream than to the privatized, deregulated world the President's pre-inauguration team had laid out. The administration came in adamantly opposed to federal cleanup of abandoned hazardous waste dumps, for instance, yet eventually agreed to a strong Superfund bill that would provide for just that.

Now, at the end of Reagan's second term, it's clear that the past eight years have not turned out to be as disastrous as the environmentalists who watched the 1980 election returns feared; nor have U.S. businesses reaped the rich harvest they anticipated in the early months of 1981. The most disappointed of all must be the ideologues, the Watts, Burfords, and Stockmans. They had their best shot ever at the American environmental ethos. Yet they strengthened, rather than weakened, the public's determination to protect the environment—and that is one of the more surprising legacies of Ronald Reagan.

At Gettysburg, Pennsylvania, on July 2, 1863, some 15,000 infantrymen under General George Pickett made the Confederacy's northernmost assault on Union lines. They failed, thrust back by withering shrapnel and rifle fire. Historians glorify the event as the high-water mark of the doomed Confederacy.

The last eight years may represent a similar high-water mark for an equally lost cause—an ethic of irresponsibility that economist Kenneth Boulding dubbed "cowboy capitalism" because it emerged from the so-called cowboy wing of the Republican party. Like the Confederacy after Pickett's charge, the minority that believes with Reagan confidant Justin Dart that environmentalism is "the disease of modern America" can no longer hope to prevail.

There can be no question that Reagan's appointees tried on numerous fronts to weaken America's commitment to the environment.

- They talked loosely of selling some units of the National Park System, and for eight years regularly proposed eliminating federal funding for park acquisition.
- A dentist from South Carolina, James Edwards, began dismantling conservation and renewable-energy programs soon after he was named Secretary of Energy.
- Through Reagan's Task Force on Regulatory Reform, headed by Vice President George Bush, the OMB's Stockman targeted scores of environmental regulations that were later weakened, delayed, or eliminated.
- Administration officials offered mineral leases at bargain-basement prices on millions of acres of public land. They recommended putting the entire outer continental shelf (OCS) on the auction block, under lease procedures that ranged from honest giveaways to outright corruption. In its first ten OCS lease sales, the administration managed to transfer titles to prime oil tracts for $7 billion less than would have been realized using the leasing methods of previous administrations.
- Reagan appointees rebuffed repeated pleas from Canada for a reduction of the acid rain that is destroying its forests, its economy, and life in its lakes. Instead of solutions, some Reaganites talked of "more studies" while Stockman made scornful references to "billion-dollar fish."
- Appointees at the EPA crippled the Superfund toxic-waste-cleanup program, and the program's key administrator, Rita Lavelle, went to jail.
- Morale at the EPA, the National Park Service, the Fish and Wildlife Service, and the Bureau of Land Management collapsed in the face of inadequate budgets, the administration's repeated refusals to enforce the laws, and its political interference in regulatory decisions.

THE MOST DISAPPOINTED OF ALL MUST BE THE IDEALOGUES, THE WATTS AND BURFORDS, WHO STRENGTHENED, RATHER THAN WEAKENED, CITIZENS' DETERMINATION TO PROTECT THE ENVIRONMENT.

If George Pickett's charge was the high-water mark of the lost cause of secession, it was also a triumph for the cause of the Union. To commemorate the victory, today cannons look out over mint-green slopes on the battlefield at Gettysburg, and white-marble memorials glisten in the Pennsylvania sun.

Likewise, environmentalists have public monuments to

REAGAN'S REIGN: ADDING UP THE IMPACTS


TOM DIETRICH-APERTURE PHOTOBANK

Logging roads, Montana

National-forest recreation facilities the U.S. Forest Service considered to be adequately maintained
in 1978: **74 percent**
in 1985: **29 percent**
(*Americans Outdoors*, The Report of the President's Commission, 1987.)

★

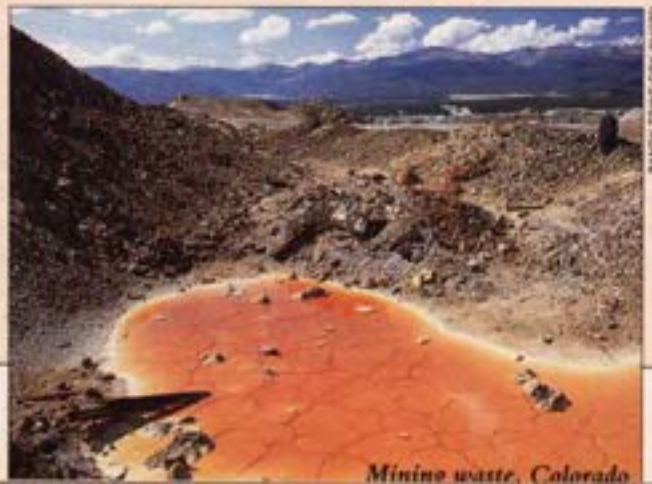
Amount of federal offshore-oil revenue placed in the Land and Water Conservation Fund and designated for park acquisition and recreation development that has been left unspent since 1981: **$6 billion**

Additional amount likely to go unspent in fiscal year 1989 under Reagan's budget: **$841 million**
(*New York Times*, March 15, 1988.)

★

Cuts in EPA budget, 1981–84: **44 percent**
in EPA staffing, 1981–84: **29 percent**

Decrease in number of violations of environmental laws referred to the Department of Justice by the EPA in Reagan's first year: **69 percent**
(Norman J. Vig and Michael E. Kraft, *Environmental Policy in the 1980s*, 1984.)
(Barry Commoner, *The New Yorker*, June 15, 1987.)


RANDY TRUE-CRA PHOTO

Mining waste, Colorado

Office of Surface Mining regulations rewritten after James Watt became Interior Secretary: **90 percent**

Number of strip-mine sites mined illegally by 1985 following James Watt's reorganization of the Office of Surface Mining: **6,000**

Civil penalties Reagan's Office of Surface Mining collected of the $108 million the agency assessed against mines for environmental infractions: **8 percent**
(Brooks Yeager, "Wasted Energy," Sierra Club, 1988.)

★

EPA portion of the total federal budget

1980: **1.0 percent**	1984: **0.5 percent**
1981: **0.8 percent**	1985: **0.5 percent**
1982: **0.7 percent**	1986: **0.5 percent**
1983: **0.5 percent**	1987: **0.5 percent**

(*Statistical Abstract of the United States*, 1988.)

★

Defense Department portion of the total federal budget

1980: **25 percent**	1984: **28 percent**
1981: **25 percent**	1985: **28 percent**
1982: **27 percent**	1986: **29 percent**
1983: **28 percent**	1987: **29 percent**

(*Statistical Abstract of the United States*, 1988.)

★

Trail maintenance, Washington

Estimated backlog in needed maintenance of national-forest trails: **$100 million**

U.S. Forest Service's fiscal 1989 budget request
for trail maintenance: **$15.7 million**
for trail construction: **$0.00**
(*Funding the Future*, National Trails Coalition, April 1988.)

★

Roads constructed in national forests

1970: **942 miles**	1983: **2,016 miles**
1980: **925 miles**	1984: **1,667 miles**
1981: **1,217 miles**	1985: **1,903 miles**
1982: **1,867 miles**	1986: **1,252 miles**

Total miles of roads in national-forest areas: **343,000**

Total miles in Interstate Highway System: **44,000**
(*Statistical Abstract of the United States*, 1988.)
(*Funding the Future*, National Trails Coalition, April 1988.)

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Coal mining, Montana

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Cuts in federal energy-conservation funding during the first seven years of the Reagan administration: **70 percent**

in funding for development of renewable energy sources: **85 percent**

PAT O'HARA/APERTURE PHOTOBANK

Barrels of oil per day now consumed in the United States: **16.6 million**

Barrels of oil per day now saved as a result of conservation measures enacted during the Carter administration: **13 million**

Barrels of oil per day it is possible to save through energy-conservation measures and the use of renewable resources: **8.7 million**

(News release, Safe Energy Communications Council, July 12, 1988.)
(Brooks Yeager, "Wasted Energy," Sierra Club, 1988.)

★

Number of high-priority toxic waste sites existing at the beginning of Reagan's first term: **546**

Number of sites currently listed: **1,177**

Number of sites that have been cleaned up and deleted from the EPA's priority list: **16**

(*Four More Years*, Sierra Club, 1984.) (*Federal Register*, June 24, 1988.)
(EPA Office of Public Affairs.)

Toxic waste site, California

CINDY CHARLES/GAMMA LIAISON

point to from the Reagan years, monuments in which they can and should take pride. Hundreds of thousands of Americans stood up to Reagan, Bush, Watt, and Burford and preserved and strengthened the country's environmental ethic. Good laws were passed and harmful ones blocked; lawsuits argued and won on their merits; scoundrels evicted from office. More people signed the Sierra Club's petition to remove Watt from Interior than had ever simultaneously petitioned Congress on any other issue. Thousands of dedicated civil servants in public agencies resisted the efforts of political appointees to disrupt the execution and enforcement of the nation's environmental statutes. The media covered environmental issues with more intensity than ever before. State and local governments assumed much of the burden that the Reaganites refused to shoulder.

Thanks in large part to environmentalist campaigns, more acreage was added to the National Wilderness Preservation System in the lower 48 states under Reagan than under any other president. Twenty-nine new wildlife refuges were established, encompassing a total of 500,000 acres; 200 new plants and animals were added to the nation's list of endangered species. The Clean Water Act, the Resources Conservation and Recovery Act, and the Comprehensive Environmental Response, Compensation, and Liability Act (the Superfund) have all been reauthorized and greatly strengthened. Lead is finally being phased out of gasoline after two generations of use. An international agreement to reduce the production of chlorofluorocarbons (CFCs), chemicals that destroy the protective stratospheric ozone layer, has been ratified. Oil leasing along the California coast has been stalled, and the Arctic National Wildlife Refuge is still closed to oil drilling.

Just this summer, the Senate renewed the Endangered Species Act by the largest margin ever—92 to 2. A majority of the House of Representatives, including 64 Republicans, went on record as favoring a massive strengthening and renewal of the Clean Air Act. The Senate declined to confirm Robert Bork and Bernard Siegan, viewed by environmentalists as Reagan's two worst judicial nominees.

In the end, even the delegates to the Republican National Convention in August demonstrated surprising disagreement with Reagan's environmental policies. In a survey conducted for the Sierra Club and other conservation groups, the delegates showed strong support for federal leadership in protecting the country's natural resources.

But behind the public monuments and official histories are often individual tragedies that raise the question of whether there can be true winners in such battles. For thousands of families, North and South, the legacy of Gettysburg was empty places at the supper table, sons and daughters growing up without fathers or grandfathers, lives wasted, saddened, or impoverished. In the aftermath of the Civil War the economy of the South suffered for generations. In the 1960s, a century later, the nation had to struggle

again with the racism and inequality that was not defeated at Gettysburg, that did not surrender at Appomattox.

Conventional historical accounts of the Civil War take too little heed of the cumulative impact of these losses. Similarly, in evaluating the legacy of the Reagan years, there is a danger of focusing too closely on questions of who won and who lost which short-term battles, ignoring the costs of the struggle. We should not forget that on mountaintops and beaches, in small woodlands and majestic rainforests, in cities and playgrounds, in the oceans and the atmosphere itself, reminders of the Reagan Era will linger for decades.

ON MOUNTAINTOPS AND BEACHES, IN SMALL WOODLANDS AND MAJESTIC RAINFORESTS, IN THE OCEANS AND THE ATMOSPHERE ITSELF, REMINDERS OF THE REAGAN ERA WILL LINGER FOR DECADES.

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There are no easy ways to count the "battlefield deaths" attributable to Ronald Reagan's environmental policies; any descriptions are necessarily impressionistic and inexact. But, as Reagan himself seems never to have grasped, the losses are real.

Beginning in space, a tour of the planet can help open our eyes to the costs of the conflict. The first and perhaps the most important change is in the very color of our Earth. From the level of an orbiting satellite, the change is invisible to the naked eye. But infrared photographs show our planet, overall, to be slightly redder than it was eight years ago—the result of a steadily increasing concentration in the atmosphere of industrial gases. These are the so-called greenhouse gases: carbon dioxide from deforestation and fossil-fuel combustion; CFCs from industrial processes, the manufacture of styrofoam, and air-conditioning systems; methane from coal seams and rice paddies.

Of the carbon dioxide concentrations that industrial society has added to the atmosphere, two thirds have been produced in the last 35 years. A 1-degree increase in average global temperatures over the past eight years has been measured, and the media have reported extensively on the environmental consequences of such a trend.

What has not been widely discussed is the extent to which the Reagan administration squandered momentum built up by its predecessors that could have helped avert a major global warming trend. By 1980 the industrial world, following the example of the United States, had begun a crucial move away from fossil fuels toward increased energy efficiency and use of renewable energy sources. Then, in 1981, the Reagan administration junked as many as it could of the programs that were accelerating the U.S. transition. At the President's request, the Department of Energy slashed funding for energy conservation by 70 percent. Auto fuel-efficiency standards, scheduled to increase regularly, were rolled back by Reagan at the behest of Ford and General Motors, and over the protests of Chrysler.

The overall energy efficiency of the U.S. economy continued to improve, because research and investments made under presidents Ford and Carter continued to pay off. But while Japan has increased its energy efficiency by 31 percent during the '80s—and was more efficient in the first place—the United States has achieved an increase of only 23 percent. Worse, in the last few years even that modest level of improvement has stalled. As a result of Reagan's belief that the world energy market could be left to the mercies of private enterprise, we face a far tougher challenge in trying to avert disastrous levels of global warming.

After eight years of Ronald Reagan, our planet is less green at ground level as well. In the Tongass National Forest in Southeast Alaska, for example, thousands of acres of ancient temperate rainforest have been slashed in a logging program that has cost U.S. taxpayers $333 million since 1982. While these cuts were mandated by a law signed by Jimmy Carter, the Reagan administration has stubbornly resisted all major legislative and administrative proposals that would lessen the damage.

South along the Pacific fog belt, in the forests of the Pacific Northwest, brown silt is running down from thousands of miles of new logging roads, courtesy of Reagan's Department of Agriculture. These roads are allowing the clearcutting of old growth at a rate of one square mile per week and opening up potential wilderness areas in Washington's and Oregon's national forests.

In California an even older forest is falling to the chainsaw. Support for the destruction of these privately owned coastal redwoods is coming not from Reagan's Agriculture officials but from the laissez-faire policies of the Treasury Department and the antitrust division of the Justice Department. In one of the last gasps of merge-and-burn Wall Street mania, the company that owned these trees, Pacific Lumber, was bought out by a corporate raider. To pay off the junk bonds that financed the sale, the new owner intends to cut old-growth redwoods at twice the previous rate, eliminating them entirely in 20 years.

At the edges of the continent, surf lines that were once brilliant hues of blue and green have grown murkier during

the Reagan years. Red tides of algae nourished by pollutants have spread, as unchecked urban and rural runoff has overstressed the tidal zone. Acid rain has clouded and poisoned coastal estuaries of the East, including Chesapeake Bay, Albemarle Sound, and Long Island Sound. In Louisiana erosion, subsidence, and rising sea levels are making the coast itself disappear into the ocean.

Along both coasts, the visible effects of pollution are overshadowed by invisible ones: the steady accumulation of toxic chemicals in marine organisms, the loss of biological productivity, and the breaking of vital links in marine food chains. The list of policy failures contributing to ocean contamination is a long one: lack of protection for the wetlands that filter urban runoff, cutbacks in funding for sewage-treatment plants, inaction on acid rain, delays in the phaseout of lead and other toxic chemicals, and inadequate funding for state coastal-zone-management programs.

The Reagan administration blocked effective international action to curb this pollution when it refused to ratify the Law of the Sea Treaty, an international agreement designed to protect offshore marine environments. It also stalled domestic efforts by suggesting that the most important uses of the coastlines are for oil and gas production or other industrial activities. Certainly responsibility for these failures goes back beyond the Reagan administration. Nonetheless, the Reaganites have done little to prevent the further decay of our coastal waters. This past summer, for the first time, huge stretches of beach in the Northeast were so littered with garbage from ocean dumping that they were closed to swimmers.

An airline passenger who flew into almost any major metropolitan area last August would have descended through a distinctly brown zone into concentrations of smog that had not been experienced in years. Denver, Los Angeles, New York, Baltimore: City after city is feeling the results of eight years of stagnation in air-cleanup efforts. Measurements taken by state agencies last August show that Washington, D.C., had pollution levels 22 percent higher than those of the worst previous year this decade. Cincinnati's levels were 31 and Chicago's 36 percent higher. Meanwhile, medical reports indicate that U.S. clean-air standards, relaxed in the Reagan years, would not adequately protect people even if they were enforced.

Also during Reagan's terms, a cascade of toxic chemicals has poured into the environment. Again, the problem preceded Reagan: Since World War II these chemicals have been accumulating in the soils and in the biological food chain—even in human bodies. But Reagan's administration has done almost nothing to stop the flow.

Reaganites point to lead as a substance the administration *did* make an effort to control. The 1988 party platform states that Republicans "have dramatically reduced airborne lead contamination" by reducing the amount of lead allowed in gasoline. But the same week the platform committee was pointing to that achievement, Lee Thomas, the final administrator of the EPA in the Reagan Era, refused to set lead standards for drinking water at the tap. Instead the EPA set standards at the water-treatment plants—even though most lead enters drinking water after leaving these facilities.

The partisans of lost causes do not give up easily. The Civil War went on for nearly two years after Gettysburg. While it appears unlikely that any administration would again launch an all-out war against the environment in the fashion of Watt, Burford, and Stockman, important challenges remain.

Eight precious years have been lost. The patterns set by Reagan's policies could have irreversible consequences in ten, or twenty, or thirty years—very brief times to change the direction of cumbersome national and international economies and polities.

The fabric of society in the American South needed similarly dramatic changes after the Civil War. A national effort called Reconstruction ensued, but soon failed. For the partisans of the South, it seemed too harsh. For the former slaves the venture was intended to liberate, it was all too brief.

WE NOW NEED A GLOBAL ENVIRONMENTAL RECONSTRUCTION. WE NEED TO ASK OF OURSELVES AND OUR LEADERS MORE SELF-DISCIPLINE THAN EVER BEFORE.

★

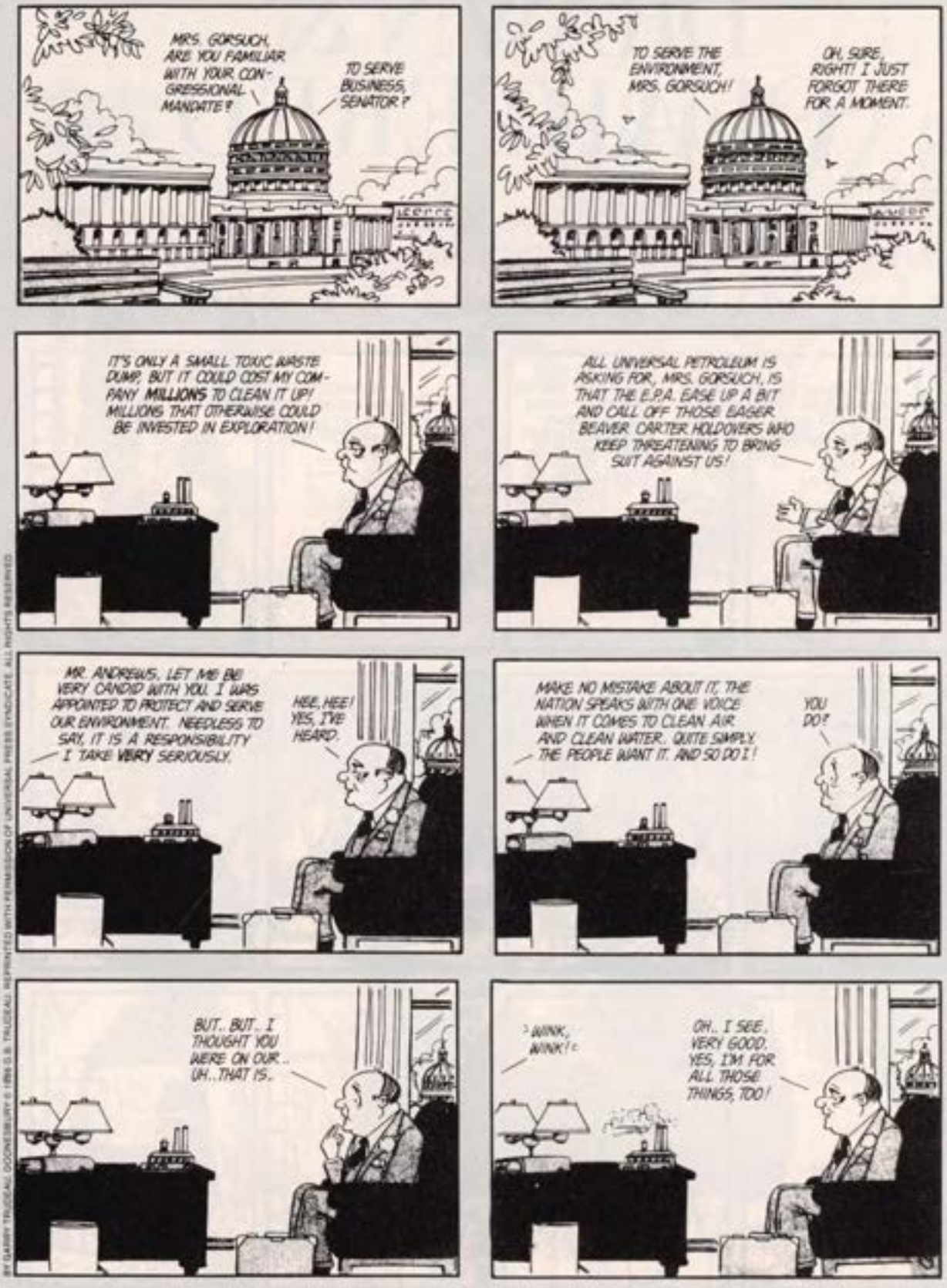
We now need a global environmental Reconstruction. We need to ask of ourselves and our leaders more self-discipline than ever before, in part to compensate for the callousness of the last eight years. We need greater fidelity to facts, in part because our most recent leaders tried to wish them away. We need above all to remember that time matters, that events have consequences, and that the world is a wondrous and intermingled web that, when torn in one place, may unravel a thousand miles or a hundred years away. ■

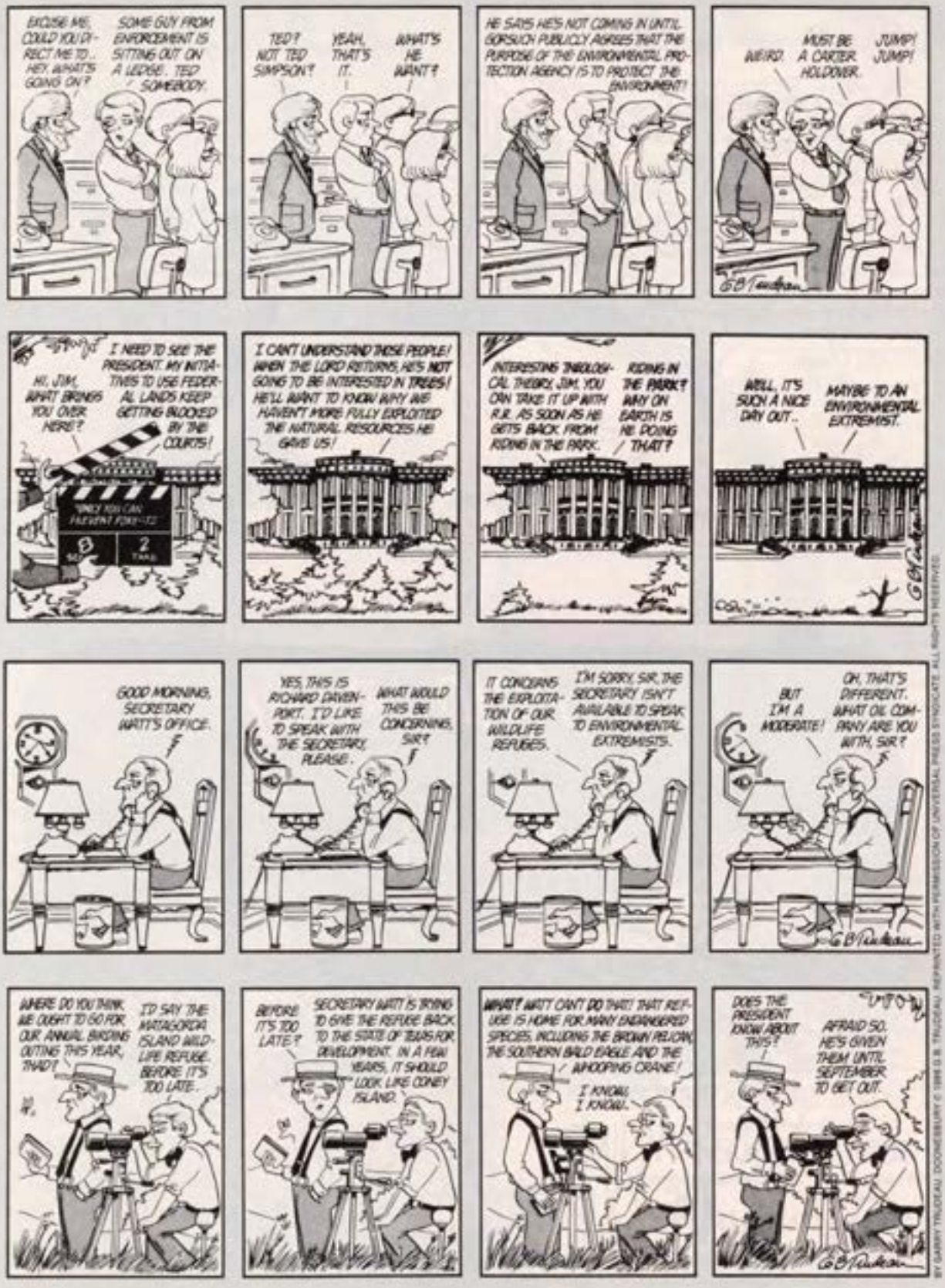
CARL POPE *is the Sierra Club's deputy conservation director.*

'SURELY,' SAYS I, 'NOT THE JAMES WATT, FOLK-HERO AND FAMOUS WILDERNESS RAPIST!' 'THAT'S ME,' SAYS HE. AND I SAYS, 'NOT THE RENOWNED DESPOILER OF OUR PRECIOUS NATIONAL HERITAGE!' 'RIGHT,' SAYS HE. SO I ATE HIM.'

DRAWN & QUARTERED

Some of the country's sharpest pens lashed out at the environmental follies of the Reagan administration. Herewith, a selection of the best and the bitterest.




EXCUSE ME, COULD YOU DIRECT ME TO... HEY, WHAT'S GOING ON?
SOME GUY FROM ENVIRONMENT IS SITTING OUT ON A LEDGE. TED SOMEBODY.
TED? NOT TED SIMPSON?
YEAH, THAT'S IT.
WHAT'S HE WANT?
HE SAYS HE'S NOT COMING IN UNTIL GORSUCH PUBLICLY AGREES THAT THE PURPOSE OF THE ENVIRONMENTAL PROTECTION AGENCY IS TO PROTECT THE ENVIRONMENT!
WEIRD.
MUST BE A CARTER HOLDOVER.
JUMP! JUMP!
HI, JIM, WHAT BRINGS YOU OVER HERE?
I NEED TO SEE THE PRESIDENT. MY INITIATIVES TO USE FEDERAL LANDS KEEP GETTING BLOCKED BY THE COURTS!
I CAN'T UNDERSTAND THESE PEOPLE! WHEN THE LORD RETURNS, HE'S NOT GOING TO BE INTERESTED IN TREES! HE'LL WANT TO KNOW WHY WE HAVEN'T MORE FULLY EXPLOITED THE NATURAL RESOURCES HE GAVE US!
INTERESTING THEOLOGICAL THEORY, JIM. YOU CAN TAKE IT UP WITH R.R. AS SOON AS HE GETS BACK FROM RIDING IN THE PARK.
RIDING IN THE PARK? WHY ON EARTH IS HE DOING THAT?
WELL, IT'S SUCH A NICE DAY OUT..
MAYBE TO AN ENVIRONMENTAL EXTREMIST.
GOOD MORNING, SECRETARY WATT'S OFFICE.
YES, THIS IS RICHARD DAVENPORT. I'D LIKE TO SPEAK WITH THE SECRETARY, PLEASE.
WHAT WOULD THIS BE CONCERNING, SIR?
IT CONCERNS THE EXPLOITATION OF OUR WILDLIFE REFUGES.
I'M SORRY, SIR, THE SECRETARY ISN'T AVAILABLE TO SPEAK TO ENVIRONMENTAL EXTREMISTS.
BUT I'M A MODERATE!
OH, THAT'S DIFFERENT. WHAT OIL COMPANY ARE YOU WITH, SIR?
WHERE DO YOU THINK WE OUGHT TO GO FOR OUR ANNUAL BIRDING OUTING THIS YEAR, THAD?
I'D SAY THE MATAGORDA ISLAND WILDLIFE REFUGE. BEFORE IT'S TOO LATE.
BEFORE IT'S TOO LATE?
SECRETARY WATT IS TRYING TO GIVE THE REFUGE BACK TO THE STATE OF TEXAS FOR DEVELOPMENT. IN A FEW YEARS, IT SHOULD LOOK LIKE CONEY ISLAND.
WHAT? WATT CAN'T DO THAT! THAT REFUGE IS HOME FOR MANY ENDANGERED SPECIES, INCLUDING THE BROWN PELICAN, THE SOUTHERN BALD EAGLE AND THE WHOOPING CRANE!
I KNOW, I KNOW.
DOES THE PRESIDENT KNOW ABOUT THIS?
AFRAID SO. HE'S GIVEN THEM UNTIL SEPTEMBER TO GET OUT.
BY GARRY TRUDEAU DOONESBURY © 1983 G.B. TRUDEAU REPRINTED WITH PERMISSION OF UNIVERSAL PRESS SYNDICATE. ALL RIGHTS RESERVED.


FOX LEASE
BUREAU OF LAND MANAGEMENT'S LAND MANAGEMENT PLAN


WATT
BEAUTY IS IN THE EYE OF THE BEHOLDER


ACID RAIN
Z-Z-Z-Z
ASTH
'IT'S RAINING, IT'S POURING,
THE OLD MAN IS SNORING...'

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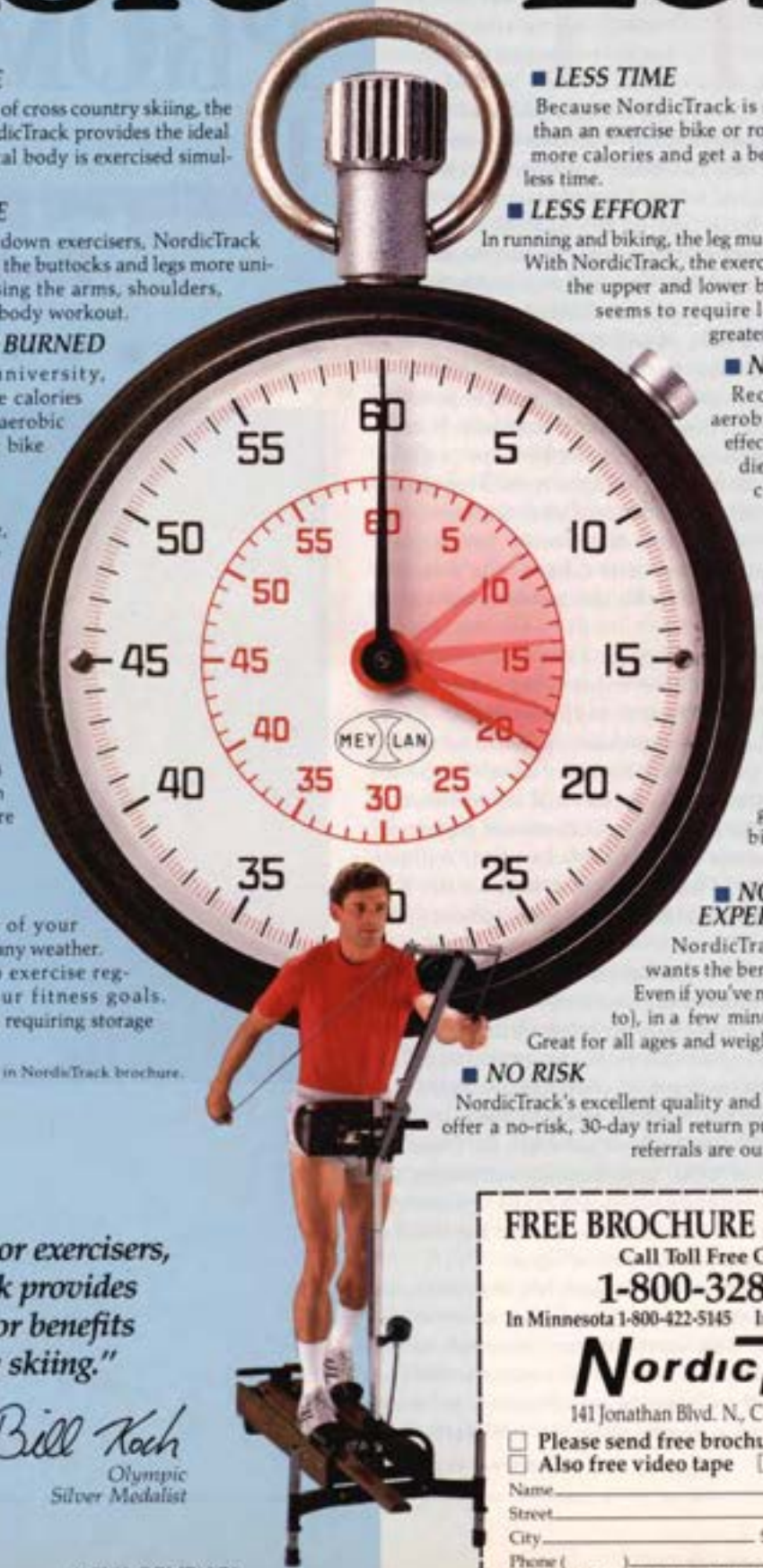
*Scientific test results included in NordicTrack brochure.



■ LESS TIME
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■ LESS EFFORT
In running and biking, the leg muscles do most of the work. With NordicTrack, the exercise workload is shared by the upper and lower body muscles, so exercise seems to require less effort and provides greater cardiovascular benefits.

■ NO DIETING
Recent studies show that aerobic exercise is much more effective for losing weight than dieting. And no other exercise machine burns more calories than Nordic Track...So you can lose weight faster without dieting.

■ NO IMPACT
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PROMISES

Ladies and gentlemen, a few
the next President of

BY GEORGE BUSH

This past summer has been a particularly noteworthy one from an environmental standpoint. Medical waste washed up on beaches from Lake Erie to the Atlantic seaboard. Unsafe levels of coliform closed beaches—the result of years of legal foot-dragging and delay in treating sewage by cities like New York, Boston, and others. Drought conditions caused severe damage to farms and turned national forests into tinderboxes. The exceptionally warm weather seemed like a warning, if only a symbolic one, of things to come.

Nineteen eighty-eight is the year Earth spoke back. That statement has a good side, as well as the obvious bad one. The positive result is that it may stir Americans, and leaders all over the world, into a new recognition of the importance of protecting the environment. That can only help, because addressing problems as comprehensive in scope as global warming, acid rain, and waste management will require the involvement of all citizens, and indeed all nations.

The trick is to ensure that the concern lasts beyond the end of the summer. I can state categorically that, in a Bush administration, concern for the environment will be year-round.

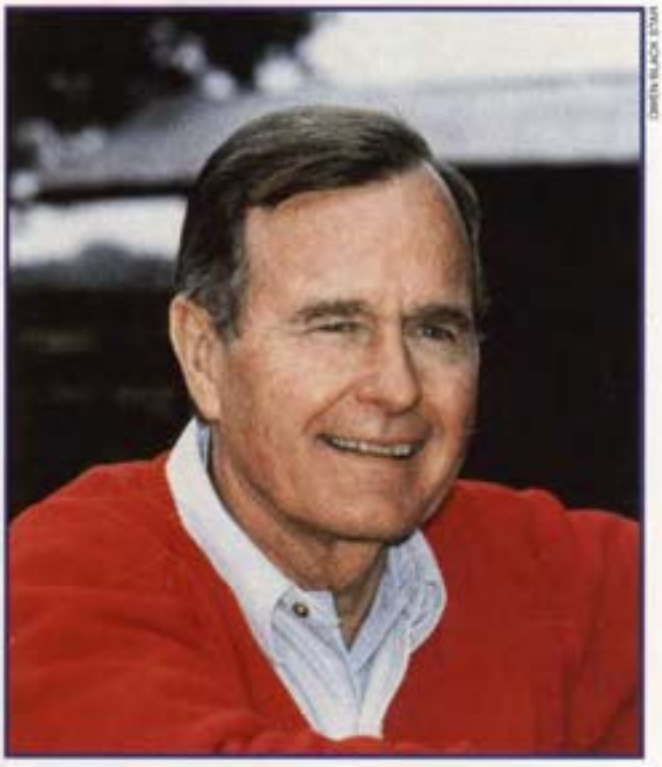
I am a businessman by background and a conservative by inclination. But I do not believe that being either one of these is inconsistent with being an environmentalist.

In fact, one goal of a Bush presidency would be to lead America toward a greater "conservation ethic"—a greater understanding that a clean and protected environment is essential to our public health, to our continued enjoyment of the outdoors, to our economic development, and ultimately to our quality of life. Most important, we owe it to our children and grandchildren to leave them a planet that is better than we found it.

These principles have guided me since I first came to Washington as a freshman congressman back in 1966, a time when congressional interest in environmental affairs was first awakening. In my two terms in Congress, I voted for many of the original landmark environmental bills that led to some of the progress we have made in these last two decades: the Water Quality Improvement Act, the Clean Air Act Amendments of 1970, and the bill establishing the Council on Environmental Quality. One bill I was particularly proud of was that which established the Big Thicket National Preserve in my home state of Texas.

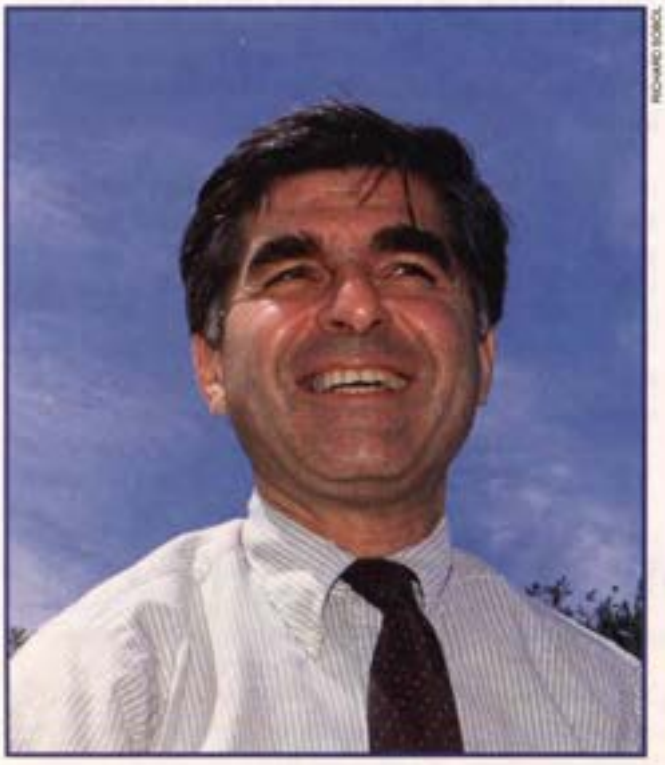
I mention this history for a reason: My interest in the environment is no recent development, but rather a lifelong commitment. That commitment continued during these last eight years, as I worked to create the Wallop-Breaux Trust Fund to improve our fisheries, to insert important conservation provisions in the 1985 Farm Bill,

Continued on page 64



TO KEEP

words on the environment from the United States . . .



RICHARD SOBOL

BY MICHAEL DUKAKIS

"Thousands of tired, nerve-shaken, over-civilized people are beginning to find out that going to the mountains is going home, that wilderness is a necessity and that mountain parks and reservations are useful, not only as fountains of timber and irrigating rivers, but as fountains of life."

—John Muir, 1897

Those words rang true in 1897. They ring even truer in 1988. But we've been taking our environment for granted, and we're beginning to pay the price.

When I was growing up, we never worried about the ozone layer or the greenhouse effect. We'd look at the vastness of the ocean and the sky and not even imagine that there was anything we could do that would jeopardize our ability to survive on this planet.

Today our children are learning to look at the world differently. They see fish they cannot eat. They see sewage and syringes washing up on a tide of environmental neglect. They discover hazardous materials in their backyards. They are learning the hard way about disappearing forests, and dying lakes, and contaminated drinking water, and air that you can taste and smell and that is hazardous to breathe.

For eight years, the Reagan-Bush administration has undermined our national commitment to long-term conservation. We've seen short-term exploitation: the appointments of James Watt and Anne Gorsuch, budget-slashing at the EPA, bargain-basement sales of natural resources, and weak enforcement of our environmental protection laws. All of this demonstrates that the present administration simply doesn't care about the environment.

We must do better, and we can do better.

My administration will reverse the shortsighted and environmentally destructive management of our land and air and water. It will set an example of environmentally sensitive and cost-effective stewardship for states, communities, and private industry to follow.

Our environment is too important to leave outside the door when the decisions get made inside. That's why, in a Dukakis administration, we're going to make the EPA a Cabinet-level department. And the first Secretary of the Environment is going to be as committed to protecting the environment as George Bush has been to neglecting it.

Environmental problems do not respect national boundaries. Acid rain, global warming from the greenhouse effect, stratospheric ozone depletion, destruction of tropical rainforests, and pollution of the oceans are problems that require cooperative, international solutions. As president I will immediately call for an international environmental and conservation summit to bring together world leaders to confront these urgent problems.

Continued on page 65

BUSH ► *continued from page 62*

and to promote the deregulation of natural gas, a clean-burning fuel.

This election, however, is about the future. I spoke at our party's convention about building a kinder, gentler nation. A big part of that is a much greater effort to protect and enhance the environment.

I should be clear: I believe that effort must begin with the individual. Each of us, whether we live in the White House on Pennsylvania Avenue or the corner house on Main Street, makes choices every day that affect the environment—we generate garbage, use water, and drive our cars, to name a few. We must all take responsibility for our own actions and recognize the impacts that they have.

Acid rain, however, is a problem that *cannot* be solved by individuals acting alone. It is a problem that engenders regional differences and requires international cooperation. It is an issue that calls for presidential leadership.

Some people believe that we should continue to study the problem and determine the exact nature of the damage it causes before acting. *I disagree.* I believe that we should begin now to *reduce* emissions of those substances that contribute to acid rain as an insurance policy against future damage.

I therefore strongly favor a program that would reduce sulfur dioxide emissions by millions of tons by the year 2000, and significantly reduce nitrogen oxide emissions as well.

I should state here that I do not believe it is wise, in the heat of an election campaign, to stake out specific numbers of reductions. I believe that a reduction of millions of tons is achievable, but I also recognize that regardless of who is elected, our new president will have to sit down with Congress to work out the exact amounts and the exact methodology. Staking out positions for political purposes now will not necessarily contribute to that process; it could well undermine it. The important point is that I am *committed* to an aggressive emissions-reduction program.

We can achieve these reductions through a combination of actions—installing scrubbers, burning lower-sulfur coal, moving forward with clean-coal technology and fluidized-bed construction, and other means.

The burden of achieving these reductions, however, must be shared equitably. No one region or group should be hit unfairly with the cost of addressing a problem that affects all of us.

I would point out that we have made some recent progress. Last year I flew to Canada and met with Prime Minister Mulroney to help secure an agreement to undertake a $5-billion joint program to develop clean technology. This year I urged that the United States join in an international protocol to limit nitrogen oxide emissions. We are close to reaching agreement with other nations on this protocol, which I believe should be signed by the United States and implemented around the world.

The need for international cooperation to solve environmental problems is increasingly evident, and I believe that such cooperation is the key to solving two other significant problems: ozone depletion caused by chlorofluorocarbons (CFCs), and global warming, or the so-called greenhouse effect.

The United States should be the leader in forging international cooperation on the environment; under a Bush administration, it will be.

We have already seen the benefits of such leadership. Last

Continued on page 116

LET THE RECORD SHOW . . .

. . . that George Bush has taken the following actions on these issues:

Clean Air and Acid Rain
- supported delays for auto-industry compliance with nitrogen oxide emission standards
- opposed acid rain legislation
- advocated (in 1988) an international agreement to freeze nitrogen oxide emissions
- chaired a Regulatory Reform Task Force in 1981 that instructed the EPA to "consider relaxing or rescinding the entire phasedown rule for lead in gasoline"
- supports a clean-coal research program and oxygenated fuels

Hazardous Waste
- chaired a task force that suspended EPA standards for hazardous waste facilities

Ozone Depletion
- supported the Montreal Protocol to reduce CFC use and production

Public Lands
- supported oil exploration in the Arctic National Wildlife Refuge

Water Pollution
- chaired a task force that suspended regulations restricting discharges of industrial toxins into sewers
- supported Clean Water Act veto

Wetlands
- supported efforts to open to development 50 percent of the wetlands protected by the Clean Water Act
- supported the wetlands-protection provisions of the 1985 Farm Bill

Energy Conservation
- chaired a task force that persuaded the administration to repeal federal requirements for energy efficiency in new buildings
- supported the repeal of auto fuel-economy standards

DUKAKIS ► *continued from page 63*

The key to a national acid-rain-control program is leadership from the top. As president I will work with Congress to stop the acid-rain pollution of North American skies and waters. I will establish national standards to reduce emissions of sulfur dioxide and nitrogen oxide—the two major components of acid rain.

Emission controls on fossil-fuel-burning power generators and motor vehicles are essential to achieving this goal. Even under the existing Clean Air Act, proper regulation of tall stacks by the EPA could cut sulfur dioxide emissions by nearly 5 million tons per year.

In addition to these domestic actions, I will initiate cooperative efforts with the Canadian government to address the broad environmental and political implications of transboundary pollution.

Today this country has no national energy policy. I propose a national energy policy that makes sense and that balances our energy needs with the environmental and economic needs of our citizens. We need a program that requires better fuel-efficiency in our automobiles, promotes greater efficiency in new building construction, and increases federal support for the development of efficient and/or renewable technologies. I will place a far greater emphasis than we currently place on recycling, increased energy efficiency, and conservation.

If we simply increased efficiency for automobiles by 1.5 miles per gallon, we would be saving more oil than we could get from drilling in the entire North Atlantic, all of Northern California, Washington, Oregon, and Alaska's Bristol Bay combined.

I will continue to oppose offshore drilling in critical environmental areas and productive fishing grounds, as I did for Georges Bank off the New England coast. It's time to cancel Lease Sale 91 off the Northern California coast and drilling in the Florida Keys.

I strongly oppose the Department of the Interior's five-year plan for oil and gas development. We need to strengthen the responsibility of individual states in determining the direction of coastal protection policies. I support legislation introduced by Rep. Leon Panetta (D-Calif.) to reestablish the right of states to review offshore-oil lease sales.

We must manage federally owned lands in the long-term public interest. In a Dukakis administration, we will manage our wildlife and timber and marine resources so that our children will inherit a world as full of life and wonder as the world handed down to us by our parents.

As governor of Massachusetts I worked with my legislature to launch the largest open-space-acquisition program in the history of our state, including the nationally renowned Urban Heritage Parks program. Massachusetts, the sixth-smallest state in area, now has one of the largest park systems in the country.

As president I will implement the central recommendations of the Report of the President's Commission on Americans Outdoors. The report recommended a new trust fund that would make it possible for us to acquire millions of acres of new wilderness and parkland for America. This fund will enable us to create new urban and rural parks; to expand our system of wild and scenic rivers; to create new trails for hiking, new areas for camping and picnicking, and new acreage of protected habitat for birds and wildlife of all kinds.

I will work with Congress to designate the Arctic National Wildlife Refuge a wilderness area, and to pass legisla-

Continued on page 116

LET THE RECORD SHOW. . .

. . . that Michael Dukakis has taken the following actions on these issues:

Clean Air and Acid Rain

- set more than 100 standards for toxic air pollutants in Massachusetts
- declared his support for a 12-million-ton reduction in sulfur emissions and a 4-million-ton reduction in nitrogen oxide emissions nationwide by the year 2000

Hazardous Waste

- supported (in 1983) the first state Superfund program
- supported a citizen initiative setting deadlines and standards for waste-site cleanups

Ozone Depletion

- signed an executive order in Massachusetts banning the use of styrofoam packaging containing CFCs

Public Lands

- introduced and enacted the largest open-space-acquisition program in the nation

Water Pollution

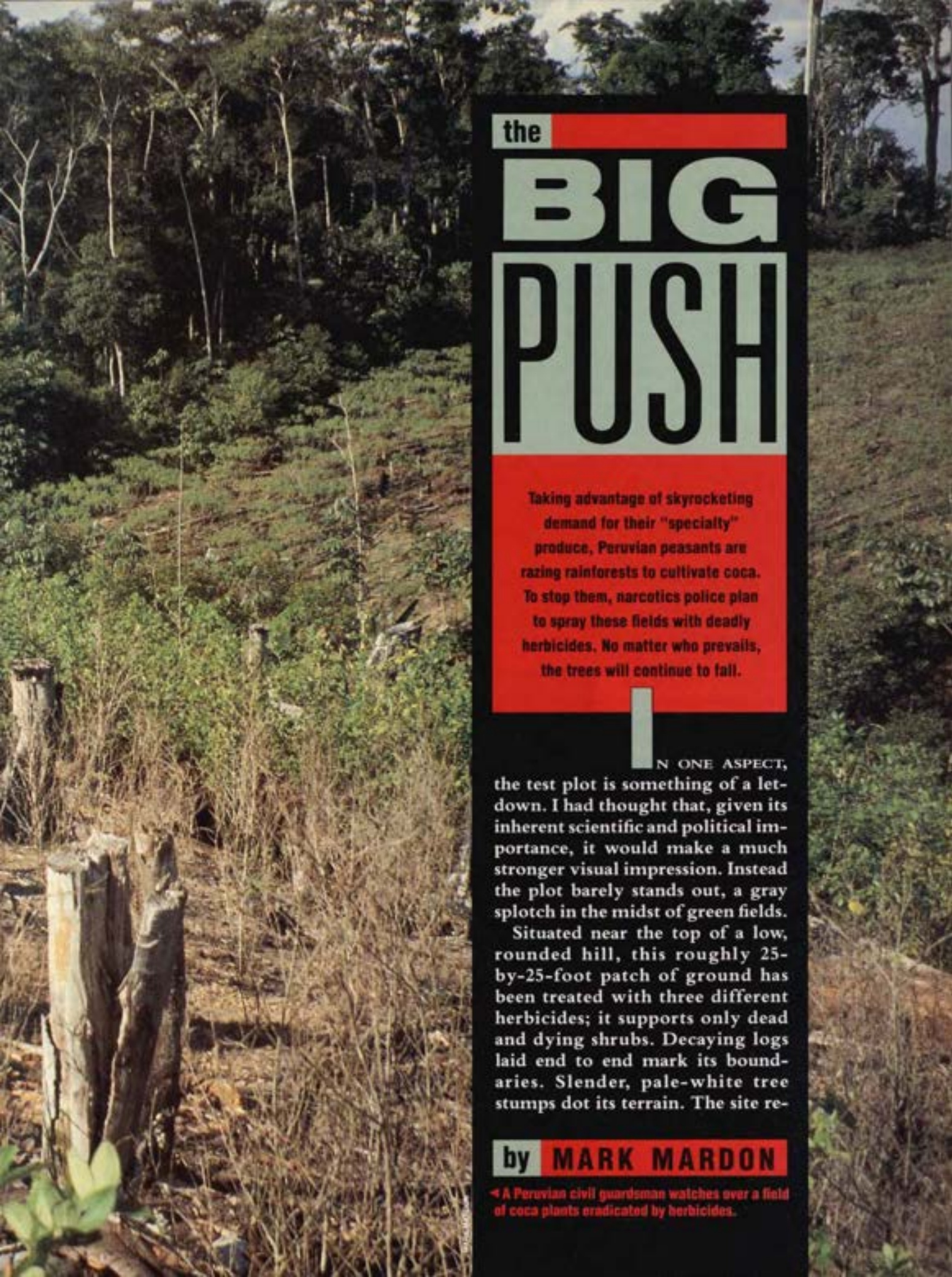
- delayed cleanup of Boston Harbor, moving only after litigation; eventually put strong program in place
- strengthened Massachusetts law to facilitate action against polluters and improve enforcement
- developed water-conservation programs to improve the efficiency of sewage-treatment systems

Wetlands

- put together a program to protect Massachusetts wetlands; after slow start, dramatically increased funding and enforcement

Energy Conservation

- initiated a state law setting energy-efficiency standards for appliances
- instituted a statewide loan program for home insulation and weatherproofing



the BIG PUSH

Taking advantage of skyrocketing demand for their "specialty" produce, Peruvian peasants are razing rainforests to cultivate coca. To stop them, narcotics police plan to spray these fields with deadly herbicides. No matter who prevails, the trees will continue to fall.

IN ONE ASPECT, the test plot is something of a letdown. I had thought that, given its inherent scientific and political importance, it would make a much stronger visual impression. Instead the plot barely stands out, a gray splotch in the midst of green fields.

Situated near the top of a low, rounded hill, this roughly 25-by-25-foot patch of ground has been treated with three different herbicides; it supports only dead and dying shrubs. Decaying logs laid end to end mark its boundaries. Slender, pale-white tree stumps dot its terrain. The site re-

by MARK MARDON

◄ A Peruvian civil guardsman watches over a field of coca plants eradicated by herbicides.

sembles nothing so much as a garden that has been left untended and unwatered for months.

If this spot were located in the farmlands of North America, these naked stems might be mistaken for the remnants of a drought-strangled crop. This is, however, Peru's Upper Huallaga Valley, an area some 150 miles long and 50 miles wide that edges the Amazon River basin along the eastern slopes of the Andes. The plants are *Erythroxylum coca* var. *coca*, the leaves of which are used to produce cocaine.

This site is one of several where the Peruvian and United States governments are conducting anticocaine experiments, initiated by the U.S. State Department at the request of former Attorney General Edwin Meese. These dead coca bushes are the aftermath of scientific experiments; they indicate the kind of destruction in store for both crops and forests if certain herbicides are applied heavily throughout the valley.

Hence the presence here of an impressive array of VIPs inspecting this pathetic-seeming bit of real estate. Principal among them is General Juan Zárate, commander of the antinarcotics force of Peru's Civil Guard, wearing his characteristic sunglasses, visored cap, and green fatigues. Zárate stands on a hilltop beneath the stationary rotor of a blue Bell 212 helicopter provided by the U.S. State Department. He rests his right hand atop the holstered pistol on his hip as he talks with the chief press officer of Peru's Ministry of the Interior. Close by stand two agents of the U.S. Drug Enforcement Agency (DEA) dressed in full military camouflage gear; M-16s slung over their shoulders, they alternately scrutinize the general, scan the hillsides, and watch a second helicopter piloted by another DEA agent circle overhead.

Down the hill, within the testing area, a chemicals analyst from the United States is poking around among the dead shrubs. He is one of four researchers from the Arlington, Virginia, laboratory of Labat-Anderson, who at the State Department's request have prepared an environmental assessment on the use of herbicides to eradicate illicit coca in the Andean countries of Peru, Ecuador, Bolivia, and Colombia. Even though his name appears on the final report, this is his first visit to South America, and his first look at a test site.

Reporters from *Newsweek*, *The New York Times*, the *Indianapolis Star*, the *Boston Globe*, *Sierra*, and ABC News are tramping through the test plot, trying to find something to report on. Unfortunately, there is little to learn. As an environmental reporter, I would like to know which herbicides have been applied to which areas, but no one here is qualified to say.

I do know that one of the herbicides used was tebuthiuron, produced by Eli Lilly & Company in the United States and sold in pellet form under the trade name Spike. Basing its decision in part on the Labat-Anderson study, the State Department has determined that Spike is the most effective, least environmentally troublesome herbicide available for the U.S.-supported war on coca. When the pellets are dropped from airplanes onto coca fields, the Labat-Anderson study says, their weight should keep them from drifting far into the surrounding rainforest. And except for preventing photosynthesis in plants, it also says, Spike is essentially nontoxic. It is, for these reasons, the product State Department officials are intent on using in their eradication campaign.

VIRA LIMTZ/VISIONS

In Peru's Upper Huallaga Valley, the unassuming coca plant is the focus of deadly controversy.

Unfortunately for them, Eli Lilly refuses to sell Spike for this purpose, citing "practical and policy considerations" preventing such a sale. The company's intransigence has caught the State Department off guard, prompting the agency to mount a campaign to mobilize U.S. public opinion in support of its anticocaine operations, and to pressure Eli Lilly into cooperation. As part of that public-relations thrust, selected media have been invited on a fact-finding tour of the Upper Huallaga Valley.

The gist of remarks the State Department officials make openly, and of what they leave unsaid, is that the coca war is a no-win situation as far as the environment is concerned. Even if Spike *does* inadvertently kill rainforests, officials imply—though they steadfastly deny it will have any significant effects on forest ecology—the coca plantations are already doing the same thing. Since the forest is lost either way, there's no reason *not* to go ahead with an eradication program that will make some contribution to stemming the flow of cocaine to the United States.

"Isn't this impressive?" asks the chief of the U.S. embassy's Narcotics Assistance Unit. He is referring to a landscape logged to make way for coca plantations. He gazes across a shallow valley, focusing on a hillside where neat rows of healthy coca shrubs grow on expanses of land surrounded by rainforest.

"They don't grow anything else," he says, mistakenly, of the coca farmers. New to his assignment in Peru, he doesn't recognize that the plot he is looking at contains yucca, a staple food crop, as well as coca. "Yeah, well," he mutters when someone points this out to him, "this is one of the rare times you'll see a mix like that."

Several minutes later, I ask him why a few coca plants still survive within the test site. He suggests almost apologetically that some seeds must have fallen onto the test site since completion of the spraying. It's a shaky theory, though. The plants we're discussing are mature specimens. Scientists from the U.S. Department of Agriculture sprayed this

Growing coca is often a family affair. In most cases its cultivation is illegal, but the profit motive is a powerful one.

plot only eight months ago. Seedlings, if they could sprout at all (given the presence of residual herbicides in the soil), would be quite small. Two of the herbicides applied here—hexazinone and dicamba—persist only a few months in tropical environments. But the third, Spike, has an estimated half-life of more than 11 months in tropical soil, meaning that it persists for years at strengths sufficient to control vegetation. Woody plants absorb Spike through their roots and die after it spreads through their stems and leaves, inhibiting photosynthesis. Once treated with Spike, the land could support no life, other than grasses, for at least two years, and probably for much longer. Our Labat-Anderson researcher dismisses the narcotics chief's idea, suggesting instead that the herbicides used were unevenly applied on the site, so that not all plants were affected. This makes better sense to me.

Around the hill's perimeter, at least 16 Peruvian policemen carrying automatic rifles stand guard against possible attack. The situation is potentially as grim as it looks: Our party would be a likely target for a variety of dissidents—narcotics traffickers, of course, but also local farmers angered by the government's destruction of their coca crops. The policemen watch also for any sign of movement by members of Sendero Luminoso (the Shining Path), a Maoist revolutionary group, or by the equally militant Tupac Amarú Revolutionary Movement, better known by its Spanish acronym, MRTA. One year ago, armed MRTA forces moved through the northern end of the Huallaga Valley, taking control of several towns. In response, Peruvian President Alan García established emergency military zones in the departments of San Martín and Huánuco, placing most of the Huallaga Valley and the region's principal town, Tingo María, under martial law. In an uneasy division of powers, Peru's military suppresses revolutionary movements, while its civilian police force, the Civil Guard, fights the war against cocaine. So far, at least, the two forces have respected each other's territory.

On a level area one or two hillsides away, a band of peasants has gathered to stare at the intruders in their midst. Standing still, they make no threatening gestures, and the police ignore them. Many of the police, who have been sweltering in the afternoon heat and humidity, have taken refuge in the shade of a peasant's shack on top of our hill. I ask one of these men the whereabouts of the owner of the house and its surrounding coca plantation; he shrugs his shoulders. "He has gone away," he says in Spanish.

General Zárate maintains that this shack and others like it are not permanent residences but "refuges"—temporary shelters built by farmers who understand, but do not accept, that coca growing is an outlaw activity. Even so, the refuge appears sturdy, its heavy wooden planks set firmly on the ground, its top a corrugated tin roof. Inside, the floor is hard-packed earth.

MARK MARCON

Hundreds of thousands of acres of rainforest have been cleared for coca plantations.

Two wooden platforms, piled with bedding and overhung with canopies, are attached to one wall a few feet above floor level. Otherwise, the interior is spare. Two roosters—one at either end of the large room—are tethered to the walls by strings tied around their necks. Oddly out of place in this setting, a backpack-type herbicide sprayer leans against the wall in the shadows of a corner of the room.

Outside, the sky is hazy, as smoke from burning forest spreads across the valley. Clouds appear only intermittently on the horizon—unusual weather, considering that the Huallaga Valley is frequently so overcast that reconnaissance flights for antinarcotics intelligence-gathering have proved difficult to conduct.

■ ESTIMATES INDICATE THAT ANYWHERE from 400,000 to 940,000 acres of the Huallaga Valley are now planted in coca. A figure midway between those extremes is probably accurate, according to conservationist Marc Dourojeanni, a former head professor at the National Agrarian University in Lima who is now with the World Bank's Latin American environmental division. In a report released by the U.S. State Department, Dourojeanni says that no crop except coffee is planted so extensively. He maintains that coca farms—together with "exhausted lands abandoned by the growers; areas used by peasants who have fled regions dominated by narcotics traffickers and terrorists; land used by coca growers fleeing police repression; and areas deforested for clandestine landing strips, camps, and laboratories"—account directly or indirectly for the deforestation of some 1.7 million acres of jungle in the Peruvian Amazon. That adds up to roughly 10 percent of the total rainforest destruction in Peru this century.

Dourojeanni, in agreement with most Peruvian agronomists, considers the Upper Huallaga Valley ideal for forestry and for wildlife reserves, but poorly suited to agriculture. Situated in a mountainous region, the valley receives heavy rainfall and has the nutrient-poor soils associated with tropical forests. Many conservationists thus decry the clearing of rainforest tracts for any purpose—even by the peasants who eke out modest livings by cultivating cassava, banana, corn, and yucca. Nonetheless, these plantations are both widely dispersed and relatively small. In contrast, the loss of ground cover to coca cultivation, especially on hilltops and steep hillsides, has led to massive erosion.

"No other crop in the world causes similar levels of erosion," Dourojeanni says. As a result, "thousands of people have . . . died in floods and landslides in the montane jungle region of Peru."

Dourojeanni is also concerned about the possible effect of herbicides used to control weeds on coca plantations: "Because the crop is so profitable, and the growers generally very ignorant, agrochemicals are applied in overdoses."

But deforestation, erosion, and chemical dumping are not the only problems, Dourojeanni says. "The coca zones are a no-man's-land where the rule of law has been replaced by the rule of anarchy. Logging, hunting, and fishing are completely uncontrolled," he says. "The few protected areas . . . are being invaded by drug traffickers and coca growers. The most pathetic example, Tingo María National Park, was invaded in 1972."

"Gold rushers" is what U.S. Ambassador Alexander F. Watson calls the Upper Huallaga Valley's new immigrants. From his embassy in downtown Lima, Watson maintains a close watch on Peru's antidrug operations, and has been instrumental in providing U.S. assistance to the antidrug police. He strongly advocates the use of Spike or some other herbicide for eradicating coca fields in the Huallaga Valley.

"These people know they're engaged in an illicit enterprise," Watson tells journalists at an embassy press conference. "They're not traditional farmers. They're not growing other crops." Nor, he adds, are they traditional coca users. Coca continues to play an integral role in Andean cultures, as it has for thousands of years: Some 2 million Quechua- and Aymara-speaking Indians who live on the high plains of the Andes chew the leaf for its mildly stimulating effect.

"They're a different kind of person," says Watson of the newcomers, and for this reason he has few qualms about wiping out their coca crops. Enough coca would still be produced legally in the country—under the auspices of the National Coca Enterprise (*Empresa Nacionál de la Coca*)—to keep traditional users supplied.

Watson believes weakening the hugely profitable cocaine-trafficking organizations, which are dominated by Colombians, is a necessary step toward reducing the demand for coca. Those organizations pay Peruvian farmers the equivalent of $3.60 for each kilogram of coca—$3 more than the government pays. "If you have less of a demand," Watson says, "then the price drops, and some sort of alternative economic endeavors become more attractive."

Watson's briefing is followed by an invitation to a cocktail gathering that evening hosted by the embassy's deputy

chief of mission. His home in the San Isidro district is surrounded by a high wall and guarded by security people. We are chauffeured there in an embassy van that is protected against terrorist gunshots by inch-thick Plexiglas panels bolted to the interior walls and covering all the windows.

After hors d'oeuvres and several pisco sours—the traditional Andean cocktail—one State Department official presses me for my opinion about coca growing and the related rainforest destruction. I have no doubt, I say, that the issues are inextricably linked. But, I ask him, isn't the only real solution to curb demand for cocaine in North America and Europe? Yes, he says, but since that is unlikely to happen anytime soon, it is essential in the interim to stem the supply of cocaine from Peru and Bolivia. As we pursue these themes, a tall, imposing gentleman strides directly toward me.

"Are you the man from the Sierra Club?" he interrupts.

"Yes, I am," I reply. "I write for *Sierra* magazine."

"Do you think," he asks accusingly, "that you can be objective when the State Department is paying your way here?"

The man's straightforwardness puts me in an awkward position. Among the news organizations present, *Sierra* alone has relied on State Department funding to cover its travel expenses.

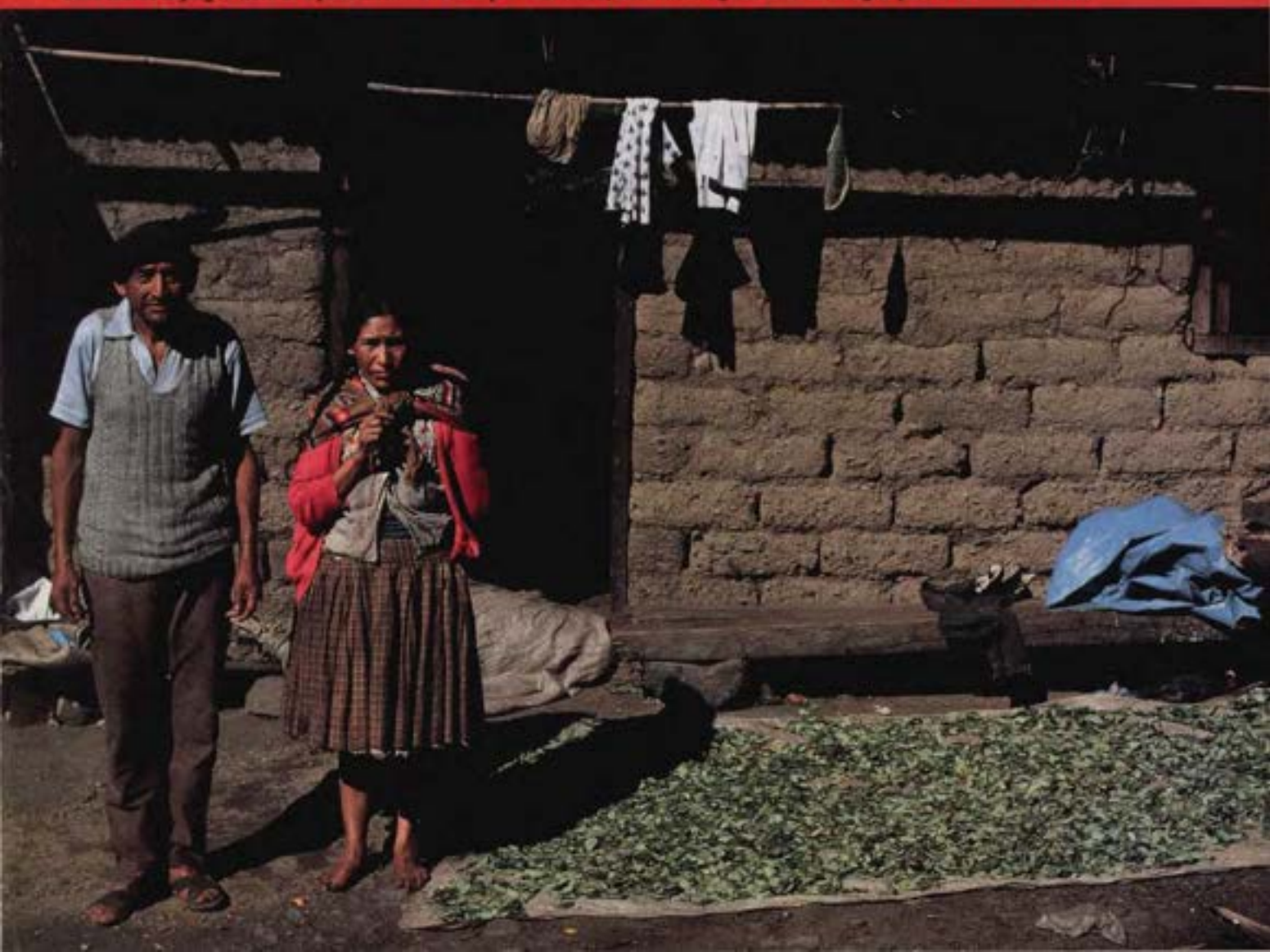
I respond as simply as I can: "I'm trying to do my best." But now I'm puzzled. I've assumed that all the officials at the gathering—the ambassador included—are interested in convincing the visiting press of the need to use Spike or some other herbicide to eliminate coca. Clearly this man has other ideas.

He introduces himself as the chief of programs for the U.S. Agency for International Development (AID) in Peru. In exchange for President García's cooperation in eradicating coca leaf, his agency supplies training and credit to Huallaga Valley farmers, helping them develop markets for coffee, palm oil, yucca flour, and forestry products. The Peruvian government is eager for this type of economic help, because such agro-industrial products require farm machinery, chemicals, and management services in short supply in Peru.

"We're spending too much money on this coca-eradication thing," he says. "We should start spending money to stop rainforest destruction in other parts of Peru where it's happening on a much greater scale."

I look around to see if anyone listening to this apparent heresy is about to grab this man and quiet him. But no one seems particularly concerned, and he continues uninterrupted.

Coca leaves drying in front of a peasant home. Since pre-Inca times, coca-chewing has been an integral part of Andean cultures.



The State Department is pumping money into the anticocaine effort in the Upper Huallaga Valley, he explains. Eighteen million dollars have been budgeted for the effort this year. By itself, AID spent almost $4 million in fiscal year 1987 to develop agriculture and employment in the valley. These efforts, the program chief hopes, will ease the peasant community out of coca growing without causing economic chaos.

"Is your program working?" I ask.

He shakes his head. It is going slowly, he admits. Because Sendero Luminoso has rallied public opinion against U.S.-sponsored programs of any kind, the valley's farmers tend to resist development efforts—even those aimed at improving the valley's economic welfare.

■ "TODAY AT 7 A.M. WE HAD GOOD luck finding a laboratory," the police commander at Tingo María announces on the second morning of our tour. "Our men are in the jungle, securing the area now. We are going to take you there so you can see how the *narcotraficantes* produce the base paste that is used in processing cocaine."

This is a surprise. The itinerary for our tour of the Huallaga does not include a trek into the jungle. But our arrival in Tingo María coincides with a bustling of police activity related to the lab discovery, and the day's activities promise to be quite enlightening.

The frontier town of Tingo María is on the Huallaga River some 17 hours from Lima by bus along Peru's Central Highway. In aesthetic terms, the town is fortunate: It sits in a beautiful tropical niche at the base of the Andes and is the gateway to Tingo María National Park.

In economic terms, though, Tingo María's blessings have been mixed at best. Colonized in the mid-1930s, the town was a sawmill, wood-processing, and distilling center into the late 1960s. Then came the cocaine boom in North America and Europe, and Tingo María's economy blossomed. Farmers began clearing jungle land, planting coca, and selling the dried leaves to cocaine producers. In return, they received far more cash than they could earn for coffee or cacao, two of the more profitable crops competing with coca leaf for the farmer's attention. As word of the boom spread throughout Peru, laborers from as far away as Lima and Arequipa moved into the valley, clearing more land, planting more coca. In the process, Tingo María acquired a nickname, "Little Chicago," reflecting the violence that came as capitalist drug barons jockeyed for control of the region's coca commerce, eventually pitting themselves against the puritanical Maoists of Sendero Luminoso.

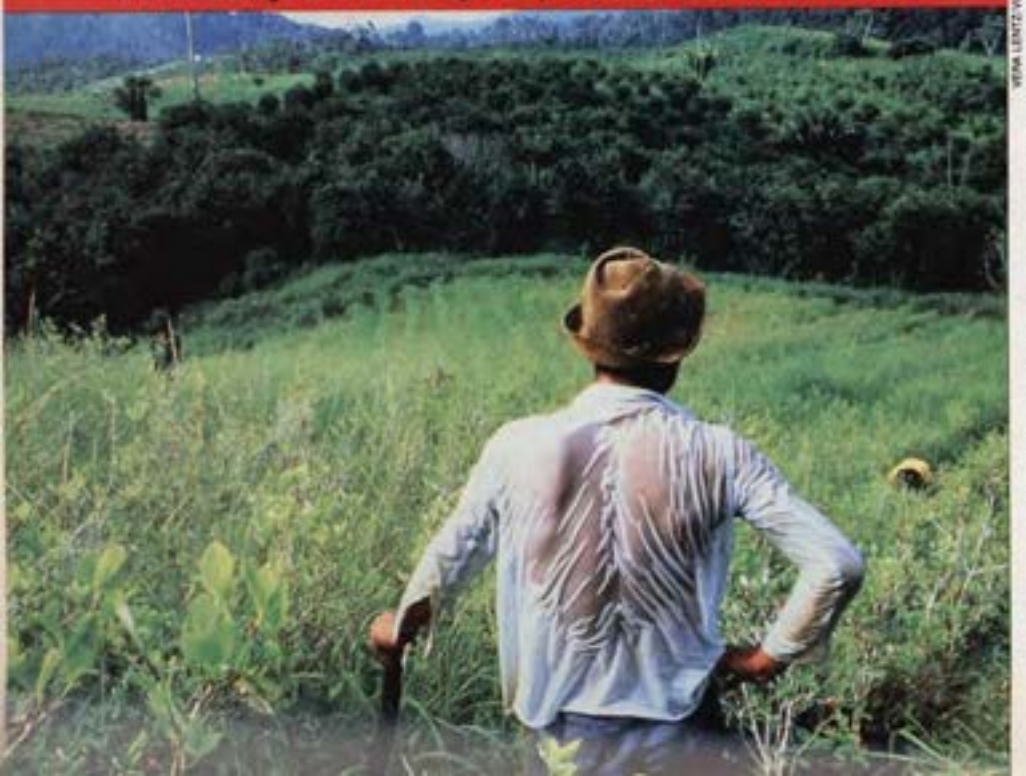
In the late 1980s the town's character has changed again: Civilian government has been suspended and administrative control assumed by the military. Even more of a headache for coca growers, the 64th Command of the Civil Guard, the "antidrug police," bases its operations here. A combat-zone tension envelops the town. Tourists visiting the national park are warned not to take photographs of the bridge across the Huallaga River, "for security reasons." One reporter who points a camera at an air force helicopter is warned away at gunpoint by a nervous young soldier standing sentinel on the grassy landing strip outside the civilian flight terminal.

From this command base, the police pressure coca growers and narcotics traffickers throughout the valley. Downriver at Santa Lucía, some 50 miles north of Tingo María as the parrot flies, a collection of red-roofed barracks and huts houses the 462-man Special Project for Control and Eradication of Coca in the Upper Huallaga (CORAH). These workers have the unenviable task of destroying coca crops by uprooting the bushes by hand. Not only is their job tedious and low-paying (each man earns about 15,000 intis—about $73—per month), it is exceedingly dangerous. In the past two years, 34 CORAH workers have been murdered by drug traffickers and both Sendero and MRTA guerrillas. Reportedly the situation in the Huallaga is so tense that police no longer travel by road, preferring instead to patrol the area in the relative safety of helicopters.

We are soon on our way across the valley to see the laboratory the police have discovered. High above the forest canopy, I sit unharnessed on the slick metal floor of one of the State Department helicopters, inches from the side opening. The serpentine Huallaga River winds through the rainforest below, curling back on itself, crisscrossing, forming white sand beaches under overhanging palms. A powerfully built young man with a very large gun resting across his knees sits opposite me, his face serious, his eyes scanning the jungle canopy. The *thwack-thwack* of the blades is deafening. A second helicopter shadows us: The choppers fly only in pairs in order to support one another.

General Zárate sits in the center of the cabin, wearing headphones. He some-

In the sweltering heat of the Huallaga Valley, a Peruvian farmer surveys his coca field.



VERA LENTZ/VISIONS

how manages to appear calm, despite the fact that he once spent days in the jungle evading armed drug traffickers after one of their rifle grenades shot him down while he was flying in a similar helicopter.

Now he receives a message from the pilot, nods, and says something into his microphone. Immediately the helicopter banks sharply. I find myself looking straight down into the jungle, certain that any slight jar will send me overboard—but I have been told beforehand not to worry, because centrifugal force will keep me in the machine. I am not altogether convinced.

We circle above a long, narrow gash in the forest, a clearing that looks incongruously like a neatly trimmed, grassy mall. Zárate explains that this was recently a clandestine landing strip, one of many such runways used by the *narcotraficantes*. The strips are just large enough to accommodate small aircraft such as single-engine Cessna 206s. The planes bring chemicals and equipment to supply rustic jungle labs, then fly coca-base paste out of Peru into isolated border areas of Colombia, Brazil, or Ecuador. There larger, more sophisticated labs are thriving, producing free-base cocaine, which forms in chunks, and cocaine hydrochloride, the most common form of the drug.

When an airstrip is first constructed, Zárate explains, many large trees are left standing along its edges, their overhanging crowns helping to conceal the cut from police and military surveillance aircraft. Only hours before a plane is due to land are the trees finally cut down and cleared away.

"Since 1985 we have discovered 179 landing strips," says the general. "We destroy them with explosives, and the *narcotraficantes* rebuild them."

This runway has been bombed by Zárate's forces and is now clearly unusable. Its otherwise manicured surface is punctuated by three enormous, water-filled craters.

One end of the landing strip points to a large hill rising sharply from the jungle floor, dripping with foliage. Northward, the rainforest stretches for miles along the flat river corridor, disappearing into the smoky haze on the horizon. So many fires burn across the valley, so much of the terrain has been ravaged, that the region resembles a scene from the Vietnam War.

KIRA LENTZ/VISIONS

The war at home: Civil guardsmen from a U.S.–supported antidrug unit on patrol.

Everywhere I see coca fields carved into the jungle, newly felled logs lying on the ground like so many pick-up sticks. Almost invariably, near the center of each coca field, a small hut has been built. On the ground near each of these, amid the dark green of mature coca shrubs, usually appears a square patch of light green: coca leaves drying in the sun.

■ "THE PRODUCTION CAPABILITY OF THIS lab," says General Zárate once we arrive at our destination, "is about 4,000 kilos [8,820 pounds] of coca-base paste per month." He walks casually across the rough floor of the wooden structure, gesturing as he approaches what look like two large, wooden crates. Both are open at the top and lined with heavy, clear plastic.

"There are always two pits," Zárate says. "In one you put the leaves; then you add chemicals: sulfuric acid, kerosene, ammonia." He demonstrates how someone would stomp—barefoot—on the toxic mixture. Then, he says, "you wait 48 hours. The leaf will release the liquid alkaloid, which flows into the second pit." He pantomimes someone pouring a bucket. "Now you add carbonates, a suspension element. It floats." Finally he cups his hand: "You scoop that up and it is now base cocaine paste."

Zárate's policemen, guns at the ready, stand alert around the lab's perimeter. The structure, supporting a peaked roof, is open to the forest on all sides. Some of the police keep watch from under the roof, others thread their way through the damp vegetation, alert for any movement; two stand with their automatic rifles leveled at a prisoner—a young man found carrying a chainsaw in the vicinity. A giant blue butterfly wafts by just inches above the forest floor, not far from the prisoner's feet.

Zárate cannot say how recently cocaine traffickers built this lab, obscuring it beneath the dense jungle canopy. We have reached it by tramping some 300 yards through a muddy stream that flows out of the jungle and into a major tributary of the Huallaga River. Fishtail palms, birds of paradise, bromeliads, orchids, bamboos, and the towering buttresses of rainforest trees lined our watery pathway.

The police begin dismantling the lab, slowly unscrewing the circular, fluorescent light fixtures attached to beams under the ceiling. As they proceed, the rest of us are asked to return to the helicopter waiting by the riverbank. The police, we are told, are going to destroy the lab by setting it on fire.

Sure enough, not more than half an hour later, as we stand beside the river at the edge of the jungle, we hear a loud *whoosh* and see a column of black smoke rise from the jungle.

Something about this scene is odd, though. I recall Zárate telling us earlier that after his men uncover a site, a judge is brought in to make a legal accounting of its contents. The most valuable equipment, including plastic receptacles, he said, is then gathered and brought into Tingo María or some other police station. But no judge is present here today, and, except for two small generators, no equipment is brought to the helicopters.

■ AT THE COCKTAIL PARTY WE ATtended our first night in Lima, an American freelance journalist suggested I let him arrange a meeting between myself and a member of the "opposition"—someone he vaguely described as being interested in stopping the government from using herbicides on coca fields.

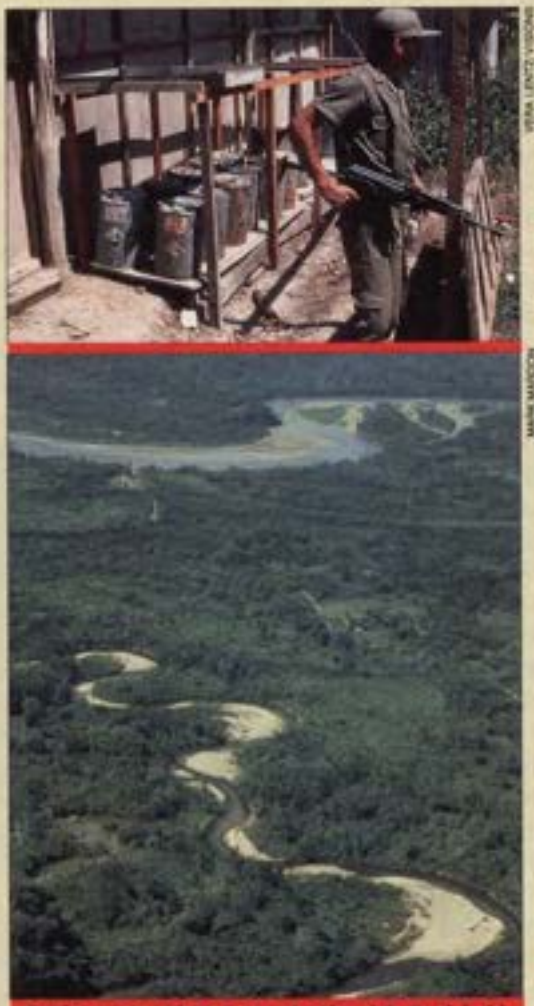
I remain uncertain about much that I've seen—for all I know, especially given the absent judge, the lab-burning was staged purely to create a sensation for the benefit of visiting journalists. Another of my journalist-companions also felt this was so, though he later reported the burning as fact. I'm no stranger to Peru, having lived and studied in Lima throughout 1980, but I'm

DUMPING COCAINE'S CHEMICALS

The evidence was everywhere. Canisters and metal drums containing poisonous chemicals littered the jungle lab our group of reporters was invited to inspect. Some of these chemicals had clearly been emptied into the stream that runs beneath the lab and feeds, in turn, into a tributary of the Huallaga River. Debris clogged the stream where it emerges from beneath the lab floor.

The toxic effects of cocaine production on the waterways of the Upper Huallaga Valley should be of critical concern to environmentalists. According to Buenaventura Marcelo of the National Agrarian University in Lima, streams and rivers in the region "have literally been flooded, year after year, with vast quantities of toxic waste and pollution."

In an unpublished paper provided to reporters by the U.S. State Department, Marcelo wrote: "In 1986 the volume of these substances was estimated at 57 million liters of kerosene, 32 million liters of sulfuric acid, 16 thousand metric tons of lime, 3,200 metric tons of carbide, 16 thousand metric tons of toilet paper [used for straining], 6.4 million liters of acetone, and 6.4 million liters of toluene." According to the research firm of Labat-Anderson, ethyl ether (an organic solvent) and concentrated hydrochloric acid are employed in the conversion of coca-base paste to cocaine hydrochloride, the white powder so familiar to users in North America and Europe. This final stage in the production process is typically carried out in the jungle laboratories of Colombia and Brazil.



VERA LENZ/VISIONS

MARK MARCON

Canisters found at a clandestine lab (top) hold chemicals, used to process coca, that are often dumped into nearby streams.

Animals and plants in many streams and rivers, Marcelo says, cannot avoid acute or chronic poisoning from sulfuric acid, an irritating, oily liquid that severely damages organic tissue. Lime is highly toxic and also raises the water's pH to levels detrimental to fauna and flora. Acetone and toluene, likewise extremely toxic, are especially dangerous to the fish and amphibians that ingest or inhale the substances, or that absorb them through their skin.

According to Marcelo, both kerosene and the sulfur released from the sulfuric acid dissolve oxygen in water. As a result, fish must pass a greater volume of water through their gills in order to breathe. Yet as they do so, their gills absorb more of the toxins from the contaminated water, resulting in lesions of the liver, heart, kidneys, and brain, and possibly leading to grave genetic mutations.

More than 150 streams and rivers in Peru have been polluted by the outfall from cocaine labs, Marcelo says, noting that "the contamination of these rivers already exceeds pollution standards established by the World Health Organization."—***M.M.***

eager to run a reality check on some of my suspicions with someone who's been in the country on a more permanent basis.

When I telephone the journalist upon my return from the jungle lab and ask him to arrange the meeting, he tells me the "opposition" member is in fact his wife, also an American journalist. I do not back out of the meeting, but I'm disappointed. I'd hoped to talk to a leader of Sendero Luminoso, or a *narcotraficante*, or at least a coca grower.

After hanging up, I begin to get a queasy feeling. The meeting place we have decided on is a popular café, the Haiti, on a roundabout called the Ovalo in the wealthy Lima suburb of Miraflores. I remember a State Department travel advisory: "U.S. citizens are advised that terrorism is a serious problem in many parts of Peru." As a result, U.S. government employees are prohibited from visiting the Ovalo after dark—and my meeting is to take place at dusk.

Imagining small headlines on the back page of my hometown paper ("Sierra Club Journalist Target of Terrorist Attack"), I place a call to the press officer at the U.S. embassy to confirm that the man who arranged the meeting is not by some chance in league with Sendero Luminoso. That group has waged a bloody guerrilla war in Peru since 1980, and I once knew a Canadian journalist who secretly helped organize the Peruvian leftist revolutionary movement.

"Oh, he's a friend of mine," the press officer says when I ask her about my new acquaintance. "You can trust him."

By extension, presumably, I can also trust his wife. She arrives at the café shortly after the waiter brings my cappuccino, and places a stack of documents on the table.

"These were given to me by confidential U.S. government sources who are dissatisfied with the State Department's tebuthiuron testing program," she says. "You're welcome to make copies of them."

The fattest document is the half-inch-thick Labat-Anderson study. It is useful, but not something the Sierra Club couldn't have obtained simply by asking the State Department for a copy.

Nonetheless, as we discuss the plan to use herbicides on coca, the woman

MARK MARDON

General Zárate (center) confers with advisers before raiding a jungle lab.

makes a point I have not previously considered. "Sure, the U.S. government is playing this up as a no-win situation," she says, alluding to the argument that the rainforests of the Huallaga Valley will suffer as surely from continued coca production as from the the effects of the chemical eradication program. "But consider this: If you kill the crops with Spike, what happens?" The answer, I realize, is that peasants will move to new areas and start over again, clearing even more rainforest. "They're highly mobile," she says. "There's no way of stopping them." Like spraying oil to put out a fire, the eradication efforts will only cause mountainous rainforests throughout Peru to be destroyed more rapidly than they already have been as a result of population pressures and economic instability.

In this light, the State Department's plan to eradicate coca crops chemically begins to strike me as untenable. The question I mull over during the long taxi ride back to my hotel in downtown Lima is whether the application of Spike—or any other concoction—to coca plants can solve a problem that begins with drug consumers as well as producers. The demand for cocaine comes from people traveling in the fast lane—or, as the case may be, the breakdown lane—of industrial society. Its users can be found in North America's and Europe's corporate boardrooms, high-society bedrooms, professional sports locker-rooms, ghetto apartments, government corridors, fashionable nightclubs, and college dormitories, among other locales. Meanwhile, between $700 million and $1.6 billion in drug profits enter the Peruvian economy each year—equal to as much as 30 percent of the country's total legal exports. It seems clear that no eradication strategy short of a scorched-earth apocalypse is likely to wholly succeed in cutting off the flow: Economic incentive at one end of the pipeline combined with powerful psychological cravings at the other are sure to stymie any control program, no matter how aggressively that program is pursued.

The taxi passes by the U.S. embassy. As usual, Peruvian police patrol the sidewalk in front of the embassy's wrought-iron fence. They face the avenue, toward the crush of smog-spewing traffic, and warily scan the steady stream of pedestrians walking by under a canopy of trees and the glow of streetlamps. This corner of the dusty old City of Kings is almost attractive—it's less gray, and a little tidier, than most of Lima.

There is a certain incongruity here, between the powerful image the embassy projects and the seeming helplessness of the U.S. government to stem the tide of cocaine use among its people at home. The situation is made all the more ironic by the economic gulf separating the two American nations. One, materially wealthy, has a society so fearful of drugs that its government, grasping for solutions, seeks to wage a chemical war in somebody else's backyard. The other, fortunate in that relatively few of its people are habituated to cocaine, is nonetheless impoverished and reliant on the goodwill of the wealthier nation—so it agrees to bear the brunt of a war it did not start.

In this dynamic, only the rainforest is neutral—and, as so often happens in war, the innocent bystander turns out to be the big loser. ■

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

By Chris Noble

SOULS ON ICE

WHEN I LOOK UP, THE COLD slaps me like spray from a breaking wave. My partner and I are sitting on a snow-covered ledge above an 80-story-high frozen waterfall in Utah's Wasatch Range. On this January night there is a stillness and a clarity of atmosphere that seems to bring the far wall of the canyon, nearly a mile distant, close enough to touch. Overhead, the stars are obscured by the undulating movement of low clouds.

Will it snow? The question hangs about me in the gelid air like my breath, frosting everything it touches. Climbing throughout the afternoon, intent on the difficulties before us, we hadn't noticed the dying light of the short winter day until twilight was upon us. Rather than risk a night descent, we've elected to wait here for dawn.

This has not been an easy decision. Climbing ice is exhausting, both physically and mentally. Our clothes are damp from dripping water and sweat. We've had little to eat or drink all day, and we have no extra clothing, shelter, or food to ease us through the night. For moisture, I run my tongue along the row of icicles forming in my beard.

Will it snow? Will the wind rise? Questions we ask so nonchalantly on the ground have a biting edge here on the mountainside. Either scenario could shift our condition from uncomfortable to urgent. As it is, the slightest breeze cuts through my clothing, triggering a paroxysm of shivering.

It will be a long, immobile journey to dawn, 11 hours distant, providing ample time for thought. Turtlelike, I draw my arms and head inside my jacket. I concentrate on the small warmth generated by my breath, and I think about this confounding activity called climbing ice. My thoughts take me to another night that, like this one, was assembled

Stretching the maxim 'Because it's there' to its frigid extreme, ice climbers encounter an eerie, frozen universe.

PATRICK MORROW-FIRST LIGHT

Johnston's Canyon, Banff National Park

out of cold and darkness and gleaming ice, but that occurred half a world away on the Khumbu Icefall of Mt. Everest.

The Khumbu is perhaps the most famous feature of its kind on Earth. Glacial ice pours from the slopes of Everest, Lhotse, and Nuptse into what's known as the Western Cwm, then surges downward once more, falling 2,000 feet in its quest for level ground. The result is a hanging chaos of ice that guards the approach to Everest's upper slopes. A list of the Khumbu's risks is a catalog of what climbers call "objective dangers," those over which mere mortals exercise little or no control. In the Khumbu, seracs 80 feet high balance like children's ill-placed blocks, crevasses open on unimaginable depths, and avalanches cascade from above.

We ran its gauntlet at night, when there was less risk of serac collapse and avalanche. At 3 a.m. the Milky Way shone like a gleaming highway above the tents of base camp. The saber ridge of Nuptse and the West Shoulder of Everest loomed above us as we climbed. In the cleft between were stars; below, the weaving beams of headlamps as climbers searched for safe passage through the icy maze. The full moon burned in the blue walls of the seracs.

I moved upward painfully, alone in the small circle of light cast by my headlamp. Sucking for oxygen, nearly nauseated by the effort, startled by the sudden cold when I stopped to rest, I found myself alone in a world of frailty, fear, uncertainty, hope, competitiveness, and pain—all the while climbing into the heart of inhuman beauty.

It is precisely these contrasts that define the world of the ice climber. Whether pursuing the sport on the flanks of Everest, on the north walls of the Alps, or closer to home on Utah's frozen waterfalls, the ice climber finds a world of glass and splintered light, a world that looks as though one has discovered Alice's magic elixir, grown small, and clambered up into the chandelier above the dining-room table.

To everyone, ice is a beautiful enigma. For climbers, its sheer audacity invites exploration; to nonclimbers, that pursuit seems insanely dangerous.

"A frozen waterfall is one of the more alien things you can find in our environment," says John Reed, an avid ice climber. "It looks different from anything else. It's constantly changing. You can go back one week to the next, one day to the next, and you'll be climbing two completely different things."

For some ice disciples, climbing is a means to an end. The techniques polished on frozen waterfalls can later help reach the ceiling of the world on icefalls like the Khumbu. For others the experience and the style of ascent are more important than reaching a well-known summit. Regardless of the goal, ice climbing distills life.

S. PETER LEWIS

◆ *On steep ice, climbers use an axe and a hammer. The axe's pick carves steps and the hammer head drives in anchors.*

Ice is a mirror, reflecting all too clearly the abilities and inadequacies of the climber. "You've got to look right into the bottom of yourself," says Rick Wyatt, a noted climber and member of Exum Mountain Guides in the Tetons. "It's the place where all the bull stops. Either you can do it or you can't."

While reaching into their souls, ice climbers must also reach for equipment that is designed for the perils and peculiarities of their medium. One of the craft's kingpins, Yvon Chouinard, emerged from the 1960s boom in the sport not only a climber of the highest standard but an equipment designer of rare creativity.

Turning to the ice runnels of the Sierra, the Tetons, and the Alps, Chouinard was the first to curve the picks of ice axes to match the climber's natural swing. Next he added serrated teeth. The result was a tool that for the first time allowed a climber to ascend vertical ice without having to chop hand- or footholds. Later, Chouinard and others refined ice screws—the long tubes of steel or (more recently) titanium that climbers drive or wind into the ice like bolts to anchor themselves in a fall.

The security and versatility of improved equipment has spawned an ice-climbing renaissance. Enthusiasts can now climb vertical and even overhanging ice without resorting to "aid," such as ice screws placed laboriously one above the other to support—rather than simply protect—a dangling climber.

This flowering of the sport following technological advances underscores a basic difference between climbing rock and climbing ice. As Michael Kennedy, editor of *Climbing* magazine, points out, "In rock climbing, you're using just your hands and your feet for purchase. In contrast, the ice climber is totally dependent on crampons [spiked frames attached to boots] and ice axes. On rock there is less technology between you and the climbing experience."

But ice-climbing equipment doesn't insulate climbers from their sport. On rock you must conform to the holds, so the medium dictates how you move. On ice you change the medium itself as you climb. Above all else, says John Reed, "Rock, in general, doesn't fall apart. Ice might. You have to be sensitive to that."

Since Chouinard's initial design changes, ice tools of every size, shape, and specialty have appeared. Yet, as Kennedy points out, most changes in the past decade have been evolutionary rather than revolutionary. The latest ice screws can be placed with one hand, a boon when one is dangling by an arm from the side of a vertical waterfall. Ice axes and crampons are more dependable, and interchangeable axe picks allow the climber to deal with a spectrum of ice conditions.

For all its reassuring technological advances, ice climbing remains a precarious human endeavor. The security

Wasatch Range, Utah

Rigid Designator, Colorado

offered by tools is limited by the fickle nature of ice itself. In the end a climber's safety depends on his or her own judgment and knowledge, which should include a thorough understanding of the vagaries of frozen water.

Ice climbers learn to identify plastic ice, whose veins tend not to shatter when struck; green ice, whose emerald appearance and uniform consistency denote solid placements for crampons, axes, and ice screws; black ice, which is full of embedded rocks and debris and can be tough as blacktop; alpine ice, which forms like silver filigree in the couloirs of alpine peaks; and the cauliflowered and chandeliered types of ice peculiar to frozen waterfalls, which form when dripping water and spray freeze into a menagerie of crystalline shapes.

ONLY A FEW MILES up the canyon from where we sit on our frozen Wasatch ledge is a climb aptly named The Fang, an immense hanging tooth of ice issuing from a single rock spout a hundred feet above the gully floor. The force of the water prevents the icicle from freezing completely even in the coldest winters, leaving a freestanding tube of ice through which the live stream pours.

The Fang is both beautiful and delicate, which poses a conundrum for climbers. The desire to climb it must be tempered with prudence: If the weather is a few degrees too warm, the dream and the dreamer may come crashing down.

I think back to a day when a friend and I climbed The Fang. I belayed, feeding out rope, as my partner sought a solution to the waterfall's delicate vertical riddle. With surgical precision he eased his weight onto one axe, then loosened the other from its purchase in the ice. Quickly he extended, swung, and sank the tool a few feet higher. If the placement seemed good—if, when struck, the ice produced the required resonance and tone—he weighted it, kicked lightly, and moved his cramponed boots higher. Then the process would begin anew. Inch by inch, foot by foot, we ascended the frozen waterfall.

Sight, sound, and touch are vital elements in judging the security of a climb. Will the ice hold a person's weight? Will the surface shatter when struck? Is the ice so hollow and brittle that the axe will shear through it?

Solid ice is clear and thick, with few air pockets. When struck it produces a deep, satisfying *thuuunk* as though the axe were hitting wood. There is little vibration either in the tool or throughout the waterfall itself. The axe bites deep without glancing off to the side,

PATRICK MCMAHON / JUST LIGHT

JAMES BALOG/BLACK STAR

◆ *A climber tiptoes up an ice wall on the sharp, curved points at the front of his crampons (top). Placed deep in solid ice and at a slight uphill angle, some ice screws can support up to 4,400 pounds without failing.*

and there is little or no shattering at the surface.

On The Fang, my partner's breath hung before him like fog as he climbed. As he moved upward the ice thinned to a few inches, and he was forced to stem across open holes in its surface. The rushing stream within was plainly visible. If he wished, he could have reached in and wet his hands.

On ice this thin, the axe meets little resistance when it slices, as if through fabric, into the hollow interior. Each kick brings a sympathetic vibration throughout the length of the waterfall. Movement slows; each motion is studied and weighed—and yet there is no time to waste. The climber must reach the top before becoming too exhausted to continue.

"It takes commitment, concentration, and the ability to focus," one ice climber says. "Like all climbing, climbing ice is dealing with possibilities and potentials. You can't afford to say, 'What would happen if . . . ?' "

In ice climbing the correlation between effort expended and rewards gained is direct. The sweat and tension endured while climbing are small concessions when held against the feelings of accomplishment and transcendence experienced at the top. As Patrick Edlinger, possibly the finest rock climber in the world, puts it, "More important than anything else is the enlightenment your climbing brings you at the end of the day."

OFF ON THE EASTERN HORIZON, someone lights a fire. Dawn at last.

I struggle upright on wooden legs. Tired but healthy, my partner and I rappel to the valley below, then bash through oak thickets to get back to the road.

"There is but one true faith, and it is faith in the mystery of life," writes Frank Waters, author of *Book of the Hopi*. Ice climbing is steeped in such mystery. Success or failure, and occasionally life or death, hinge on such unanswerable questions as whether the wind will rise, whether snow will fall, whether a free-hanging icicle will support a person's weight, or whether a particular serac will collapse at one moment rather than another.

The Chinese ideogram for challenge is made up of two symbols: one for danger and one for opportunity. Some of us see only the former, others only the latter. The poetry of climbing ice reveals itself when we grasp the opportunity and accept the danger. ■

CHRIS NOBLE *is a writer, photographer, and climber based in Salt Lake City.*

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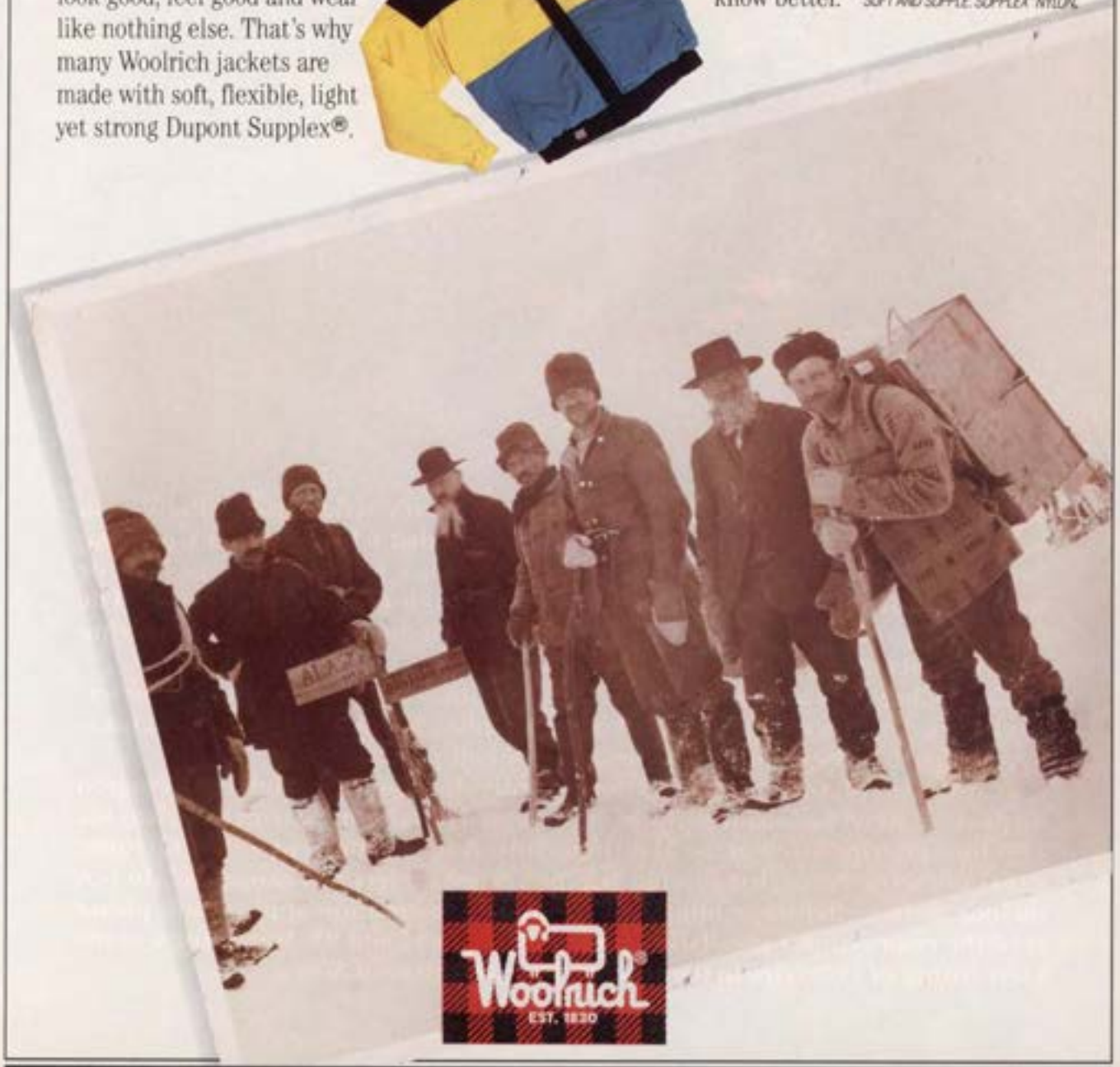

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OUTINGS

Sierra Club ◆ 1989 Spring Trips

Spring is the time to enjoy the Grand Canyon's wildflowers, the Virgin Islands' warm Caribbean waters, or Spain's fabled white cities of Cordoba, Seville, and Granada. Whether you want to backpack in Zion National Park or canoe California's river delta, there's a Sierra Club outing just for you. The following pages include brief descriptions of the unique winter and spring vacations planned by our trip leaders.

Sierra Club trips are cooperative ventures with an average of 12 to 25 participants. Trip members share camp chores, including food preparation and clean-up, an aspect of the outings that most people enjoy.

To order supplemental information on individual outings, send in the coupon on page 93. Reservations are now being accepted for all spring trips as well as for 1989 foreign trips listed in the May/June, July/August, and September/October issues of *Sierra*. Note that foreign trip prices are subject to change and do not include airfare. Before sending in a completed reservation application, please read the reservation/cancellation policy on pages 92 and 93. Watch for a complete listing of 1989 trips in the January/February issue of *Sierra*.

Backpack

Backpacking trips offer great freedom for exploring the wilderness because everything you need is on your back. Today young and old alike find adventure, solitude, and personal challenge in the activity. Sierra Club trips offer these rewards as they provide excellent practice in knowledgeable backpacking.

Backpacking is strenuous. For a week-long trip, you may start with a load of 35 to 40 pounds, but the extra effort will exhilarate you and make you feel even more a part of the wilderness. With today's new designs in backpacking equipment, almost anyone in good physical condition can enjoy a backpacking trip.

Trips are rated by individual leaders at levels that are leisurely (L), moderate (M), strenuous (S), or somewhere in between. Ratings are as accurate as possible, based on total trip miles, aggregate climb, difficulty of the terrain, and elevation, as well as on less obvious measures determined by the leader. On desert trips, members are often required to carry liquids that significantly increase their pack loads. Canyon trips entail steep descents and climbs, and temperatures may vary considerably from top to bottom. The demands of backpacking require that each leader consider trip members' qualifications based on responses to questions about equipment and previous backpacking experience. If you lack experience or have never backpacked at high elevations for any length of time, you may qualify for one of the less strenuous trips by going on weekend backpack outings prior to your departure. Unless otherwise stated, minimum age on backpack trips is 16, although qualified 15-year-olds are welcome if accompanied by a parent.

[89031] Salmon Creek, Coast Ranges, California—March 19–25, 1989. *Leaders, David and Frances Reneau, 330 Nimitz Ave., Redwood City, CA 94061. Price: $225, Dep: $35.* The Santa Lucia Mountains include high ridges with ocean views, colorful wildflower displays, and rugged forested canyons. From the coast at Salmon Creek we will climb through scenic meadows, with views from the southern Big Sur coastline to Buckeye Flat. We will then hike past the southernmost coastal redwood groves, up Alder Creek, and along the coast ridge to the sycamore groves of San Carpoforo. We will have one layover day on our 35-mile loop trip to allow time for nature study, relaxation, and exploration. (Rated M)

[89033] Phantom Creek and Crystal Creek Loop, North Rim, Grand Canyon, Arizona—April 1–15, 1989. *Leaders, Bert Fingerhut and George Steck, 225 West 83rd St., New York City, NY 10024. Price: $580, Dep: $70.* On our two-week trip we will explore upper Phantom and Crystal creeks. Although we will meet at the South Rim of the Grand Canyon, most of our trip will be on the north side and much of it off-trail in less-traveled parts of the park. This trip is for experienced backpackers only. (Rated S)

[89034] Galiuro Wilderness, Galiuro Mountains, Arizona—April 9–15, 1989. *Leader, Sid Hirsh, 4322 East 7th St., Tucson, AZ 85711. Price: $240, Dep: $35.* If your idea of wilderness is a place where trails are not superhighways and where seeing other hikers is the exception and not the rule, you'll love the Galiuros in southeastern Arizona. Our route will take us along dry bushy ridges with impressive rock formations to heavily forested canyons with—we hope—running streams and irresistible pools. Some of the hike will be off-trail. Although we will move every day, we will still have time to explore and enjoy this extraordinary wilderness. (Rated M-S)

[89035] Thunder River/Kanab Canyon, Grand Canyon, Arizona—April 15–22, 1989. *Leader, John Malarkey, 861 South Kachina, Mesa, AZ 85204. Price: $285, Dep: $35.* The scenery in this remote area of the North Rim is the best that the Grand Canyon offers to off-trail adventurers. The steep Bill Hall Trail leads down the North Rim across the Esplanade to the explosive headwaters of Thunder River. Our first camp will be at the beautiful riparian area near Deer Creek Falls. Next we will go to the Colorado River; then twisting Kanab Canyon with its redrock walls, swimming holes, and waterfalls; and finally the narrows of Jumpup Canyon. The terrain is difficult, but the adventure will be worth it. (Rated S)

[89036] South Guardian Angel, Zion Park, Utah—April 16–22, 1989. *Leader, Don McIver, 7028 West Behrend Dr., Glendale, AZ 85308. Price: $270, Dep: $35.* Zion National Park's South Guardian Angel is a landmark of Great West Canyon in the park's very remote western section. This immense sandstone dome stands isolated and nearly inaccessible on a peninsula between two deep and narrow canyons. Bands of red-orange and stark white sandstone are offset by pines and aspens, providing vistas to satisfy even the most demanding photographer. Our elevation of 6,000 feet—together with the absence of any trails—will provide ample challenges for the adventurous backpacker who wants to explore and help find routes under the guidance of the leader. (Rated S)

[89037] Kanab Canyon/Thunder River, Grand Canyon, Arizona—April 19–29, 1989. *Leader, Howard Newmark, P.O. Box 2429, Page, AZ 86040. Price: $280, Dep: $35.* Geared to the photographer, our off-trail route will allow extra time for exploration and picture-taking in one of the most remote and beautiful areas of the Grand Canyon. Panoramic views, sinuous narrows, hidden turquoise pools, waterfalls, and flower gardens are all part of the Kanab experience. Our trip will culminate with visits to Deer Creek and Thunder River, where we will see two of the Canyon's largest cascading waterfalls. The terrain is strenuous, but unique photographic opportunities will make this grand experience one of a kind. (Rated S)

[89038] Grand Canyon in the Spring: From the Tonto Plateau to the Colorado River, Arizona—April 22–30, 1989. *Leader, Bob Posner, 3216 Rittenhouse St., N.W., Washington, DC 20015. Price: $390, Dep: $35.* Experience the grandeur of the Grand Canyon from the Tonto Plateau and the power of the Colorado River from beaches at Granite, Crystal, Boucher, and Hermit rapids. On this 9-day trip, you'll enjoy gourmet food, wildflowers, and lush streams. (Rated M)

[89039] California's North Coast: Redwoods and the Sea—April 30–May 6, 1989. *Leader, Jenny Holliday, 1170 Cloud Ave., Menlo Park, CA 94025. Price: $240, Dep: $35.* Come enjoy spring weather on California's uncrowded North Coast. We will spend three days hiking through the filtered sunshine of the deep redwood forest and four days combing the beaches of the Lost Coast, a 26-mile stretch of beach sequestered by the precipitous King Range. Accessible only by foot, the remote land and seascape of the Lost Coast offer spring flowers, sea lions, tidepools, pounding surf, and, we hope, fair spring weather. Our pace will be leisurely, but hiking the beach rock and sand may be more difficult. (Rated L-M)

[89040] Appalachian Serenity, Nantahala and Cherokee Forests, North Carolina and Tennessee—May 20–28, 1989. *Leader, Chuck Cotter, 1803 Townsend Forest Lane, Brown Summit, NC 27214. Price: $315, Dep: $35.* South of Great Smoky Mountains National Park on the North Carolina/Tennessee state line is a perfect place to escape the "trials and tribulations" of our society. Here are the Joyce Kilmer/Slickrock and Citico Creek wilderness areas. These two areas provide 30,000 acres of beauty unmatched anywhere in North Carolina or Tennessee. They contain open balds, rhododendron-draped streams, and occasional stands of virgin timber. Our trip dates coincide with the peak of the spring wildflower display. (Rated L)

[89041] Arch Canyon, Utah—May 28–June 3, 1989. *Leader, Belva Christensen, 715 West Apache, Farmington, NM 87401. Price: $300, Dep: $35.* Arch Canyon is an important archeological site. The cliff dwellings of the ancient Anasazi are located in high alcoves on the canyon walls. We will explore these dwellings as well as several intriguing side canyons where years of winds and rains have formed three magnificent arches among the pine and fir trees. (Rated L-M)

FAMILY BACKPACK

[89032] Easter Family Backpack, Aravaipa Wilderness, Arizona—March 21–26, 1989. *Leaders, Beth and Bob Flores, 2112 West Portobello, Mesa, AZ 85202. Price: adult $255; child $170, Dep: $35.* In southeastern Arizona is a canyon of outstanding natural beauty rich in western lore, Indian ruins, homesteads, and wildlife. We'll backpack three to five miles to each of our two base camps. Two layover days, a food cache, little elevation gain, and sunny days will make the hiking enjoyable for the entire family. Hiking Aravaipa is a rewarding experience for both the casual outdoorsperson and the dedicated backpacker, and a great adventure for families with children ages seven and up. (Rated L)

Base Camp/Highlight

[89044] America's Paradise Base Camp, Virgin Islands Park, Virgin Islands—March 5–11, 1989. *Leader, Chuck Cotter, 1803 Townsend Forest Lane, Brown Summit, NC 27214. Price: $530, Dep: $70.*

[89047] America's Paradise Base Camp, Virgin Islands Park, Virgin Islands—March 26–April 1, 1989. *Leader, Jim Absher, 225 Ansley Dr., Athens, GA 30605. Price: $530, Dep: $70.* Join us for a week-long exploration of tropical splendors on St. John, the least developed of the U.S. Virgin Islands. Almost 65 percent of the island is included in the Virgin Islands National Park. We'll stay in rustic beachfront cottages and hike or drive to various locations for short walks, snorkeling, and visits to cultural sites. We'll also take advantage of some ranger/naturalist programs. Other days will be free for sunbathing, sailing, or shopping. Jeeps will take us to corners of the island and into town for the nightlife and Caribbean dining. Meals are not included in the trip price, but the cottages have stoves and ice chests. You'll be amazed at the diversity and beauty of this national park—its tropical forests, white sand beaches, coral reefs, tropical fish, and more.

STEPHEN KASPER

Hikers in Death Valley, California

[89045] Anza-Borrego Natural History, Anza-Borego State Park, California—March 18–25, 1989. *Leader, Carol Baker, 3146 Udall St., San Diego, CA 92106. Price: $270, Dep: $35.* The Anza-Borrego Desert comprises more than a million acres in Southern California east of the Coastal Range. Uniquely juxtaposed terrain and landforms vary from 6,000-foot piney crags to fossilized badlands to a low inland sea, supporting a rich variety of desert plants and animals for study with our accompanying naturalist. Participants will ride in carpools to camps and trailheads. Hikes are easy to moderate; energetic walkers may climb a peak. Weather should be mild, but rain, wind, and snow are possible at this time of year.

[89046] East Mojave Scenic Area, California—March 18–25, 1989. *Leader, Ken Horner, 1223 Yale Ave., Claremont, CA 91711. Price: $410, Dep: $35.* Spring is the perfect time to visit the desert region proposed as Mojave National Park in Sen. Alan Cranston's California Desert Protection Act. From our camp at 5,600 feet, we will take leisurely to moderate day hikes to 600-foot sand dunes, caverns, canyons, cinder cones, volcanic spires, mesas, and petroglyphs. A naturalist will help us learn about the unique and beautiful flora and fauna of the Mojave Desert.

[89048] Cedar Mesa Geology and Archeology, Utah—April 16–21, 1989. *Leader, Bill Huntley, 1313 Clay St., Ashland, OR 97520. Price: $615, Dep: $70.* Starting from Bluff, we will travel in a 6,500-foot remote tableland south of Canyonlands National Park in famous Four Corners country. A geologist will accompany us as we travel by jeep in short cross-country moves to explore and investigate Anasazi ruins, deep canyons, geological formations, and long ridges with spectacular views. All participants must be surefooted. Leader approval required.

[89049] Chiricahua Mountains Van and Hiking Tour, Coronado Forest, Arizona—April 19–28, 1989. *Leader, Edith Reeves, 1739 East San Miguel Ave., Phoenix, AZ 85016. Price: $550, Dep: $70.*

Stronghold of Cochise and Geronimo in a bygone era, these mountains remain largely untouched by man. The area is home to a variety of wildlife; hundreds of songbirds—including a breeding population of the coppery-tailed trogon, the rarest and perhaps most gorgeous bird in the United States—return each spring to nest in the lush riparian woodlands. Each day we will take hikes of varying length. A highlight will be a visit to The Nature Conservancy's Mule Shoe Ranch at Hooker Hot Springs. Our trip will start in Tucson.

[89050] Hiking Virginia's Rooftop, Mt. Rogers Recreation Area, Virginia—May 21–28, 1989. *Leader, Ray Abercrombie, 5409 Crossrail Dr., Burke, VA 22015. Price: $265, Dep: $35.* This national recreation area covers 154,000 acres of Jefferson National Forest in southwestern Virginia and includes every 5,000-foot peak in the state. We will stay in a group camp at Beartree Gap, east of the town of Damascus, and take day hikes along the Appalachian and Iron Mountain trails in preparation for our moderately strenuous ascent of Mt. Rogers. During these hikes we will pass through hardwood forests, mountain meadows, and, on the higher summits, spruce/fir stands. Much of the rhododendron along the creek banks should be in bloom. The Virginia Creeper Trail, which follows an old railroad grade through Laurel Creek gorge, will provide us with an opportunity for some level walking.

[89051] Mono Basin Natural History, Tahoe Forest, California—June 3–10, 1989. *Leader, Len Lewis, 140 Stacey Lane, Grass Valley, CA 95945. Price: $385, Dep: $35.* For about a million years the blue water of Mono Lake has reflected the beauty of the eastern Sierra Nevada. Cradled by glaciated canyons, extinct volcanoes, and snow-covered peaks, this lake is unique in its geology and wildlife. We will camp in a cottonwood grove in the shadow of the eastern escarpment and explore the enigmatic Mono Basin with the guidance of our geologist/naturalist. The energetic may also hike to high Sierra granite country and climb a peak or two. This is a glorious trip for all ages and interests.

JOHN DECOCK

Above: Lamjung Himal, Nepal

JOHN K. EDDINGTON

Right: Death's Head Dancers, Bhutan

Foreign

AFRICA

[89840] A West African Adventure, Togo, Benin, and Ghana—January 18–February 2, 1989. *Leader, Ruth Dyche, 2747 Kring Dr., San Jose, CA 95125. Price: $3,200, Dep: $100.* Join us for the Sierra Club's first trip to West Africa. We will visit the countries of Togo, Benin, and Ghana, each of which has a long and colorful history. As early as the 13th century powerful kingdoms in the region vied for control of trade caravans from Timbuktu and beyond. We will visit cities as well as villages where tribal peoples await us in this land of symbols and religious rituals, music and dance, and distinct cultures and environments. We will ride in a pirogue on the River Volta, attend a voodoo dance, visit marketplaces and mosques, meet a king, and visit a part of Africa where life has seen little change in centuries. We will also visit Keran National Park for an introduction to the wildlife of the region. We will stay in hotels and tented camps; travel will be by Land Rover and minibus. Leader approval required.

ASIA

[89855] Annapurna-Chitwan Trek, Nepal—February 20–March 11, 1989. *Leader, Peter Owens, c/o Cheryl Parkins, 4285 Gilbert St., Oakland, CA 94611. Price: $1,195, Dep: $100.* Spring comes early to Nepal, whose national flower, the rhododendron, will be in full bloom during our moderate trek along the southern slopes of the most beautiful mountains in the world. After the trek we will visit Royal Chitwan National Park for three days of elephant safaris and jungle walks. Leader approval required.

[89875] The China Kaleidoscope—April 7–26, 1989. *Leader, Bud Bollock, 1906 Edgewood Dr., Palo Alto, CA 94303. Price: $2,980, Dep: $100.* Join us on this odyssey into exotic China: a long walk atop the Great Wall, the vast expanse of Beijing's Tian'anmen Square and Forbidden City, an encounter with the Qin Dynasty terra-cotta warriors in Xi'an, observation from a bicycle of farmers in Sichuan Province, an intimate glimpse of those beloved and protected pandas, an all-around sighting of Dafu (the Grand Sitting Buddha), a brief climb of Emei Shan (from 8,700 to 10,150 feet), an afternoon in a marketplace, a river trip through the Yangtze gorges, a walk through the prehistoric Dawn redwoods, and a possible stay at a farm home. We'll end our trip with shopping opportunities in bustling Shanghai. Travel will be by plane, train, bus, boat, and bicycle (optional), and on foot. Accommodations will be the best available hotels or guest

houses. Leader approval required. *Note that the dates for this trip have changed from what was originally published.*

[89880] Manaslu Circle Trek, Nepal—April 30–May 27, 1989. *Leader, Peter Owens, c/o Laurie-Ann Barbour, 3131 Quintara St., San Francisco, CA 94116. Price: $1,525, Dep: $100.* Manaslu, one of the world's highest peaks at 26,760 feet, can be circled to the north by crossing 17,100-foot Larkya La Pass. Starting in Gorkha, we will follow the Buri Gandaki, the Dudh Khola, and the Marsyangdi Khola rivers. This 25-day trek passes by the Tibetan border and ends in Pokhara. We will cross spectacular terrain, visit villages rarely seen by trekkers, and see Buddhist *gombas* along the way. Leader approval required.

EUROPE

[89845] Cross-Country Skiing in the Austrian Alps, Salzburg, and the Austrian Tyrol—January 29–February 12, 1989. *Leader, Lynne McClellan Loots, 147 Spring Cove Dr., Cary, NC 27511. Price: $2,595, Dep: $100.* Cross-country skiing is the best way to see Austria in winter. Our tour of the countryside will include daily trips from a chalet and ski lessons for beginners and intermediates the first week, and ski adventures from town to town the second week. Comfortable, first-class hotels complement the daily skiing. Leader approval required.

[89885] Southern Spain and the Balearics—May 5–20, 1989. *Leader, Joe Lee Braun, 1323 Brandy Lane, Carmichael, CA 95608. Price: $1,840, Dep: $100.* This is Don Quixote country. We will travel from one end of "La Mancha" to the other, starting at Toledo and visiting the fabled white cities of Cordoba, Seville, and Granada. We will have opportunities to hike through wildlife preserves and the Sierra Nevada and Sierra Segura ranges, and to visit such national treasures as the Alhambra and the Alcazar. This land seems not to have changed for centuries—which contrasts with our next destination, the Balearics. After an overnight ferry ride to Ibiza, we will continue on to Mallorca and Menorca for a blend of the old and the new. Here we'll spend much time close to the crystal-clear Mediterranean, swimming from secluded beaches and taking interesting dayhikes among the old villages and ancient ruins. Leader approval required.

[89887] Paris, France: A Non-Tourist View—May 11–22, 1989. *Leaders, Sidney Hollister and Sandy Tepfer, 42 August Alley, San Francisco, CA 94133. Price: $2,400, Dep: $100.* A repeat of a successful 1988 outing, this trip will introduce you to parts of Paris the tourist doesn't usually see—from the wholesale produce market at Rungis to the basement ovens of a famous bakery; from a restored park to walking paths along a recently polluted but now healthy river just south of the city. Environmentalists will talk to us about the role Paris plays in the ecology of its region—how the city gets its water, food, and energy, and what it is doing to keep its air clean and its streets free of gridlock. We'll take a tour of the subway, train, and bus system that moves millions of people every day, and we'll use that system to reach places Parisians go to escape the city's bustle. And, of course, we'll walk—through parks filled with blooming chestnut trees and scarlet tulips, markets filled with spring vegetables, immigrant neighborhoods filled with exotic sights and sounds, and remarkable new urban housing areas. Our Parisian home will be a hotel in the heart of this ever-changing yet timeless City of Light. Leader approval required.

LATIN AMERICA

[89833] Brazil: Yuletide Odyssey to a Samba Beat—December 20, 1988–January 2, 1989. *Leader, Mary O'Connor, 2504 Webster St., Palo Alto, CA 94301. Price: $2,580, Dep: $100.* Discover the heart of Brazil, with its many natural and cultural features. In coastal Salvador we'll experience a blend of European, Indian, and African heritages. We'll visit Belo Horizonte in the mountainous interior and the colonial towns of Ouro Préto and Congonhas; then we'll tour the futuristic capital, Brasilia, for a dramatic contrast. Starting from Manaus, we'll be surrounded by the Amazon jungle for three days as we navigate the Rio Negro in a typical riverboat. The five nights we spend in Rio de Janeiro will include a particularly festive New Year's celebration. This is essentially a leisure trip with plenty of time for fun and sun—but we'll also talk to naturalists and a sociologist and make as much contact with local people as possible. All hotels are five-star. Air travel within Brazil is included in the trip price. The trip begins and ends in Rio. Leader approval required.

[89835] Sea of Cortez Kayaking, Baja California, Mexico—December 26, 1988–January 1, 1989. *Leader, Sallee Menning, 997 Lakeshire Court, San Jose, CA 95126. Price: $895, Dep: $100.*

[89870] Sea of Cortez Kayaking, Baja California, Mexico—April 8–14, 1989. *Leader, Bill Bricca, P.O. Box 159, Ross, CA 94957. Price: $895, Dep: $100.* Espíritu Santo and Partida islands lie in the Gulf of California north of La Paz. Explore sandy coves and inlets where you will find excellent fishing and snorkeling, hidden canyons, fascinating geology, and spectacular desert vegetation. Spend a day snorkeling at Los Islotes, a sea lion rookery. These trips are designed for inexperienced to expert paddlers and will include instruction and a support boat to carry duffel, food, and fresh water. Airline schedules require coming to La Paz a day ahead of the trip and leaving a day after. Leader approval required.

[89846] The Southern Hemisphere: Patagonia and Iguazú Falls, Argentina and Chile—January 30–February 21, 1989. *Leader, Bob Madsen, 3950 Fernwood Way, Pleasanton, CA 94566. Price: $2,625, Dep: $100.* Patagonia and Iguazú Falls are perfect destinations for a South American summer adventure. We'll see outstanding natural highlights—and have ample opportunities to experience the local culture and meet the friendly inhabitants. A special thrill might be seeing the Ventisquero Moreno glacier calve into Lago Argentino. We will spend a third of our time in Patagonia backpacking around Chile's Torres del Paine National Park with its unique granite towers, glaciers, waterfalls, and aqua-colored lakes. We'll also visit Punta Arenas on the Straits of Magellan and then complete the trip at one of the most magnificent sights in Argentina—Iguazú Falls, with its main falls gradually spreading to a width of two and a half miles while tumbling in a series of cataracts. Leader approval required.

[89848] Crossing Baja California by Mountain Bike, Mexico—February 12–17, 1989. *Leader, Harry Neal, 25015 Mt. Charlie Rd., Los Gatos, CA 95030. Price: $925, Dep: $100.* Ride a mountain bike on back roads crossing the 50-mile-wide southern tip of Baja California from the Pacific Coast to San José del Cabo. We will have several easy days of riding on beaches, over low rolling desert, and through clusters of cardon, averaging 25 miles a day over dirt roads. Then, after we cross the Sierra Laguna, we will bike near the Sea of Cortez. A truck will carry our gear, and we will camp in the desert each night except the last, when we'll stay in a hotel. Bicycling experience is required for this moderate trip. Bikes will be available to rent or you may bring your own. Leader approval required.

[89849] Mayan Archeology—Eastern Guatemala and Southern Mexico, February 14–23, 1989. *Leader, J. Victor Monke, 9033 Wilshire Blvd., Suite 403, Beverly Hills, CA 90211-1837. Price: $2,390, Dep: $100.* Come for a jungle and archeological adventure among Mayan

ruins in remote rainforests of Guatemala's Petén and Mexico's Chiapas provinces. Along the basins of Rio de la Pasión, Rio Usamacinta, and Rio San Pedro lie ruins of fabulous Mayan city states: Sayaxché, Sebol, Altar de Sacrificios, Yaxchilán, Piedras Negras, and Tikal—some accessible only by river. Surrounded by lush growth in the rainforests, we'll see many species of exotic birds, hear bands of howler monkeys, and listen in the evening to a chorus of frogs along the riverbanks. This trip requires no strenuous physical effort, but participants need to be adaptable and feel at home in the outdoors. Leader approval required.

[89851] Belize: Reef and Ruins, Central America—February 18–27, 1989. *Leader, Wilbur Mills, 3020 N.W. 60th St., Seattle, WA 98107. Price: $1,360, Dep: $100.* The second-longest barrier reef in America's tropical jungle, an amazing variety of birds and wildlife, mysterious Mayan ruins—we'll explore these and more in Belize. South of Mexico's Yucatán Peninsula, Belize is politically stable, safe, and seldom visited. English is the official language. 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. A 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 guest house on the beach, snorkel in crystal-clear 80-degree water, and feast on fresh seafood. Leader approval required.

[89850] Magdalena Bay Sea Kayaking, Baja California, Mexico—February 20–26, 1989. *Leader, Karen Short, 1160 St. Francis Dr., Petaluma, CA 94952. Price: $895, Dep: $100.*

[89860] Magdalena Bay Sea Kayaking, Baja California, Mexico—February 27–March 5, 1989. *Leader, J. Victor Monke, 9033 Wilshire Blvd., Suite 403, Beverly Hills, CA 90211-1837. Price: $895, Dep: $100.* Few methods of travel allow a more intimate bond with nature than kayaking. Journey with us on the narrow waterways of tranquil Magdalena Bay, winter home of hundreds of California gray whales that come to these protected waters each year to mate or bear young. We'll also see a wide variety of migrating shore- and seabirds as we paddle through miles of mangrove-lined channels. On the barrier island, huge rolling dunes await exploration, while miles of uninhabited shoreline are a paradise for beachcombers. These trips are designed for inexperienced to expert paddlers. Instruction will be given, and a support boat will carry duffel, food, and water. Airline schedules require coming to La Paz a day ahead of the trip and leaving a day after. Leader approval required.

[89867] Brazilian Jungle and Wildlife Adventure—March 16–29, 1989. *Leader, Dolph Amster, P.O. Box 1106, Ridgecrest, CA 93555. Price: $2,580, Dep: $100.* We will focus on the vast, spectacular natural attractions of Brazil, but we'll also experience the fabled pleasures of Rio de Janeiro for four days. The abundant flora of the Amazon Basin will surround us for three days as our riverboat navigates the Rio Negro. Next on our itinerary will be the Pantanal, one of the world's great wildlife preserves, which boasts more than 600 species of exotic birds and thousands of rare animals. We'll relax in an isolated camp and explore this breathtaking natural habitat on foot, by jeep, and by boat. In the high jungle we'll marvel at the mighty power of Iguazú Falls. We'll stay in comfortable, tented camps, sleep in hammocks on the deck of our riverboat, and enjoy first-class hotels in the cities. Leader approval required.

[89868] Family Paradise in Belize, Central America—March 18–26, 1989. *Leaders, Karen Short and Stephen Pozzgai, 1160 St. Francis Dr., Petaluma, CA 94952. Price: adult $1,280; child $855, Dep: $100.* Relax on virtually uninhabited beaches in the Caribbean and swim and snorkel in its warm, aquamarine waters. Walking to the nearby Creole fishing village of Placencia, exploring the jungle interior by boat, examining Mayan ruins, visiting the second-longest barrier reef in Central America—all of these opportunities and more await you in the charming country of Belize. We will stay in cottages on the beach and eat family-style meals of such seafood delicacies as lobster, conch, and snapper. Leader approval required.

[89872] Jungle and Beaches—Sea Kayak in Costa Rica—April 8–15, 1989. *Leader, Carol Dienger, 3145 Bandera Dr., Palo Alto, CA 94304. Price: $1,325, Dep: $100.* Costa Rica is unsurpassed in its rich diversity of wildlife and plant species. A world center of tropical research, Costa Rica is a leader among Third World countries in its effort to conserve natural resources. Our itinerary will include spectacular birdwatching in Palo Verde National Park. A two-day float down the jungle-lined Rio Canas allows us close-up wildlife observation. For five days we will paddle and snorkel along untouched palm-fringed beaches on the Pacific Coast. Some basic kayak experience is required, but a support boat will carry our food, water, and gear. You must schedule your arrival in San José one day before the trip begins and your departure the day after the trip ends. The price includes hotel accommodations for these nights in San José. Leader approval required.

[89877] River Rafting, Jungle, and Beach Adventure, Costa Rica—April 29–May 6, 1989. *Leader, Mary O'Connor, 2504 Webster St., Palo Alto, CA 94301. Price: $1,325, Dep: $100.* We'll pack a variety of activities in diverse environments into this one-week trip, beginning with three days of paddle-rafting with professional river guides on the Rio Pacuare. We'll experience the thrills of whitewater and the serene beauty of deep river canyons, jungle beaches, clear pools, and spectacular waterfalls. A short flight will take us to Manuel Antonio National Park, one of Costa Rica's most beautiful areas, where jungle and beach intersect. A variety of birds and wildlife can be seen on jungle hikes. The beach offers swimming, bodysurfing, and snorkeling. Marine life abounds. We will spend two days in the historic city of San José and have the option of further exploration on side tours. Leader approval required.

BETTY POLLOCK

Seals in the Galápagos Islands, Ecuador

PACIFIC BASIN

[89865] Backpack New Zealand—March 5–26, 1989. *Leader, Jim W. Watters,*

50 El Gavilan, Orinda, CA 94563. Price: $2,440, Dep: $100. For such a small country, New Zealand is bulging with delightful contrasts. We might hike in rainforests among tree ferns and waterfalls and then visit a glacier the same day—and we'll see forests of huge, ancient Kaori trees, hot springs, unique native birds, sheep, more sheep, and friendly people. Beginning and ending our trip in Auckland, we'll backpack and car-camp on both North and South islands and travel on the famous Milford Track in Fiordland. Leader approval required.

Hawaii

[89054] Molokai and Maui, Hawaii—March 17–25, 1989. *Leaders, Lynne and Ray Simpson, 4275 North River Way, Sacramento, CA 95864. Price: $775, Dep: $70.* Molokai, our first destination, invites us to celebrate the arrival of spring in a land of tropical sunshine and showers. We plan to visit Kalaupapa, the isolated peninsula where Father Damien worked so diligently, during this 1989 centennial of his death. For a century this peninsula has been sparsely populated and only rarely visited. Because of its history, pristine quality, and beauty, Kalaupapa was made a National Historical Park in 1980. Our second destination will be the island of Maui where we will snorkel, hike, or just lie on the beach. We will camp on both islands, travel by rental car, and feast on foods of various Pacific Island cuisines.

Moaula Falls, Molokai, Hawaii

Service

[89057] Deer Creek Trail Maintenance, Mazatzal Wilderness, Arizona—March 5–12, 1989. *Leader, Vance Green, 437 East Pierce, Tempe, AZ 85281. Price: $130, Dep: $35.* Located in the Mazatzal Mountains approximately 70 miles northeast of Phoenix, Deer Creek cuts an eight-mile canyon while descending 2,600 vertical feet from Mt. Peeley. Plant and animal life in this high desert canyon is plentiful and varied. Trail work will consist of improving and possibly rerouting an existing track by clearing brush and repairing tread. Participants will alternate work and play days to allow ample time to explore this little-used area. Leader approval required.

[89058] Dutchman Grave Trail Maintenance, Mazatzal Wilderness, Tonto Forest, Arizona—March 25–April 1, 1989. *Leader, Jim Vaaler, 4644 East Montecito, Phoenix, AZ 85018. Price: $145, Dep: $35.* In the Sonoran Desert, not far from the recently designated Wild and Scenic Verde River, we will reconstruct an old Basque sheepherder trail built early in the century. We will hike in about six miles and establish base camp at Dutchman Grave Spring, at an elevation of 2,950 feet. We will have time to explore Sycamore Creek and visit scenic Mountain Spring. Many other desert trails lead out from this area and can be hiked during free time. Leader approval required.

[89059] Superstition Wilderness Trail Maintenance—April 2–8, 1989. *Leaders, Will Passow and John Ricker, 8422 East Vernon Ave., Scottsdale, AZ 85257. Price: $125, Dep: $35.* The Superstition Wilderness lies east of Phoenix in legendary Apache Indian country. The mountains and canyons in this remote and rugged area are forested with oak and pinyon pine at lower elevations and with ponderosa at higher elevations. We will backpack three miles to a base camp at 4,000 feet. Our trail work will be on a route that has been used by cowboys and miners since the 1860s. It won't be all work; we will have time to explore, climb a peak, and look for evidence of Indian culture. Plan for cool nights and clear, warm days. Leader approval required.

[89060] Trail Building, Buffalo National River, Arkansas—April 16–22, 1989. *Leader, Janie Grussing, P.O. Box 225, RR1, LaOtto, IN 46763. Price: $155, Dep: $35.* Along the cliff-ringed valley of Cecil Creek, a Buffalo National River tributary, we'll open a new hiking trail following the path of early settlers to this region. We'll work from a base camp a mile from the nearest road and have time to hike and swim. Waterfalls, caves, pioneer homestead ruins, surrounding hardwood forest, and springtime Ozark wildflowers—all invite exploration and picture taking. Leader approval required.

[89061] Red Rock Trail Maintenance, Munds Mountain Wilderness, Coconino Forest, Arizona—April 23–29, 1989. *Leader, Jim Ricker, P.O. Box 730, Alta, CA 95701. Price: $100, Dep: $35.* This rugged and beautiful land of deep canyons and pine-covered mountains is located on the southern edge of the Colorado Plateau. Our trip will have two parts. First will be construction of the final leg of the Hot Loop Trail, which we started in 1987. Work will consist of clearing brush, moving rocks, and building switchbacks. Second will be a moderate backpack trip into one of the many colorful sandstone canyons. Elevations range from 4,500 to 6,500 feet. Expect warm days and cool nights. Leader approval required.

[89062] Navajo Trail Maintenance, Kaibab Forest, Arizona—May 5–14, 1989. *Leader, Rob Dorival, Box 1065, Ojo Caliente, NM 87549. Cook, Deborah Northcutt. Price: $150, Dep: $35.* Join us as we continue clearing brush and building cairns along this remnant trail, which will eventually become part of a longer trail linking Yellowstone National Park to the Mexican border. Used for centuries by Native Americans and sheepherders, the Navajo Trail crosses the pinyon and ponderosa forests of the Kaibab Plateau north of the Grand Canyon. As we work, we'll be able to view the scenic pastel cliffs of the surrounding canyon country. Following our work project, we'll hike along a primitive trail into South Canyon, down to the Colorado River. Here we'll spend a couple of days visiting Vasey's Paradise and Stanton Cave, fishing, or relaxing. This will be a strenuous trip. Leader approval required.

Ski

[89370] Adirondack Hut to Hut Ski Tour, New York—January 28–February 3, 1989. *Leader, Tom Kligerman, RD 1, P.O. Box 242, East Chatham, NY 12060. Price: $505, Dep: $70.* Join our adventure in the Siamese Ponds Wilderness Area. Each day we will ski a new leg of our journey. Each night we will come

to a different hut. Jeeps and snowmobiles will transport our gear for us. The huts, comfortable lodgings spaced about eight miles apart, are heated by woodstoves; some are not accessible by road, making them feel genuinely remote. The first day will be instructional and will include some telemark lessons. A certified cross-country instructor will accompany us on the entire trip. Leader approval required.

[89371] High Peaks Ski Tours, New York—February 20–24, 1989. *Leader, Larry White, D#2, Tracy Creek Rd., Vestal, NY 13850. Price: $420, Dep: $35.* We will spend five days cross-country skiing through the Adirondack High Peaks region. Our trip will include climbs and descents of two major mountain passes, tours of remote glacial lakes, a lap around the Olympic ski area at Mount Van Hovenberg, and treks down abandoned Adirondack roads. With our luggage transported for us each day, we will ski from hut to hut. The huts are heated; hot meals are provided every day; and we'll be able to take hot showers every night except the first. This trip is designed for the intermediate to expert skier interested in touring majestic mountain terrain. Leader approval required.

[89372] Yellowstone Winter Wildlife and Geology, Wyoming—February 26–March 5, 1989. *Leader, Bert Fingerhut, 225 West 83rd St., New York, NY 10024. Price: $1,225, Dep: $70.* Some people consider Yellowstone Park in winter to be the most beautiful place on Earth. Join us and see for yourself. During the day we will ski with geologist Charles Woodward and biologist Jim Halfpenny to remote spots in the park. This will give everyone an opportunity to improve skiing techniques and to learn about winter animal behavior and tracking, geology of the park, snow and avalanche conditions, and regional ecology and history. While it will be cold during the days, our nights at three different Yellowstone lodges will be warm as well as entertaining and educational. Being comfortable on cross-country skis is the major prerequisite for this trip. More strenuous ski excursions for those interested will also be available. Price includes all meals, lodging, and transportation from the airport. Leader approval required.

JIM HALFPENNY

Skiing in the Sierra Nevada, California

Water

Water trips are a special way to experience the wilderness. Being close to nature is a constant. Becoming part of a river as you flow with it through time and space is unforgettable.

Canoe trips are graded as follows: Grade A—no canoeing experience required; Grade B—some canoeing experience required; Grade C—canoeing experience on moving water required; Grade D—canoeing experience on whitewater required.

[89065] Buffalo Bluffs Paddle, Buffalo National River, Arkansas—April 10–15, 1989. *Leader, Sarah Rust, 1282 Reaney Ave., St. Paul, MN 55106. Price: $325, Dep: $35.* Paddle our premier national river and watch the Ozark spring unfold! The clear waters of the Buffalo National River will take us past imposing bluffs crowned with flowering dogwood in the heart of the Ozark hill country. We will fall asleep to a whippoorwill's call and wake to mists rising above the gravel bars. Our moderate to leisurely pace will allow plenty of time for swimming and taking short side hikes. While the bends and riffles of the upper Buffalo may challenge some canoeing novices, they are fairly forgiving. Leader approval required. (Grade B)

[89066] California's Great Delta Canoe Journey—April 23–29, 1989. *Leader, Barbara B. Sharpe, 2921 Bedford Ave., Placerville, CA 95667. Price: $410, Dep: $35.* The Sacramento-San Joaquin Delta is a maze of meandering waterways created by the confluence of a vast network of California rivers. Besides canoeing the lower Stanislaus and San Joaquin rivers, we will visit the historic Chinese-American community of Locke before resuming our river exploration of the Mokelumne and Consumnes rivers and Snodgrass Slough. A special treat will be a visit to The Nature Conservancy's Consumnes River Nature Preserve. Overnight camping will be in state recreation sites, at private boat marinas, and—at least one night—on a riverbank. Families with children who have good swimming ability are welcome. All of our canoeing will be on Class I water. Leader approval required. (Grade B)

[89067] Blackwater Sampler, Little Pee Dee and Edisto Rivers, South Carolina—May 13–20, 1989. *Leader, Barry Beasley, 125 West Idlewood Circle, West Columbia, SC 29169. Price: $290, Dep: $35.* Four days on the quick-moving blackwaters of the Little Pee Dee River will take canoe paddlers down one of the Southeast's true wilderness rivers. The Little Pee Dee meanders through bottomland hardwood and cypress swamps, slips past white sand beaches, and finally meets the Great Pee Dee. We will spend our last night in a treehouse deep in the swamp. From here we'll go to the Edisto River for three more days of paddling. A premier recreational river, the Edisto has black, clear waters; a white, sandy bottom; and sandbars that make swimming irresistible. Expect to see abundant bird life and perhaps beaver or otter as we float down two of the Southeast's best-kept river secrets—the cool, clear waters of the Little Pee Dee and the Edisto. Leader approval required. (Grade B)

Eligibility: Our trips are open to Sierra Club members, applicants for membership, and members of organizations granting reciprocal privileges. You may include your membership application and fee with your reservation request.

Children must have their own memberships unless they are under 12 years of age.

Unless otherwise specified, a person under 18 years of age may join an outing only if accompanied by a parent or responsible adult or with the consent of the leader.

Applications: One reservation form should be filled out for each trip by each person; spouses and families (parents and children under 21) may use a single form. Mail your reservation together with the required deposit to the address below. No reservations will be accepted by telephone.

Reservations are confirmed on a first-come, first-served basis. However, when acceptance by the leader is required (based on applicant's experience, physical condition, etc.), the reservation is confirmed subject to the leader's approval, for which the member must apply promptly. When a trip is full, later applicants are put on a waitlist.

Give some thought to your real preferences. Some trips are moderate, some strenuous; a few are only for highly qualified participants. Be realistic about your physical condition and the degree of challenge you enjoy.

The Sierra Club reserves the right to conduct a lottery to determine priority for acceptance in the event that a trip is substantially oversubscribed shortly after publication.

Reservations are accepted subject to these general rules and to any specific conditions announced in the individual trip supplements.

Deposit: A deposit is required with every trip application. The amount of the deposit varies with the trip price, as follows:

Trip price per person	*Deposit per person*
Up to $499	*$35 per individual (with a maximum of $100 per family on family trips)*
$500 and above (except foreign trips)	*$70 per individual*
All foreign trips	*$100 per individual*

The amount of a deposit is applied to the trip price when the reservation is confirmed. All deposits and payments should be in U.S. dollars.

Payments: Generally, adults and children pay the same price; some exceptions for family outings are noted. You will be billed upon receipt of your application.

Reservation and Cancellation Policy

Full payment of trip fee is due 90 days prior to trip departure. Trips listed in the "Foreign" section require additional payment of $200 per person six months before departure. Payments for trips requiring the leader's acceptance are also due at the above times, regardless of your status. If payment is not received on time, the reservation may be cancelled and the deposit forfeited.

No payment (other than the required deposit) is necessary for those waitlisted. The applicant will be billed when placed on the trip.

The trip price does not include travel to and from the roadhead or specialized transportation on some trips (check trip supplement). Hawaii, Alaska, foreign, and sailing trip prices are all exclusive of airfare.

Transportation: Travel to and from the roadhead is your responsibility. To conserve resources, trip members are urged to form carpools on a shared-expense basis or to use public transportation. On North American trips the leader will try to match riders and drivers. On some overseas trips you may be asked to make your travel arrangements through a particular agency.

Infrequently, the Sierra Club finds it necessary to cancel trips. The Club's responsibility in such instances is limited in accordance with the Trip Cancellation Policy. Accordingly, the Sierra Club is not responsible for nonrefundable airline or other tickets or payments or any similar penalties that may be incurred as a result of any trip cancellation. You may protect yourself against such penalties by purchasing trip cancellation insurance as described in the brochure enclosed with your reservation confirmation, or you can check with your travel agent for other remedies.

Confirmation: A reservation is held for a trip applicant, if there is space available, when the appropriate deposit has been received by the Outing Department. A written confirmation is sent to the applicant. Where leader approval is not required, the confirmation is unconditional. Where leader approval is required, the reservation is confirmed subject to the leader's approval. Where there is no space available when the application is received, the applicant is placed on the waitlist and the deposit is held pending an opening. When a leader-approval trip applicant is placed on the waitlist, the applicant should seek immediate leader approval so that in the event of a vacancy the reservation can be confirmed. When a person with a confirmed reservation cancels, the person at the head of the waitlist will automatically be confirmed on the trip, subject to leader approval on leader-approval trips. The applicant will not be contacted prior to this automatic reservation confirmation except in the three days before trip departure.

Refunds: You must notify the Outing Department directly during working hours (weekdays 9–5; ph. 415-776-2211) of cancellation from either the trip or the waitlist. The amount of the refund is determined by the date that the notice of cancellation by a trip applicant is received at the Outing Department. The refund amount may be applied to an already confirmed reservation on another trip.

A cancellation from a leader-approval trip is treated exactly as a cancellation from any other type of trip, whether the leader has notified the applicant of approval or not.

The cancellation policy for river-raft and sailing trips is stated separately.

The Outing Committee regrets that it cannot make exceptions to the Can-

River-Raft, Sailing, & Whalewatching Cancellation Policy

In order to prevent loss to the Club of concessionaire cancellation fees, refunds on these trips might not be made until after the departure. On these trips, refunds will be made as follows:

No. of days prior to trip	Amount of trip cost refunded
45 or more	90% refunded
30–44	75% refunded*
14–29	50% refunded*
0–13	No refund*

*If the trip place can be filled by a full-paying member, then the cancellation fee shall amount to the nonrefundable deposit or 10% of the total trip cost, whichever is greater.

Important Information On Sierra Club Outings

Mail To:
Sierra Club Outing Dept.
Dept. #05618
San Francisco, CA 94139

1. Refer to the Reservation/Cancellation policy page for important payment information and instructions for filling out this application.
2. Deposits are nonrefundable from a confirmed trip space or a confirmed trip space subject to leader approval.
3. All participants age 12 and over must be Sierra Club members to attend an outing.
4. Your address may be released to other trip participants for purposes of ride-sharing or other trip-related purposes.
5. Not all trips can accommodate special dietary needs or preferences. Contact the leader for this information before applying.
6. Applications for trip space will be accepted in the order that they are received at the following address: Sierra Club Outing Dept.
   Dept. #05618
   San Francisco, CA 94139
7. Please do not send Express Mail to this address. Doing so will delay your application.

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OUTING RESERVATION FORM

MEMBERSHIP NO.	TRIP NO.	TRIP NAME	DEPARTURE DATE

YOUR NAME	HAVE YOU RECEIVED THE TRIP SUPPLEMENT? YES ☐ NO ☐
STREET ADDRESS	YOUR HOME PHONE ( )
CITY STATE ZIP	YOUR WORK PHONE ( )

PLEASE PRINT YOUR NAME AND THE NAMES OF OTHER PEOPLE IN YOUR PARTY	MEMBERSHIP NO.	AGE	RELATIONSHIP	NO. OF OUTINGS YOU'VE BEEN ON: CHAPTER	NO. OF OUTINGS YOU'VE BEEN ON: NATIONAL	YEAR OF LAST NATIONAL OUTING
1.			SELF			
2.						
3.						
4.						

PER PERSON COST OF OUTING:	TOTAL COST THIS APPLICATION:	DEPOSIT ENCLOSED:	FOR OFFICE USE ONLY:

PLEASE MAKE CHECK PAYABLE TO SIERRA CLUB
MAIL TO: SIERRA CLUB OUTING DEPT., DEPT. #05618, SAN FRANCISCO, CA 94139

OUTING RESERVATION FORM

MEMBERSHIP NO.	TRIP NO.	TRIP NAME	DEPARTURE DATE

YOUR NAME	HAVE YOU RECEIVED THE TRIP SUPPLEMENT? YES ☐ NO ☐
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2.						
3.						
4.						

PER PERSON COST OF OUTING:	TOTAL COST THIS APPLICATION:	DEPOSIT ENCLOSED:	FOR OFFICE USE ONLY:

PLEASE MAKE CHECK PAYABLE TO SIERRA CLUB
MAIL TO: SIERRA CLUB OUTING DEPT., DEPT. #05618, SAN FRANCISCO, CA 94139

cellation Policy for any reason, including personal emergencies. Cancellations for medical and other reasons are often covered by traveler's insurance, and trip applicants will receive a brochure describing this type of coverage. You can also obtain information regarding other plans from your local travel or insurance agent. We encourage you to acquire such insurance.

Trip leaders have no authority to grant or promise refunds.

Transfers: For transfers from a confirmed reservation made 14 or more days prior to the trip departure date, a transfer fee of $35 is charged per application.

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d) 4–13 days prior to trip departure date if replacement *cannot* be obtained from waitlist (or if there is no waitlist at the time of cancellation processing)	40% of trip fee, plus $35 processing fee, but in no event more than 50% of total trip fee	As above
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Hugh Kaufman: EPA Whistle-Blower

Jeffrey Johnson

THE UNITED STATES is missing the "mother lode," Hugh Kaufman says, and that has him worried.

Kaufman believes the Environmental Protection Agency is missing the chance of a lifetime to mine a vein so rich it could help fund the cleanup of old hazardous waste sites and force industry to manage its wastes more carefully in the future.

Kaufman's mother lode is the Comprehensive Environmental Response, Compensation, and Liability Act, better known as Superfund. An EPA employee since the agency's beginning, Kaufman helped craft that law—and his exuberant demands that industry and the EPA live up to it have almost cost him his job more than once. They've also earned him a reputation as a pariah to some, a hero to others.

In response to his outspoken criticism, EPA agents have tapped his phone, trailed him and reported that he spent a night in a motel with an attractive brunette, and pressured him to keep quiet about his concerns that the agency was caving in to industry influence in refusing to enforce hazardous waste laws.

Superfund, passed in 1980 and amended in 1986, gives the agency the legal tools it needs to go after companies that refuse to pay to clean up hazardous waste sites they have created, Kaufman says. If a company refuses to pay, the agency can begin cleanup immediately by tapping the money Congress appropriated when it passed the law and then seek treble damages later.

"Just the fact that a company knows it might have to pay for today's bad practices ten years down the road would drive it into the fold," Kaufman says. "The idea is to take these 'winnings' and use them to clean up other sites and supply Joe and Sally with decent drinking water so they don't have to drink trichloroethylene and benzene. Joe and Sally didn't make billions on these spills. Why should they pay? Let's hit these suckers, build a pot of money. Let's do cases!"

But the law has never been fully enforced: The EPA has begun treble-damage proceedings in just six cases, with none going to trial, and has only reluctantly begun suits under Superfund's other legal provisions. As a result, according to a House Appropriations Committee report released last spring, the government is footing the bill for 70 percent of the EPA's Superfund cleanup studies and 55 percent of its cleanups. At

"The citizens are armed with rubber bands and chewing gum against major polluters armed with the best-paid engineers and lawyers in the country. It ain't a fair fight."

—Hugh Kaufman

JOHN STEINER, © 1988 GRAND FORKS HERALD

this rate, the Superfund will easily be exhausted long before even half of the nearly 1,200 sites on today's National Priorities List are cleaned up.

Meanwhile, dangerous wastes are still dumped illegally; most sites still don't get cleaned up; the EPA still doesn't force companies to pay for cleanups; and Kaufman is still mad.

Hugh B. Kaufman, 46, began working for the EPA in 1971 after college and a hitch in the Air Force during the Vietnam War. He signed on as an engineer with the new agency and was excited about its potential from the beginning. Now, 17 years later, he refers to himself as "an aging bureaucrat."

Kaufman's first EPA job was with the Office of Noise Abatement, where he helped develop legislative proposals for what became the Noise Abatement and Control Act of 1972. After the nation's first hazardous waste law was passed in 1976, he became the agency's chief hazardous waste investigator; he likens his role then to that of General Patton at the start of World War II. Today, he says, he "writes reports" for the EPA as the assistant to the director of the Hazardous Waste Site Control Division.

The son of a career federal statistician, Kaufman grew up in Washington, D.C., where he now lives with his wife and their two-year-old daughter in a tidy townhouse across the street from the EPA's headquarters, two blocks from the Potomac River. He calls himself "a plain schmo" and says, "I don't parachute or have interesting hobbies. If I have free time, I'll play with the kid or read a book. If the hot-water heater breaks, I'll get two bids."

Of medium height and weight, Kaufman appears to be just one of a seemingly endless stream of nameless officials who people the federal government—until he opens his mouth. A forthright iconoclast, his testimony to Congress and leaks to the press on the EPA's laggard enforcement of hazardous waste laws helped spur Congress to create the Superfund law in 1980 and helped topple the agency's administration three years later. He has also incurred the wrath of much of Carter's and especially Reagan's EPAs.

As the sun sets on the Reagan era, Kaufman is still not popular around the

agency, even among many rank-and-filers. Calls to the EPA usually elicit either "no comments" about him or strong responses—all off the record: "He's an egomaniac; he thinks he's God's gift to the taxpayer; he takes time off to go on these 'trips' to communities."

David Cohen, EPA communications director, is more charitable. "At his best, Hugh is an excellent gadfly," Cohen says. "He always lets you know where your left flank is. At his worst, he's given to conspiracy theories with a good amount of ego thrown in. The EPA will never be as good as Hugh wants it to be." But EPA Administrator Lee M. Thomas sometimes meets with and listens to Kaufman, Cohen notes, and has made some changes based on Kaufman's views. "If everybody in the EPA took Hugh's liberties, the place would be unmanageable. But we're better off with him than without him."

Community activists like Lois Gibbs, founder of the Citizens' Clearinghouse for Hazardous Wastes, and Sue Greer, executive director of People Against Hazardous Landfill Sites, have more positive things to say about Kaufman. His role as an adviser to their groups, they say, is important and unique—and they like him.

"Hugh's the government whistleblower, the EPA official who tells people that the agency has other interests besides protecting human health," Gibbs says. "And Hugh speaks English. He takes the 'awe of government' some people have and brings it down to where it belongs."

Gibbs entered the national scene while living near New York's Love Canal. She became a leader in the effort to get the leaking hazardous waste site there cleaned up and has since created the Citizens' Clearinghouse, a Virginia-based national organization that works to educate other communities so they can avoid becoming Love Canals.

Gibbs first worked with Kaufman when he spoke at a local leadership-development conference sponsored by the Clearinghouse in a 4-H center in Columbus, Ohio. He led a role-playing exercise designed to help participants focus on power-holders at meetings and not waste time with EPA technicians.

"Hugh was funny and entertaining, and he made us think," Gibbs says. "We're a low-cost operation, and he slept with us on children's bunk beds with his feet hanging over the edge. He never complained; he seemed to think it was great. How many EPA officials would put up with that?"

Greer, head of a citizens' group started by people living near a Waste Management Company landfill in Wheeler, Indiana, is also grateful for Kaufman's help. Her group was frightened about health effects from the landfill and didn't want to see it get any bigger, Greer says. She turned to Kaufman when an EPA official scheduled to speak at a 1983 organizing meeting backed out. She was expecting 700 people to attend and had only two days to find a replacement.

"I didn't know Hugh, but I was desperate," she says, recalling that the originally scheduled speaker had recommended Kaufman. He brought a reporter from NBC's *Today* with him to tour the landfill, and when Waste Management wouldn't let them in, the reporter got angry. "It was the worst thing the company could have done," Greer says. The journalist stayed another day and finally got in to see the landfill, and the group "wound up with media coverage and a huge meeting where Hugh blasted the company. It really got us off the ground."

Kaufman has continued to help Greer's group on other projects, which now address a variety of environmental issues in seven states, Scotland, and Australia. "Hugh helps us understand that we're not nuts and that it's not our fault we live near those contaminated sites," Greer says. "He tells us how the government works, how to file Freedom of Information Act requests, and how to testify before officials and not be afraid."

Anyone else as outspoken as Kaufman "would have been fired, dismantled, blackballed," Gibbs notes. "But Hugh is smart, and he knows he has to protect himself. He always takes time to figure out the consequences and how to cover his ass."

Kaufman says he gets requests for advice from five to ten community groups a month and usually visits one of them. Being an active technical consultant to citizens is "the least a good civil servant can do," he says. "The public has to protect itself today because the cops [the EPA] are in a deregulation mode. The citizens are armed with rubber bands and chewing gum against major polluters armed with the best-paid engineers and lawyers in the country. It ain't a fair fight."

The federal government, therefore, should be a "fair referee" to create an even playing field upon which societal battles can be fought, Kaufman says. He compares today's environmental movement with the civil-rights movement of the 1950s and says that the government sometimes needs to act as an advocate, as it did then.

"The federal government got involved," he says. "Sure, we still have bigotry in America, and racism. But at least the problems don't exist the way they did. You need strong national leadership to help. There's no way a county with three big plants that employ half the population can step in and stop the plants from poisoning the drinking water."

Kaufman still works with Gibbs, Greer, and other community activists, but he now turns down more projects than he once did to spend time with his daughter, Elissa, says his wife, Elana Strom.

Strom, who sometimes travels with her husband or listens to him speak, is not entirely comfortable with his role in the EPA. "Sometimes he's not a nice guy," she says. "He is a very moral man who knows how things work and has strong opinions. But you can't be a vulnerable, sensitive person and a butt-kicker at the same time. Sometimes he's not the kind of person I want to sit down and have dinner with."

Kaufman first moved into the spotlight with his work on hazardous wastes during a series of House hearings held in 1978 and '79 by Albert Gore, Jr., then a young Democratic representative from Tennessee. Gore, who sat on the House Energy and Commerce Subcommittee on Oversight and Investigations, had called on Kaufman to testify regarding allegations that the Carter administration was stalling litigation aimed at initiating hazardous waste cleanups.

Kaufman called the committee's at-

tention to a string of dangerous sites owned by companies that the EPA and the Department of Justice didn't want to prosecute. He testified that he had been ordered to back off on any further site investigations and brought a memo to support his claim. In the memo, Steffen W. Plehn, EPA deputy assistant administrator for solid waste, had ordered Kaufman's boss, John P. Lehman, to tell him "to put a hold on all imminent hazard efforts" and instead concentrate on "writing regulations."

Furthermore, Kaufman said, regional EPA offices, backed by agency headquarters, had told him to stay out of their areas when investigating dangerous hazardous waste sites. Another memo told regional administrators not to "discover" new cleanup sites through field visits, substantial file searches, or other means, but instead to make estimates based on general knowledge of disposal practices.

In the wake of Love Canal and growing publicity about many other sites, the Carter administration eventually rescinded the memos and backed the growing pressure in Congress to create a fund and a program to clean up contaminated sites. The eventual result was Superfund.

Kaufman was again the focus of attention in 1982 when he testified to Congress that cleanups were being stalled. This time the fault was with the Reagan administration's EPA, under Administrator Anne Gorsuch Burford and Assistant Administrator for Solid Waste and Emergency Response Rita Lavelle, who was in charge of the new Superfund program.

Kaufman blames the failures of the Carter and Reagan administrations on the same problem. "Nobody wants to take on big business over hazardous waste," he says. "Superfund is . . . very important to major campaign contributors. Under Carter, the government didn't want it to look like the first thing a Democratic administration does is take on business; for Reagan, it was really a rape-and-pillage mentality."

Lavelle expressed the hands-off disposition clearly in a memo that angered Congress and helped bring her down in the end: She criticized a subordinate for "systematically alienating the primary constituents of this administration, the business community."

The difference between the Carter and Reagan administrations, Kaufman says, is that eventually Carter wanted "to do what is right, to correct matters and clean up the mess. But unfortunately he and his people had no understanding of how national government works. It took them two years to find the toilets in the White House.

"But when the Reaganistas came into power," Kaufman continues, "they knew exactly where to throw the monkey wrench. They are not conservative; they turned the place into a raving whorehouse."

In October 1982 the House Subcommittee on Oversight and Investigations, chaired by Rep. John D. Dingell (D-Mich.), released a report based on a study of the EPA's enforcement activities, especially regarding Superfund. It concluded that the Reagan administration had been "dangerously deficient" in enforcing the law: Among the committee's findings was that EPA referrals to the Justice Department con-

cerning companies accused of violating environmental laws had plummeted from 252 to 78 between 1980 and '81; worse yet, referrals specifically relating to Superfund violations had dropped by 82 percent, from 46 to 8 cases.

By that time Kaufman had begun leaking documents to Congress and the media, and had aired his concerns about the agency on the television program *60 Minutes*. "All hell broke loose," he says. "The EPA began monitoring my phone calls at work and at home, and they put a tail on me. They couldn't fire me outright; my support was too broad. So they tried to blackmail me out of the agency."

His wife thought it was a funny overreaction at first. "Hugh said a friend told him that we should assume our phone had been bugged and that we were being watched," she says. "It was a July Fourth weekend and it seemed amusing. But then I thought, 'This is my government, and it's watching me and listening to my phone conversations.' We left our house and went to stay in a hotel in Baltimore for the weekend." Later a friend told Kaufman that the EPA had spotted him with a woman at a motel in Pennsylvania. The woman was his wife; the two were en route to visit her parents in Michigan.

The EPA's Office of the Inspector General was conducting the investigation, Kaufman says. He fought back by filing Freedom of Information Act requests and a complaint with the Department of Labor. He also went to the media.

"The phone calls were unbelievable," Elana Strom says. "I began taking the phone off the hook and putting it in the refrigerator so we could eat dinner in peace. Hugh left for a weekend trip to Texas and the phone rang the whole weekend; CBS sent over a messenger when they couldn't get through. When Hugh came back, I gave him three pages of phone numbers."

After a Labor Department investigation concluded that the EPA's harassment of Kaufman had been "extraordinary," the EPA requested a formal hearing. Welcoming the chance to air his complaints, Kaufman lined up the networks and promised subpoenas for the major administrative players, from Reagan's counselor Edwin Meese III on down. "I was ready to kick ass," he says. But a week after Reagan fired Lavelle in February 1983, Kaufman made a deal with the administration that was approved by the Labor Department administrative-law judge handling his case. In return for Kaufman dropping his complaint, the administration was to end its investigation and harassment. Furthermore, all general laws protecting federal employees were in Kaufman's case to be enforced by a federal judge rather than through the usual cumbersome administrative review process.

Kaufman now calls himself the country's "most-protected civil servant. It can take a whistle-blower ten years and $250,000 just to get through the hoops to get an administrative ruling," he says. "A federal judge can still fire me if I break the rules, but I won't have to scrape along for a dozen years waiting to get there."

By the time the EPA stopped hassling Kaufman, the agency was in complete turmoil. Dingell's committee issued subpoenas to 37 EPA employees, including Burford, and seven congressional

panels were investigating the agency. Within a month, Burford resigned. Then, on December 1, 1983, Lavelle was found guilty of three felony counts of perjury for lying to Congress during its investigation.

Kaufman believes Lavelle, who was sentenced to six months in jail and fined $10,000, was sacrificed to get Congress off the administration's back. "They looked around and said, 'So who's going to go to jail? Ain't going to be Ed Meese; ain't going to be Anne Burford. No, it's going to be the dumb blonde who looks like Miss Piggy. The public will buy that.

"I feel bad for her, like I feel bad if some 17-year-old pushing a little crack goes to jail and the head of the drug cartel is doing fine. Sure, the 17-year-old deserved to go to jail, but. . . ."

Kaufman predicts that the next administration will take environmental issues more seriously than the last two, no matter who is elected president. "If Dukakis wins, he'll start moving the ball, and environmental regulations will start coming and enforcement actions will increase," he says. "But there's a lot of pent-up energy in midlevel technical people in the agency. The ball is going to get moving too fast and he's going to lose control and get worried. Then we'll see what happens.

"If Bush wins, he'll try to carry on like Reagan. But he can't. He'll screw up. He's not as good at public relations as the Reaganistas are, and he's not a rape-and-pillage kind of guy. In the end we'll be better off with him, too.

"The real wild card is how fast the economy falls," Kaufman continues. "With the huge national debt Reagan is leaving, he is playing Coolidge to Hoover. If the economy collapses, industry will start screaming and moaning about the costs of regulation and the president will have a job on his hands."

Kaufman, however, does not put his faith in presidents. He sees their role as masters of a "bully pulpit" who take advantage of tendencies that already exist in a society. He looks to the people—community activists like Gibbs and Greer—to direct the country and says that, in effect, Reagan's program has thrust local people onto center stage.

That's a tough place to be, and sometimes Kaufman worries. "I'll tell you something," he says. "If a large segment of the body politic of a society does not have the attention span, tenacity, courage, will, and wisdom to confront and deal with problems, then that society will decay. That society may have a large segment driving Rolls Royces or wearing Brooks Brothers suits, but make no mistake about it, that is the formula for a decaying society.

"A healthy society is up to the challenges of life. It's a society that is growing, that identifies problems and solves them and feels good about that. You know, if this were heaven it would be called heaven, but it's called Earth."

No matter who heads the new administration, Kaufman's role will remain the same: He will continue to press for change from within and support community groups. "That's the very least a taxpayer should expect of a civil servant," he says. "Anyway, who's going to fire me, Rita Lavelle? She can't even vote." ■

Jeffrey Johnson is a Washington, D.C., reporter who writes about the environment.

HOT SPOTS


ADRIAN DORST

Sitka spruce within Vancouver Island's 27-square-mile Carmanah Creek watershed now rise more than 300 feet. Some of the threatened trees are estimated to be 700 years old.

A Threat to Tall Timber

VANCOUVER ISLAND, B.C.

HIKERS MAKING THEIR WAY along Vancouver Island's spectacularly rugged West Coast Trail pass the mouth of Carmanah Creek as it empties into the Pacific. Even if they pause to gaze up into the densely wooded drainage, they can't see what it is that has conservationists in British Columbia so excited these days.

"A Sitka spruce more than 310 feet tall has just been discovered," reports Peter McAllister, chair of the Sierra Club of Western Canada. "It's the tallest tree of any species in Canada, and probably the tallest Sitka spruce in North America."

That find could be just the beginning. Scientists and environmentalists have only recently started to explore Canada's finest surviving stands of giant Sitka spruce, which thrive (for now) along the rich alluvial floodplain in the middle Carmanah drainage, hidden from public view—and hence from public concern. Only when MacMillan Bloedel, one of Canada's largest lumber companies, built logging roads into the drainage to clearcut these ancient stands was the existence of the trees finally confirmed—although rumors about them had been floating around for 30 years.

And how is MacMillan Bloedel responding to the discovery of irreplaceable old-growth stands in an area where it had planned to begin extensive logging operations? Following recent public furor over the company's forest-management practices on the Queen Charlotte Islands, where it wasted huge amounts of timber by clearing the best old growth

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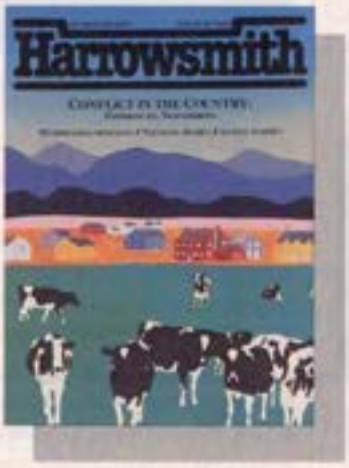

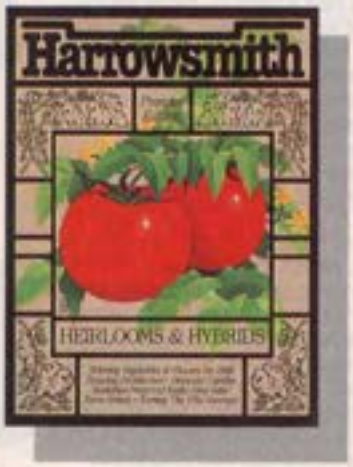

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Canadian loggers covet Sitka spruce.

and leaving the rest on the ground, it agreed this spring to a temporary moratorium on roadbuilding in the Carmanah drainage. Conservationists welcomed the chance to buy time for negotiations with officials in the federal and provincial governments.

Unfortunately, no one in government seems willing to take ultimate responsibility. While Canada's constitution suggests that each province controls its own land, British Columbia says that the federal government ought to decide the fate of Carmanah Creek because the area sits so close to Pacific Rim National Park. Meanwhile, the provincial Ministry of Forests and Lands has requested a new logging plan from the company, but—based on public statements from Minister Dave Parker—conservationists fear that it might accept a plan agreeing to preserve only a few hundred acres. Although the ministry has final say over the land, "the company is very powerful and usually gets what it wants," says Bristol Foster, former head of Ecological Reserves for the province of British Columbia. This comes as small surprise to local conservationists, since the ministry seems simply to have rubber-stamped MacMillan Bloedel's logging plan for the drainage, which considered only economic benefits.

"We need a continued moratorium on roadbuikding in the Carmanah Valley so we can complete our inventory of its scientific, recreational, and scenic values," the Club's McAllister says. "It would be a tragedy to cut these trees when MacMillan Bloedel and a few other multinationals have access to virtually every acre of temperate rainforest on the Pacific Coast of British Columbia."

Foster agrees, noting that very little of the old growth on British Columbia's

coast, which stretches nearly 16,000 miles, is protected—and "nothing of this quality of Sitka spruce."

In July, MacMillan Bloedel proposed setting aside 240 acres for protection at two different floodplain sites, including a few acres surrounding the biggest tree—an amount "totally inadequate to protect the area," says Sharon Chow, conservation coordinator of the Sierra Club of Western Canada. She believes the concession was made "basically to appease the public and the environmentalists" and says efforts to preserve more of the area will continue.

Media coverage and a series of local Sierra Club presentations are helping to spread word of the region's spectacular Sitka spruce forests—and Club activists hope that public pressure will convince government officials to ask MacMillan Bloedel to forego its harvest there.

The Sierra Club would like to see the entire drainage protected within Pacific Rim National Park, McAllister says. He urges U.S. activists interested in helping to write to Environment Minister Tom McMillan (House of Commons, Ottawa, Ontario K1A 0A6) and British Columbia Premier William Vander Zalm (Parliament Buildings, Victoria, British Columbia V8V 1X4), emphasizing the need to preserve these outstanding examples of North America's temperate rainforests.

"What we've discovered along Carmanah Creek," says McAllister, "represents the most exciting find in the temperate rainforests anywhere in North America."—***Jonathan F. King***

Big Neighbor Poses Big Risks

RICHMOND, CALIFORNIA

The people of Richmond, on the northeastern end of San Francisco Bay, have a neighbor bigger than most. Chevron USA, with its giant refinery and Ortho pesticide plant, is the city's largest employer, one of the bay's biggest industrial polluters, and the Bay Area's second-largest local point source of airborne cancer-causing benzene.

For years residents of primarily blue-collar Richmond have talked of foul odors and mysterious sicknesses, and since the chemical tragedy in Bhopal, India, they have worried about what would happen should a sudden chemical catastrophe befall their community. Until recently, however, they weren't organized to bring their concerns forcefully to Chevron.

But in 1986 Ernie Witt, an activist with a community group called the Richmond Citizens Action League, told the National Toxics Campaign, "If you have the organizer, we have the place for you to organize."

DAVID D. TURNER

Do people worry about the hazards posed by a 2,900-acre refinery? Chevron's neighbors do.

Soon after, the campaign hired an organizer, Craig Williams, and set up an affiliate in Richmond to mobilize the community.

The group, called the West County Toxics Coalition, developed a plan to ask Chevron for five things: better air-quality monitoring, an early-warning system for chemical accidents, an assessment of the refinery's impact on community health, a local health clinic, and a community consultant to inspect Chevron's facilities and recommend ways to reduce their toxic hazards.

Williams went door to door to explain the group's program. "People were shocked to learn that some of these safeguards didn't exist. Then they would start telling me about their health problems, and *I'd* be shocked." He started working with residents at their houses and churches and talking with homeowners and neighborhood groups. Soon a steering committee was directing the coalition's activities.

Chevron offered only limited cooperation. The company took a busload of people—including three nationally known toxics experts—on a tour of the facilities in March 1987, but would not allow visitors off the bus for a closer look. Afterward, the consultants (together with Citizens for a Better Environment and the National Toxics Campaign) prepared a report documenting hazards and suggesting solutions.

But by then Chevron had stated that it had "no plans for further discussions" with the coalition. It believed, according to Chevron Manager of Environmental Affairs Pete Williams, that the coalition had demonstrated bad faith by distributing "inflammatory and inaccurate" literature and by conducting a "citizens' inspection" without giving the company proper notice. Chevron's Williams says the company works with other environmental groups and has made great progress in reducing environmental impacts.

Jean Siri, a member of the coalition's steering committee and mayor of neighboring El Cerrito, says that the literature *was* accurate (though she admits it was inflammatory), and that Chevron knew of the inspection long before it occurred. She agrees that the company has improved but insists it has much yet to do to meet the coalition's demands. "Chevron has done mainly what it has been required to do," she says. "It also needs to work with neighbors. I'm talking about science versus emotion. They have to deal with both."

In the meantime, the coalition has resolved to speak with a louder voice. It introduced its plan as a shareholder resolution at two of the company's annual meetings (with no success), picketed the home of Chevron's president, held a number of demonstrations to raise community awareness, and organized a Labor Day weekend boycott of Chevron products that was supported by local and national environmental groups.

Despite the company's continued failure to respond, the coalition's Williams refuses to be discouraged. He cites labor organizer Cesar Chavez, who says that by talking to people one at a time, persistently, you can accomplish anything. —***Donald Forman***

Parade of Bureaucrats Stalls Reserve

MARTIN COUNTY, FLORIDA

"You can say it's a little like the Okeefenokee Swamp, you can say it's a little like the Everglades—but the fact is, there's no place else like it."

That's how Martin County Commissioner Maggy Hurchalla describes the Savannas, a narrow, 12-mile-long strip of wetlands, marsh, and lakes that scientists say is the last remaining ecosystem of its type in Florida.

The Savannas marshland hugs the heavily developed coastline between Stuart and Fort Pierce along Florida's southeastern edge. Bordering its eastern side, an ancient sand dune rises like an alligator's spine, separating the sawgrass-covered marsh from the brackish Intracoastal Waterway. Some 700 plant and animal species live and feed in the Savannas, including bald eagle, bobcat, and wood stork. One species, the fragrant wool-bearing cactus, is found nowhere else.

Hurchalla and other environmen-

ED FISHER

Water-lily-covered marshes and pine flatlands are characteristic of Florida's Savannas. While freshwater-marsh ecosystems once dotted the state's eastern coast, only this one remains.

talists saw development coming ten years ago and set up a deal whereby the state purchased 3,500 acres of marshland and established the Savannas State Reserve. The state also pledged to buy another 1,600 acres considered key to the ecosystem's survival. But since 1979 only 20 acres have been purchased, with another 51 acres under contract. That leaves a patchwork pattern of public and private land that the reserve's former manager, biologist John Rae, calls "virtually unmanageable." Runoff from nearby golf courses and subdivisions could dictate what lives or dies in the fragile marsh, Rae says.

Money isn't the problem—Florida's Conservation and Recreation Lands program has more than $40 million available annually for land purchases. The problem is simply bureaucracy: The Savannas project has languished through the tenure of three governors, four Department of Natural Resources directors, four DNR division directors, seven DNR bureau chiefs, and four state acquisition agents.

The parade of state officials has left behind stacks of outdated ownership records and inaccurate appraisals that have made landowners suspicious. Many are old-timers who settled near the pale-green marshland in the early 1900s, when pineapple plantations covered the sand ridge; they don't trust the state, and the personnel turnover hasn't helped. They complain about mysterious documents that offer money for acreage but provide no explanation of what will be done with the land.

One Savannas native, 88-year-old Sarah Babcock, is firmly convinced that the state wants to build a road on the ridge. Even when told of plans for the reserve, she remains skeptical. "They want to preserve it? They want to preserve it for the money they can get out of it," she says. "I wouldn't trust any of them today."

At this point the best hope for preservation lies with the Trust for Public Land, a national nonprofit organization that hopes to purchase some 528 acres of Savannas land from private owners and expects to turn over 228 acres to Florida this fall. Some conservationists are opti-

mistic that the TPL initiative will restimulate state interest.

"The solution," Hurchalla says, "is to get state officials down here on a continuous basis to learn about the people and the property and to regain the trust of the landowners."

Meanwhile a small band of environmentalists is continuing a ten-year-long vigil at state land-committee meetings, lobbying politicians, and sounding alarms when development comes close to the Savannas' scenic borders. Says Walter Stokes, a 90-year-old conservationist who often fishes in the area, "We're still hanging on like bulldogs."

—Julie Hauserman

Spirit Dancers and the Law

MT. BAKER–SNOQUALMIE N.F., WA

Cedar is to the Coast Salish Indians of the Pacific Northwest as buffalo were to the Plains Indians. For thousands of years the coastal Natives used the bark, roots, and wood of this majestic tree for just about everything. From cedar the Salish built their homes and canoes, wove their baskets, made their skirts, and carved their dance masks.

Today these Native Americans wear bluejeans and drive cars, but the cedar groves remain sacred to them. Several thousand Salish Indians still take to the forests and smokehouses each year to practice *seyowen*, their ancient winter-dance rites. In the solitude of the old-growth forests, dancers gather ritual paraphernalia, deepen their relationship with the spirits, and purify themselves.

Because of a U.S. Supreme Court ruling last April, spirit dancers say their religion is in jeopardy. That decision was the last phase of the Gasquet-Orleans (G-O) Road case, a legal battle that goes back to the mid-1970s. In litigation, members of three California tribes had joined the Sierra Club and other plaintiffs to try to block construction of a Forest Service logging road through the Indians' sacred high coun-

try. The Supreme Court overruled both the trial court and the Ninth Circuit Court of Appeals, deciding that Native Americans do not enjoy a First Amendment right to protection of their most sacred sites. Even now, with the 1984 California Wilderness Act protecting much of the land from logging, the G-O Road may pass through a corridor exempted from the law.

Although the Salish tribes of Puget Sound were not parties to that case, they may suffer from the decision at least as much as the Indians who helped take the federal government to court. Since 1981 the Salish Indians have been fighting to preserve some 450,000 acres of sacred cedar groves and other culturally important sites in the Mt. Baker–Snoqualmie National Forest.

The Forest Service, guided by the American Indian Religious Freedom Act of 1978 (AIRFA) and the First Amendment's guarantee of religious freedom, consults with the tribes before logging or building roads in problematic areas. But the agency rejects the Natives' demand that all 450,000 acres be permanently exempt from logging, and the Supreme Court's G-O Road decision leaves the tribes no legal recourse if a logging plan is approved despite their protests.

When AIRFA was passed, its House sponsor, Morris Udall (D-Ariz.), was quick to point out that it had "no teeth." An effort is now under way to give it some bite. Senate Bill 2250, introduced by Alan Cranston (D-Calif.) prior to the Supreme Court ruling, would require that federal land "indispensable" to traditional Native religions be protected except when that protection would conflict with governmental interests "of the highest order." The bill would give federal courts greater authority to ensure that Native Americans' religious needs are met.

"The forest is our temple," says Sam Cagey, a traditional leader and member of the Lummi Tribal Business Council, one of the most politically active Salish groups. "We don't question Salt Lake City's temple. We don't question the Vatican's temple. We don't want anybody to question how important nature is to us, because that's *our* temple."

—*Keith Ervin*

SIERRA NOTES

Sierra Club Books offers ideal holiday gifts this year with two new titles in its postcard series. Photographic images in *The Sierra Club Nature in Close-Up Postcard Collection* ($8.95, paper) range from the delicate tracery of a swallowtail butterfly's wing to the shadings and textures of Indian paintbrush or a red cabbage leaf. *The Sierra Club Endangered Species Postcard Collection* ($8.95, paper) captures a cross section of the world's living treasures in their natural environments. Each portfolio contains 22 ready-to-mail postcards featuring the work of noted photographers.

Michael P. Cohen's *History of the Sierra Club: 1893–1970* ($29.95) tells the story of how a small, dedicated group of conservationists organized by John Muir grew into the influential environmental organization and national political force we know today. The account features portraits of eminent Club members and their times, from Muir to David Brower. Cohen also recounts many of the Club's victories and defeats, including the Glen Canyon Dam controversy and the fight to preserve Yosemite National Park.

Thomas Berry's *Dream of the Earth* ($18.95) is the first volume in the Sierra Club Nature and Natural Philosophy Library Series. The work provides an intellectual-ethical framework for the human community by positing a universal "biocratic" criterion—planetary well-being—as the measure of all human activity.

John L. Culliney combines natural history and popular science writing in his examination of Hawaii's evolution and ecology in *Islands in a Far Sea: Nature and Man in Hawaii* ($24.95). Culliney also chronicles how humans have affected this delicate biosystem, especially by clearcutting forests.

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

The *National News Report*, published by the Sierra Club about 27 times each year (weekly when Congress is in session), is an insider's look at the workings of the environmental movement and a way for activists to keep up to date on national and regional campaigns. A one-year subscription costs $15 ($30 outside the U.S.). Checks should be mailed to Sierra Club *National News Report*, 730 Polk St., San Francisco, CA 94109. A free sample copy is available on request.

Students seeking volunteer field work in conservation and resource management may find their opportunity with the help of the Student Conservation Association. The SCA, a nonprofit organization, operates placement programs for high school and college students who wish to volunteer with such federal agencies as the Fish and Wildlife Service, National Park Service, Bureau of Land Management, and Forest Service, or with any of a number of state and local conservation agencies. Participants gain on-the-job skills in backcountry trail and bridge construction, wildlife management, fisheries biology, and environmental education. For further information contact the Student Conservation Association, Inc., P.O. Box 550, Charlestown, NH 03603; phone (603) 826-5206 or 5741.

Environmental Job Opportunities Bulletin lists the latest openings with environmental groups, government agencies, nature centers, consulting firms, colleges, and universities throughout the United States. A one-year subscription (ten issues) costs $10. For a sample copy write to EJO, Institute for Environmental Studies, University of Wisconsin, 550 North Park St., Madison, WI 53706; phone (608) 263-3185.

A meeting of ecological restorationists is scheduled for January 16–20, 1989, in Oakland, California. Symposia on restoration in the national parks and on setting standards for the evaluation of restored ecological communities highlight the event. For information and registration forms, write to the Society for

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The South American Explorers Club, a nonprofit, nonpolitical organization with offices in Lima, Peru, and Denver, Colorado, promotes wilderness conservation and wildlife protection in South America. The club's quarterly magazine, *South American Explorer*, features articles on scientific exploration and research, as well as on whitewater rafting and kayaking, hiking, backpacking, mountaineering, and caving.

A one-year subscription to *South American Explorer* is $15. An individual membership in the club, which includes a subscription to the magazine, costs $25. To receive a free copy of the club's fact sheet and 16-page catalog, write to the South American Explorers Club, 1510 York St. #214, Denver, CO 80206; phone (303) 320-0388.

Americans for Safe Food, a project of the Center for Science in the Public Interest, has compiled and published a list of mail-order suppliers of food produced without the use of pesticides, animal drugs, or other synthetic chemicals. Single copies of "Organic Food Mail-Order Suppliers" may be obtained by sending a self-addressed, business-size envelope with 50 cents return postage to Mail-Order Organic, CSPI, 1501 16th St. N.W., Washington, DC 20036.

The premier issue of *Borealis* came off the press in September. The new conservation quarterly is published by the Canadian Parks and Wilderness Society. Among the magazine's offerings are full-color photography; book, record, and art reviews; news shorts from across Canada; profiles of Canadian environmentalists; a section for young readers; and feature articles on such topics as Canada's largest ecosystem—the boreal forest—and the fate of the porcupine caribou herd in the Northern Yukon. To join the society and receive *Borealis*, send $23 for an individual membership or $28 for a household membership to the Canadian Parks and Wilderness Society, Suite 1150, 160 Bloor St. E., Toronto, Ontario, M4W 1B9 Canada; phone (416) 972-0868.

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Lichens: Nature's Paintbox

APPEARING AT TIMES as if an artist has splashed paint on tree trunks and across the faces of rocks, lichens present a display as vibrant as wildflowers. Yet most people know very little about these exotic plants. Striking in variety as well as in color, lichens are useful to humans and serve as excellent reminders of both nature's fragility and its resilience.

Lichens make up just one group of the world's nonflowering plants; others include bacteria, algae, fungi (such as mushrooms), ferns, and coniferous trees (such as pines). About one third, or 100,000, of the world's plant species don't produce flowers; roughly 20,000 of them are lichens.

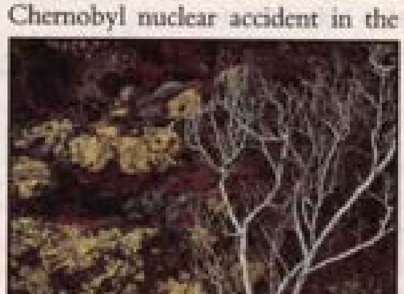
Like most plants that don't flower, lichens can survive extremes in temperature and moisture. They can thrive in lush tropical rainforests —and in dry desert valleys unfit for most living things. They can be found buried under Arctic ice and snow, on a windswept alpine peak, in the branches of an evergreen, on an old fence post or rusting car, or even on the backs of certain beetles in New Guinea.

In the Arctic and the Antarctic, where temperatures plunge well below freezing, lichens easily outnumber other plant species in both number and variety. Experiments have also shown that some lichens survive temperatures above 400 degrees Fahrenheit, and that some can live without water for more than a year. A lichen's response to dryness is simple: When there isn't enough moisture, it enters a period of "suspended animation" in which it barely grows. When the rains come again, the plant absorbs moisture like blotting paper. Some species can hold as much as 30 times their weight in water.

Lichens grow at different rates, depending on the species and the surrounding environment. During the course of a year, some grow less than a millimeter while others increase by ten millimeters. Lichens compensate for their slow growth by being long-lived: Some colonies in Greenland are thought to be more than 4,000 years old.

Although they endure extreme conditions, most lichens are easily damaged by air pollution. Some will survive only if the air is pollution-free. Because lichens accumulate minerals (mainly from the air and rainfall), they are sensitive to contamination. Scientists can determine the spread of pollution from an industrial source by analyzing the lichens in the surrounding area.

Pollution doesn't harm just the lichens. Reindeer, which feed on a type of lichen called reindeer moss, are easily contaminated by radiation. The animal passes the radioactive substances on to humans and other animals that consume its meat, milk, or cheese. After the 1986 Chernobyl nuclear accident in the Soviet Union, entire herds of reindeer in Sweden, Norway, and Finland were put to death to reduce the threat to humans.



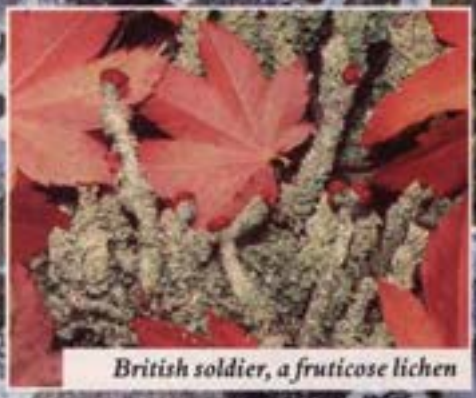
Lichens near Conway Summit, eastern Sierra Nevada

Each lichen is made up of two plant types—fungi and blue-green or green algae—living together. A look through the microscope at a lichen's body, or thallus, reveals a network of fungal threads, called hyphae, surrounding an individual alga cell. The alga is capable of photosynthesis—it uses sunlight to combine carbon dioxide and water to make carbohydrates, the lichen's food. The fungus depends on this food from the alga. Botanists aren't sure what the fungus contributes in return, although researchers have proposed several theories to explain the partnership. Some believe that the fungus is a parasite, freeloading from the alga. Others argue that the relationship is mutual: The fungus pulls its weight by providing water and minerals for photosynthesis and by protecting the alga.

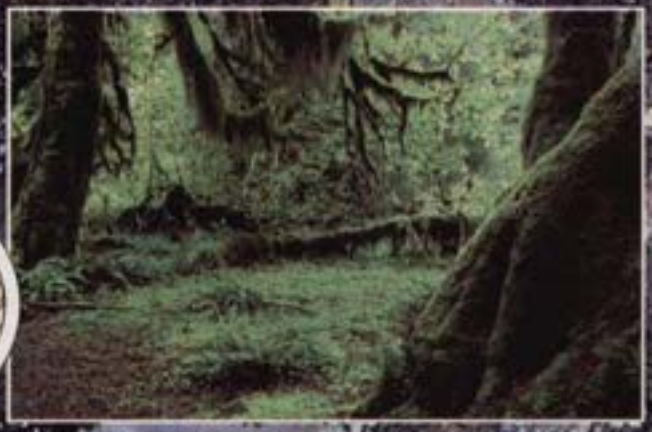
Lichens fit into three groups: crustose (crusty), foliose (leafy), and fruticose (shrubby). All three types live in the soil and on rocks and trees. Crustose lichens are generally flat. Foliose lichens are anchored only in spots and usually have lobed edges, like leaves. The fruticose varieties have many branches and grow upright on land or hang from trees.

Lichens are called pioneer plants because they can take hold on bare rock, in sand, or in soil where other plants cannot grow and begin to form a soil suitable for mosses, ferns, and larger plants. The decaying action of lichen acids combines with weathering (the natural action of wind and water on the land) to

Kathleen Almy



British soldier, a fruticose lichen



Rock tripe, a foliose lichen

Orange star, a crustose lichen

Lichens thrive throughout the world: in frigid Antarctica (top), in a lush rainforest on Washington's Olympic Peninsula (middle), and in a dry New Mexico desert (bottom). Inset: A lichen is made up of a crust of fungal threads entwining colonies of algae.

CLOCKWISE FROM TOP RIGHT: WOLFGANG KAEHLER; SCOTT S. WARREN; SCOTT S. WARREN; ROD PLANCK / PHOTO RESEARCHERS; JOHN SERRAO; MILTON RAND; TOM STACK & ASSOCIATES

wear away a rock's surface, converting the minerals there to new compounds. These join the developing soil, where other organisms can use them.

Lichens are important to most ecosystems. All life forms need nitrogen, but few can use it as it occurs naturally in the air. Lichens that contain "nitrogen-fixing" blue-green algae can convert nitrogen in the atmosphere to compounds that other organisms can use. In the tundra, lichens may cover miles of open ground, providing food for reindeer and caribou; the plants make up as much as 60 to 90 percent of the diet of these grazing animals. Warblers in the Arctic build their nests from lichens, while snails, slugs, and some moth larvae use the plants for both food and shelter. One small insect camouflages itself by covering its body with bits of lichen; the common name, "trash carrier," aptly fits this moving pile of debris.

Humans have also found uses for lichens—as cosmetic ingredients, leather-tanning agents, fibers for clothing and shoes, and medicines. In fact, the word *lichen*, from the Greek word meaning "leprous," refers to the plant's scaly growth on tree bark and its use in treating leprosy.

GEORGE HEINRICH

Reindeer on Alaska's Seward Peninsula paw through snow searching for lichens.

Although many lichens have relatively high food value, they contain chemicals that make them taste bitter. Even so, they have been a source of starches, vitamins, and minerals for people in some parts of the world. The "manna from heaven" described in the Bible was probably a lichen blown down from high mountain slopes to the desert. Rock tripe, a leathery lichen that grows on rocks, was a common meal for Pacific Coast Indians and also nourished French explorers in the area. Early Arctic explorers survived almost entirely on rock tripe for weeks.

The chemicals that give lichens their coloring are also useful to humans as dyes, producing earthy shades of yellow, red, and blue. The colors of Scottish wool tweeds were once made from lichen dyes. The cudbear lichen is a source of dye for litmus paper, used to measure chemical acidity. The perfume industry also uses lichens as stabilizers, and large quantities of oakmoss are harvested for soaps and perfumes.

Lichens aren't as obviously beautiful as many plants because they don't produce attention-grabbing flowers. But a close look reveals a complex and colorful plant that is important to animals, humans, and other plants. ■

KATHLEEN ALMY *is a naturalist and freelance writer in Fort Collins, Colorado.*

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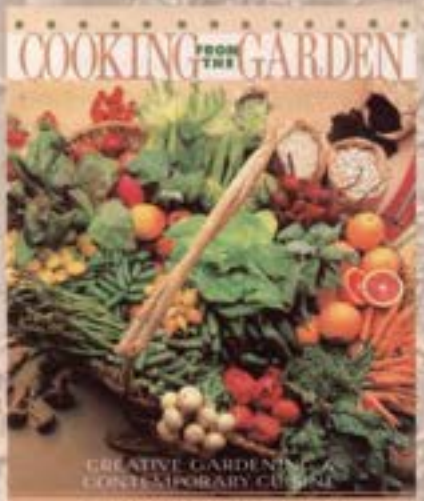

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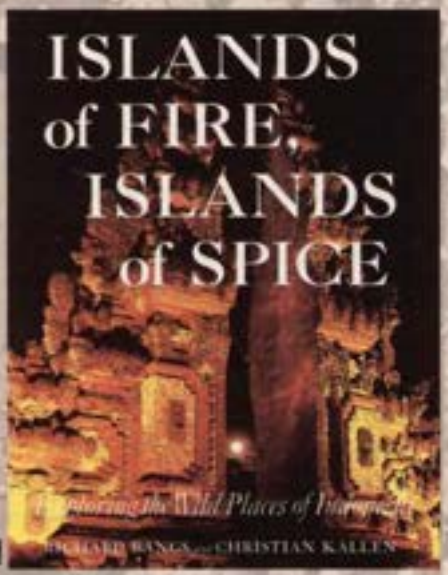

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GEORGE BUSH

Continued from page 64

year the United States took the lead in developing a historic accord to cut worldwide production of CFCs by 50 percent. The agreement is known as the Montreal Protocol.

The first priority now is to get all nations to proceed with ratification and implementation of the agreement. But I believe that, beyond that, our goal should be a complete phasing-out of CFC production, and that would be the policy of a Bush administration. As we work to make sure that the Montreal Protocol is implemented, the United States can and must be the leader in reaching this next stage of agreement.

I have announced that in my first year in office, I will convene a global conference on the environment. It will include the Soviets, the Chinese, the developing world as well as the developed. Among the first items on the agenda will be how to reduce global warming and the related problem of preventing the loss of tropical forests.

Oil and gas development on public lands is a difficult issue because we must balance concern for the environment with the *knowledge* that the national-security interests of the United States are not well served by excessive dependence on foreign oil.

I believe that oil and gas development, particularly offshore, must be subject to stringent environmental safeguards. I also believe that in some cases a site may be so environmentally sensitive and valuable that it makes sense to prevent drilling. Many of the tracts off the coast of California, for example, might fall into this category. We should delay any further exploration and drilling in these areas until and unless we are certain that no lasting environmental damage will be done.

Twenty years ago I voted to increase funding for the Land and Water Conservation Fund. Since its creation in 1965, the LWCF has enabled localities and states to acquire 2.8 million acres of recreation lands and waters. The LWCF expires in 1989, but I strongly support its continuation. As a way of strengthening the LWCF, I believe we should recast it as a national endowment for the environment. The endowment could operate as a self-perpetuating trust fund, with money coming from interest earned on investment, from public/private partnerships, from user fees, and from oil-lease revenues.

There are a number of other environmental issues of critical concern.

Seventy percent of America's population lives within 50 miles of an ocean. I support a ban on the ocean dumping of sewage sludge, federal involvement to develop a comprehensive system for tracking the disposal of medical waste, and a beefed-up effort—encompassing the Coast Guard, the FBI, and the EPA—to enforce laws against the illegal dumping of various forms of waste at sea.

Fifty percent of America's families depend on groundwater for their drinking water, and communities across this country are threatened by improper disposal of toxic wastes. I support a significant strengthening of enforcement of hazardous waste laws. I would go after polluters much more aggressively and use the legal powers granted in the Superfund to make polluters pay for cleanups. I would pursue comprehensive cleanups, and make greater use of the EPA's emergency authority to begin cleanups earlier.

America is losing almost a half-million acres of wetlands every year. I support a national goal of "no net loss" of wetlands so that we can preserve these valuable resources, which are essential as wildlife habitats, flood-control devices, and natural filters of our water.

Americans produce 160 million tons of garbage every year. As president I would pursue a national recycling and source-reduction strategy.

You may be surprised that such an aggressive environmental agenda comes from a Republican. Don't be. It follows a long tradition of conservationism in our party, from Abraham Lincoln to Teddy Roosevelt to Richard Nixon, who presided over creation of the EPA and the CEQ and pushed for such landmarks as the National Environmental Policy Act and the Endangered Species Act.

I would be a Republican president in the Teddy Roosevelt tradition. A conservationist. An *environmentalist*. ■

MICHAEL DUKAKIS

Continued from page 65

tion that sets aside millions of acres of the California Desert as new wilderness and national parkland. And I will act aggressively to preserve endangered species.

We should evaluate the possible use of trade restrictions to reduce the use of climate-altering substances around the world.

We should also act decisively to secure a global ban on chlorofluorocarbons (CFCs). Interior Secretary Hodel's suggestion that we deal with the problem of ozone depletion with sunscreen, hats, and sunglasses is disturbingly indicative of the current administration's general lack of concern for global environmental issues.

To meet our domestic responsibilities for these problems, we not only need to eliminate domestic CFC production, but also must reduce the carbon dioxide emissions we produce by burning fossil fuels.

To reduce domestic production and emission into the atmosphere of substances linked to ozone depletion, I would require that such substances be listed by the EPA and subjected to a rapid phaseout schedule.

We must help developing countries avoid environmentally destructive economic-development practices that may provide short-term benefits but are not sustainable over time. The wholesale cutting of tropical forests has implications not only for tropical countries but for our own nation and the citizens of the world. If this destruction continues, we face massive extinction of plant and animal species, depletion of the world's oxygen supply, and drastic climatic changes.

We must encourage multilateral development banks to carry out projects that promote sustainable growth in concert with sound resource conservation. To prevent environmentally unsound development from continuing, the debt and environmental crises must be jointly addressed and creative solutions explored. Replication of the recent debt-for-nature swaps on a far broader scale, with the active encouragement of the

U.S. government, is one way to address both debt and environmental problems.

The first step toward meaningful environmental protection is presidential leadership. Leadership means that the tone must be set from the top that the president not only expects but demands vigorous and visible enforcement of our environmental laws.

Leadership also means being willing to commit resources to make a difference on environmental issues. I have demonstrated this willingness in Massachusetts and will continue to do so as president.

Investing in the environment doesn't impose costs on the American people; it saves us all money. It saves us health-care costs, it saves us future cleanup costs, and it saves us the hundreds of millions of dollars the federal government has been spending every year on environmentally unsound subsidies to a variety of industries.

By investing in the environment, we enhance the quality of life for millions of Americans, provide recreational opportunities, protect water supplies and air quality, and uphold our responsibility to future generations to preserve for them America's magnificent scenic heritage.

In the last few years, more and more people have come to understand one of the key insights of the environmental movement: We're all in this together. In the years ahead, I believe we will cease to think of environmental issues as "domestic" and will instead think of them as overarching concerns in the same way we now think of foreign and defense policies.

The dissolving ozone layer, global warming, overpopulation, deforestation, and the loss of species are all aspects of the same phenomenon: As our aggregate effect on our environment increases, so too does the interdependence of the world's peoples. Future presidents will need to understand this in a way that past presidents have not.

A quarter century ago, John Kennedy said, "It is our task, in our time and in our generation, to hand down undiminished to those who come after us, as was handed down to us by those who went before, the natural wealth and beauty which is ours." We must fulfill that vision. And we can. ■

Ethics for the Earth

The Rights of Nature:
A History of Environmental Ethics
by Roderick Frazier Nash
University of Wisconsin Press
$27.50, cloth

Environmental Ethics:
Duties to and Values in the Natural World
by Holmes Rolston, III
Temple University Press
$34.95, cloth

Earth and Other Ethics:
The Case for Moral Pluralism
by Christopher D. Stone
Harper & Row
$19.95, cloth

Respect for Nature:
A Theory of Environmental Ethics
by Paul W. Taylor
Princeton University Press
$37.50, cloth; $12.50, paper

Kristin Shrader-Frechette

A YAKIMA INDIAN FRIEND of mine tells me that his people continually ask forgiveness of the earth. Whenever they till the soil or draw water from their wells, they try to make amends for the harm they inflict on the land.

Although most of us probably don't think that the earth is a living being from whom we ought to ask forgiveness, my friend has an important insight: We are morally blind if we think that nature is here only to serve human needs. In other areas of ethics, we have overcome our blindness and prejudice; we realize that racism and sexism are wrong, for example. We have been slower to recognize the related error of speciesism, the belief that only members of the human species have worth or value.

Part of the reason for the modern world's insensitivity to environmental values is that many moral philosophers, particularly those in academia, have abandoned the ancient tradition of serving as societal critics. Instead they have become ivory-tower speculators, wanting little to do with real-world problems such as ozone depletion, acid rain, or the destruction of tropical forests.

Four recent books on environmental ethics go a long way toward correcting this neglect by contemporary philosophers. All four reject the human-centered emphasis of conventional moral philosophy, and provide environmentalists with well-reasoned arguments with which to defend their activism.

Writing what philosophers call descriptive ethics, Roderick Nash in *The Rights of Nature* surveys what people have actually believed about environmental values; he doesn't presume to discuss what we *ought* to believe. Holmes Rolston, Christopher Stone, and Paul Taylor, however, engage in normative ethics: They attempt to provide ethical prescriptions for how we ought to act toward the earth. They claim, respectively, that we humans have duties to ecosystems and to all living beings, not just to other persons; that we ought to give all natural objects "moral considerateness"; and that we ought to treat all members of the biosphere as equals, practicing "species impartiality."

Environmental historian Nash has produced the finest prose and the most readable volume of the four. Tracing the cultural and intellectual history of "radical environmentalism," he provides a colorful description of the controversial persons and movements that have forced us to recognize our environmental obligations. "From the perspective of intellectual history," he writes, "environmental ethics is revolutionary; it is arguably the most dramatic expansion of morality in the course of human thought."

One of the more fascinating parts of Nash's book is his account of the exploits of environmental activists such as Mark Dubois. In 1979, Dubois, a leader

of Friends of the River, vowed to give his life to prevent the Army Corps of Engineers from flooding a stretch of California's Stanislaus River. When water began rising behind the New Melones Dam, Dubois chained himself to some rocks at a hidden spot near the riverbank, eluding searchers. When the press publicized his efforts, then-Gov. Jerry Brown ordered a halt to the filling of the reservoir. Dubois's efforts delayed the flooding for more than two years.

In *Environmental Ethics*, philosopher-naturalist Holmes Rolston provides the most insightful and poetic work of the group. "That there ought to be some ethic concerning the environment," he writes, "can be doubted only by those who believe in no ethics at all." He urges a personal and compassionate interaction with our earthly home: "Our role is to live out a spacetime, placetime ethic, interpreting our landscapes and choosing our loves within those landscapes. We endorse the world with our signatures. In this sense we want an emotive ethic but not . . . an ethic that is nothing but emotion."

Unlike some thinkers in the environmental field, Rolston claims that humans are superior in nature and ability to other organisms. Nevertheless, he maintains that the nonhuman inhabitants of the planet are more important for the survival of the global ecosystem. To promote the peaceful coexistence of human and nonhuman species, he incorporates in his volume 25 ethical "rules" that will help humans practice enlightened restraint in their commerce with the natural world. These include principles such as "avoid irreversible change" and "increase options." We follow the first rule, for example, by using biodegradable chemicals, and the second by protecting endangered species.

Earth and Other Ethics, by attorney Christopher Stone, begins where the author's well-known 1974 book *Should Trees Have Standing?* ends. In the earlier volume, Stone argued for giving legal rights to natural objects such as trees and rivers. His more recent work looks at how classic cases in environmental law provide a moral and philosophical basis for according more value to nature and nonpersons. Although philosophically naive, the Stone volume is the best of the four in providing a practical, policy-oriented analysis of environmental law.

A philosopher's philosopher, Paul Taylor in *Respect for Nature* presents the best-argued, most analytically skilled work in this group of books. His effort, however, requires more philosophical sophistication on the part of the reader than do the other three.

Taylor defends "the biocentric outlook," the view that all species are equal and interdependent members of the planet's community of life. His arguments are precise and powerful, easily convincing the reader that no person who is both rational and just can live by human-centered ethics. Without appealing either to emotion or to religion, Taylor makes radical environmentalism intellectually respectable.

Each of these authors presents some of the best work in the field. None of the books has any major flaws. Some seem slightly more successful in defending environmentalism, however, and it might be useful to see why this is so.

Historian Nash claims to offer no moral prescriptions, so it would be inap-

propriate to expect his volume to provide a defense of environmentalism. His account makes history "come alive" more than that of any other academic I know. Only in one minor area is Nash's book potentially flawed: his claim that the actions of environmental activists and "liberators of nature," even when they violate the law, are justified by a philosophy he chooses, incorrectly, to identify as ethical relativism.

Ethical relativists maintain in fact that one ethical position is no better than another; hence, "anything goes"—everything is permitted. But if that is so—if one ethical position is, after all, no better than another—then environmental activism cannot be justified, because *no* position can be justified. The only way to justify environmental activism, especially when it violates civil law, therefore, is to appeal to a moral law or principle that is *higher* than the civil law. Thinkers from Thoreau to Gandhi have justified civil disobedience by arguing that, because a particular civil law did not conform to a higher moral law or principle, it need not be obeyed.

Although this misunderstanding of ethical relativism (nonphilosopher Nash has confused it with a variant of utilitarianism) is a minor point in a brilliant and compelling book, its consequences could be powerful. More environmentalists need to know that correct moral principles (like Rolston's 25 rules) are their most important tools. Armed with them, environmentalists have a basis for criticizing and reforming existing laws. Ethical relativism, in denying such principles, destroys the moral foundation for environmentalism.

One reason for Taylor's success in providing such a moral foundation is that he explicitly avoids basing his ethics on intuitions. He points out that intuitions are a subjective product of conditioning and that they differ from culture to culture and from person to person. They are the products of immediate awareness, not reasoning. (One person might have an intuition that nuclear power is good, while another might intuit that nuclear power is bad.)

What we need in ethics, Taylor recognizes, is not just the intuition that something is good or bad, but a rational justification for why that is so. We need to

criticize and rationally evaluate our ethical beliefs, not just base them on perceptions and sentiment. Otherwise ethics would be merely subjective, and it would be useless to argue for an environmental ethic that is purely subjective. To command our assent, an ethic has to be objective in some sense. To the greatest extent possible, it has to represent "the way the world is."

In contrast to Taylor, Rolston admits that his claims rely "largely on intuitions." Likewise, Stone takes aesthetics as a model for his ethics, claiming that intuition and taste help determine environmental rules. But by grounding their environmental ethics largely on intuition, Rolston and Stone have saddled their views with a certain amount of subjectivity, weakening their ethical stances. They needn't have done so. The choice to be an environmentalist is rationally defensible. It is not as arbitrary and subjective as, say, choosing the color of a pair of shoes.

At the heart of Taylor's analysis is a detailed, empirical argument that provides the objective, rational foundation for his environmentalism. At the risk of oversimplifying, Taylor's reasoning goes like this:

All organisms, including humans, have biological requirements for survival. All organisms must realize their "good" (in the objective, biological sense), despite many disturbances not under their control. This means that all organisms need to be free to realize this good. Yet, compared with other organisms, humans are relative newcomers to the planet. Moreover, humans need nonhuman organisms if they are to survive and prosper, although the reverse is not true. Therefore, because humans are planetary newcomers who need other members of the biotic community, they ought to leave nonhuman organisms free to attain their good.

Taylor claims that understanding this basic argument leads us to the biocentric outlook, to recognition of our community and our equality with all things. He argues that this recognition imposes a duty on us, a duty to respect nature for its own sake.

Of all four authors, Taylor appears to offer the most penetrating defenses of actions based on respect for nature. His moral principles are more specific than those of the other writers, and he gives us rational criteria for deciding troublesome cases when human interests conflict with those of nature. Hence he moves environmentalism beyond appeals to "motherhood and apple pie." He avoids giving us subjective or sentimental drivel, or what Nash aptly calls "charming nature essays." Instead he gives us a precisely argued, logically and scientifically sophisticated defense of environmentalism.

None of this is to suggest that Taylor or the other three authors have solved all our philosophical problems. They have not. Two major conceptual obstacles face anyone who wants to develop and defend good environmental ethics.

First, if we follow Aldo Leopold (and Nash, Rolston, and Stone) and claim that ecological principles suggest guidelines for ethical actions, we must acknowledge that those principles are not fully understood. Ecologists are now divided, for example, on the question of whether biotic communities are "structured" or "balanced." They are even at

odds on ways to define these terms. We can't merely "follow nature," as Rolston urges, unless we know what nature is doing, precisely and predictively. Often we don't.

Second, we must learn how to mediate between the Western tradition that maximizes individual, inalienable human rights and the holistic tradition that maximizes biocentric well-being. We need to know how and when to limit individual freedom and rights in the name of environmental and community well-being. Rolston claims that natural communities promote the goods and rights of individuals, but surely this is not always the case. Childbirth, for example, may be good for the population and community but bad for the individual, and vice versa. Hence we face the problem of when and how to maximize community—versus individual—welfare.

If we follow the classical Western moral philosophers and view humans as superior organisms, then ethics seem to allow domination of the planet by only one species. If we follow the holistic moral philosophers and view all organisms as equal, then humans have no more right to life than palm trees and sea oats. Both of these alternatives are unworkable. The holistic tradition could lead to "environmental fascism" and justifying situations such as letting 100 humans die in order to save 101 palm trees. The classical Western tradition could lead to "business as usual" and to continued environmental degradation.

To mediate between the Western and the holistic traditions, we need a new Plato and a new Hypatia. They should have Nash's flair, Rolston's wisdom, Stone's pragmatism, and Taylor's rationality. For the High Sierra trails, for the cloud-nestled Appalachian breaks, for the Everglades' sea of grass, for my favorite deepwater reef at Looe Key, they must be the spokespersons. They must be able to do for the natural environment what the ancient Greek philosophers did for the Athenian marketplace and Academy: Make them the focus of human concern, the center of what is wise, good, and beautiful.

KRISTIN SHRADER-FRECHETTE, *author of six books on environmental ethics and science*

and technology policy, holds a distinguished professorship at the University of South Florida. She is editor of the Oxford University Press series on environmental ethics.

BRIEFLY NOTED

"Sunset and dawn are great times to be on a mountaintop," writes Jim Perrin in ***On and Off the Rocks*** (published in England by Victor Gollancz and distributed in the U.S. by David & Charles; $13.95, paper). "The physical world then settles itself down with all the sighing, rustling rhythms of darkness, or heaves and stretches itself into light." The book is a compilation of finely crafted essays about Perrin's climbing days in the Welsh hills. . . . Perrin's previous work, ***Menlove: The Life of John Menlove Edwards*** (also from David & Charles; $34.95), is the biography of Britain's greatest prewar rock climber. Though most famous for his climbing achievements, Menlove was also known as a poet, an essayist, a conscientious objector, and a homosexual who advocated openness and tolerance at a time of sexual conservatism. . . . For serious mountaineers, the second edition of Fred Beckey's ***Cascade Alpine Guide, Climbing and High Routes, Vol. 1: Columbia River to Stevens Pass*** (The Mountaineers; $16.95, vinyl-bound) details dozens of approaches to and routes up Washington's peaks and glaciers. Suggestions for winter climbs are included. The writing is technical, but the reader is aided by a useful glossary. Maps, drawings, and photographs illustrate the guide. . . . Also from The Mountaineers is Chuck Williams' ***Mount St. Helens National Volcanic Monument*** ($4.95, paper), an adventurer's pocket guide to "a fascinating landscape—a barren one that is still alien and unworldly to most visitors." . . . For those outdoors-lovers who occasionally enjoy a good novel by the fireplace, North Point Press has reprinted James Salter's ***Solo Faces*** ($8.95, paper), about a highly skilled mountain climber obsessed with his sport but anchored to nothing and no one. . . . "The rainforest is perhaps more truly a silent world than the sea," wrote Marston Bates in ***The Forest and the Sea***, first published in 1960 and reprinted now by Nick Lyons Books ($11.95, paper). David Rains

Wallace introduces the new edition with a suggestion that the book may be more relevant today than Rachel Carson's 1962 classic, ***Silent Spring***. . . . "You don't find many blacks canoeing solo down the Mississippi River and camping out every night," writes Eddy L. Harris in ***Mississippi Solo: A River Quest*** (Nick Lyons Books; $17.95), a recounting of Harris' own such experience. The author sees the river as a symbol of our times, for it "fights in a desperate battle against the U.S. Army Corps of Engineers, who refuse to let the river find its own way." The book is commendable as travelog, literature, black perspective, Americana, and outdoor adventure. . . . Speaking of trips down the river, Major John Wesley Powell published a report on his famous Colorado River journey in 1875, but only now have the writings of his crew members been collected in a single volume, ***The Great Unknown: The Journals of the Historic First Expedition Down the Colorado River*** (Northland Publishing; $21.95). John Cooley, director of environmental studies at Western Michigan University, assembled the texts, which are illustrated with engravings based on photographs taken on the second Powell expedition of 1871–72. Cooley has dedicated the book to the preservation of America's remaining wild and scenic rivers. . . . Tom Horton credits a long line of editors at the *Baltimore Sun* for giving him free rein to write about Chesapeake Bay's natural history (as well as for not making him wear a necktie). Horton has collected many of his essays about the region in ***Bay Country*** (The Johns Hopkins University Press; $16.95). . . . The political battles waged between environmentalists, legislators, federal agencies, and industry interests over the passage and implementation the 1964 Wilderness Act are the subject of ***The Wilderness Movement and the National Forests*** (Intaglio Press, P.O. Box 9952, College Station, TX 77842; $12.95, paper). Authored by Dennis Roth, chief historian of the U.S. Forest Service, the book includes black-and-white photographs of wilderness areas that exist today. The names of key players involved in the struggles will be familiar to many Sierra Club members.—***Mark Mardon***

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More Than Just Kicks

Why own four pairs of cross-country skis when you have only one pair of feet?

Reed McManus

As I DRAG OUT my ski equipment in preparation for a new season, I'm dumbfounded. I own four pairs of Nordic skis. Together they remind me how removed I am from the simple, inexpensive, back-to-nature sport of cross-country skiing that I took up 12 years ago. One pair is designed for backcountry touring, one for skating, one for track skiing, and one for telemark turns. Add three pairs of boots and a box full of waxes, buffers, and scrapers, and it's easy to see why I am the ski maker's ideal customer.

A fellow *Sierra* editor who has skied faithfully on the same pair of skis for seven years constantly reminds me of my extravagance. A skilled skier who regularly tackles heady backcountry terrain, she plans to replace her aging gear —if it breaks. She, clearly, is not the sort who warms the ski dealer's heart.

My colleague doesn't feel obliged to invest in new gear for each new turn. However, we do agree that skiers of all abilities and degrees of consumerism can benefit from learning the three basic Nordic styles: diagonal stride, telemark, and skating.

The diagonal stride is the tried-and-true Nordic technique. Its rhythmic kick-and-glide is indispensable for covering level and rolling ground; its name comes from the profile of a skier gliding with the right leg and left arm swinging forward as the other arm and leg swing back, and vice versa. By pushing her weight forward on one ski, the skier moves ahead. She then kicks down firmly on the center of that ski, flattening its midsection into the snow and gaining traction from a waxless "fishscale" pattern or a meticulously applied "kick wax" on the underside of the ski. She then brings the trailing ski forward, shifts her weight forward to that ski, and rides out the next glide. Her arms and poles join in; arm motion helps drive the weight forward and adds power to the kick. Twenty minutes later she is a ruddy-cheeked cardiovascular star.

Striding skis fit into four categories: racing, light touring, touring, and backcountry. Racing skis, built for groomed tracks where they encounter little resistance, are light (about two pounds per pair), narrow, and hard to control. Because they ride in a track, these skis often don't have a sidecut (the narrowing of the ski at its middle), which helps a skier carve a turn. Light-touring skis, designed for tracks or trails, are slightly wider, which makes them heavier (three pounds or more) and more stable. Touring and backcountry skis are even wider, which increases their weight (to five or six pounds) as well as their ability to plow through untracked snow and not bury a pack-laden skier.

Because striding involves kicking, gliding, and turning, striding skis are by nature a compromise. Skiers who want more of a downhill rush use parallel turns (from alpine skiing) and telemark turns. The balletic telemark turn, the oldest skiing technique known, is essentially a diagonal stride without the kick, aided by joyous gravity. As the skier pushes one ski ahead of the other, she genuflects (with or without a prayer) and edges the forward ski into a turn. This, in effect, creates one very long ski. The position is less stable than straddling two side-by-side skis, but it is ideal for turning. As the skier completes the turn, she brings the trailing ski up, shifts her weight to it, and begins another turn. Piece of cake.

The telemark turn combines balance, edging, and unmitigated fun.

Telemark turns can be performed on touring skis, especially in powder snow, but telemark skis, with their metal edges, can turn on packed and icy snow without slipping. "Tele" skis are wide, relatively heavy (five to seven pounds), and narrow at the middle to improve turning. They usually lack double camber (the high arch beneath a touring ski), so they don't have the "wax pocket" necessary for the kick of a diagonal stride. Left floundering on flat terrain, most telemark skiers strap on climbing skins and march straight up a mountain—or come full circle and ski at lift-served resorts.

Telemark gear is similar to

alpine equipment: Short poles allow sharp turns on steep slopes, and stiff boots accent support rather than flexibility. Tele boots resemble the high, leather alpine boots of the 1950s; some even incorporate the rigid plastic shells of modern downhill boots. In fact, if it weren't for their free-heeled bindings, most telemark skis would look identical to their alpine kin. For the steepest terrain, skiers turn to alpine-touring bindings, which enable them to ski uphill with a free heel and then lock their heels in for an alpine-style descent.

While telemarking focuses on steep turns, skating pursues raw speed. Imagine Olympic speed-skater Eric Heiden on skis and you have the model. Instead of pushing forward and down into a kick, the skater pushes one ski forward and to the side, forming a vee, then rides out the glide, pushes off the ski and both poles, and glides on the other ski. Because edging slows a ski, proficient skaters keep their skis as flat as possible.

Skating skis are basically track skis dedicated to gliding. They usually have no kick wax and no wax pocket, but they have more camber than any Nordic ski; often only their tips and tails touch the snow. Like racing skis, they are exceedingly light and narrow. To survive the pressure on their inside edges generated by strong push-offs, they must be exceptionally strong. To keep their tips and tails from crossing, skaters use skis about 10 cm shorter than touring skis; to help generate momentum, skating poles are 15 to 20 cm longer than standard Nordic poles.

Whether you supplement your diagonal stride with some skating and telemark turns on $100 touring skis, or go whole hog and invest $300 or more in specialized skis and boots, remember that in skiing it's technique that matters most. My colleague and her seven-year-old outfit are testimony to that. But I'll wager that once you begin skating or telemarking, you'll soon be mulling over the finer points of sidecut, camber, and flex. While you're honing your technique, you just might experience an irresistible urge to refine your equipment as well. ■

REED MCMANUS *is an associate editor of* Sierra.

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CHINOOK INDUSTRIES

If bears don't hibernate in the winter, what do they do? (Ron Mandell, Scottsdale, Arizona)

Fat and sleek from an autumn food binge, most bears head for a den at the onset of winter. Then they do what many people think of as hibernating: They fall into an extended sleep, their body temperature decreases, and their metabolism slows. Often they do not eat, drink, urinate, or defecate for six months. In the coldest part of the season, adult females give birth, then sleepily suckle one to four tiny newborn bruins. When food becomes available in the spring, the whole family lumbers out into the world again—skinny and ravenous. The adults have typically lost about a quarter of their former bulk.

This half-year of suspended animation resembles hibernation, but technically it is not. True hibernators—bats, ground squirrels, and marmots, for instance—spend the winter in a state closer to death. Their temperature can drop to nearly 32 degrees Fahrenheit, depending on the air temperature around them, and their respiration and heartbeat slow dramatically. They can be aroused by warmth, but only very slowly.

Bears, on the other hand, go into a fitful sleep from which they can be easily awakened, and their normal 100-degree body temperature remains high, rarely dropping more than 12 degrees. Other mammals that sleep a lot in winter and maintain high body temperatures include skunks, opossums, and chipmunks.

Not all bears sleep through the winter, by the way. Where food is available year-round—in the Arctic (where polar bears hunt seals on the ice) and in certain parts of Asia and South America—bears stay active all year.

How fast are we losing the world's tropical rainforests? (Sheila Currier, Akron, Ohio)

They are disappearing so rapidly that it's difficult to quantify the loss, but the United Nations Food and Agriculture Organization's well-informed guess is that we are losing about 80,000 square miles of tropical rainforest a year—an area the size of Kansas.

These rainforests originally covered about 5 million square miles of the planet, primarily between the tropics of Cancer and Capricorn in Latin America, Africa, and Southeast Asia. They are home to about half the world's plant and animal species. Forest clearing for timber, cattle grazing, fuelwood, and farming has reduced the original forest area by half since the turn of the century.

If deforestation continues at the current rate, almost all of the world's tropical rainforests will be completely destroyed in 30 years or so, according to the United Nations. If human populations grow rapidly in these areas, they could disappear much sooner. That gives us the equivalent of less than half a human lifetime to try to save what's left.

I've been following Cesar Chavez's crusade against certain pesticides used on grapes. Does the Sierra Club support the grape boycott? (Linda Kholl, Los Angeles, California)

Although the Sierra Club's board of directors has not taken a formal position on the boycott, many members have expressed concern about the threats that pesticides pose to farmworkers. "An agricultural system that takes advantage of laborers is not a sustainable system," says Terry Shistar, a pesticide specialist on the Club's Hazardous Materials Committee.

The five pesticides that Chavez wants to see banned—captan, dinoseb, methyl bromide, parathion, and mevinphos—have been criticized in a 1988 Sierra Club paperback, *Pesticide Alert*. The book's authors, Lawrie Mott and Karen Snyder of the Natural Resources Defense Council, point out that even though California has the nation's strongest program to protect farmworkers, pesticide poisonings in the fields have risen an average of 14 percent each year since 1973. "Fieldhands suffer the highest rates of occupational illness in the state," the authors say.

As part of Chavez's crusade, the United Farm Workers' president went 36 days without food. On August 21, Sierra Club Executive Director Michael L. Fischer and others joined Chavez in Delano, California, as the fast was broken. Then Fischer went on to fast for three days himself. "I wanted to show the Sierra Club's concerns," he says. "I was deeply moved by the event, the cause, and Chavez's sacrifice." ■

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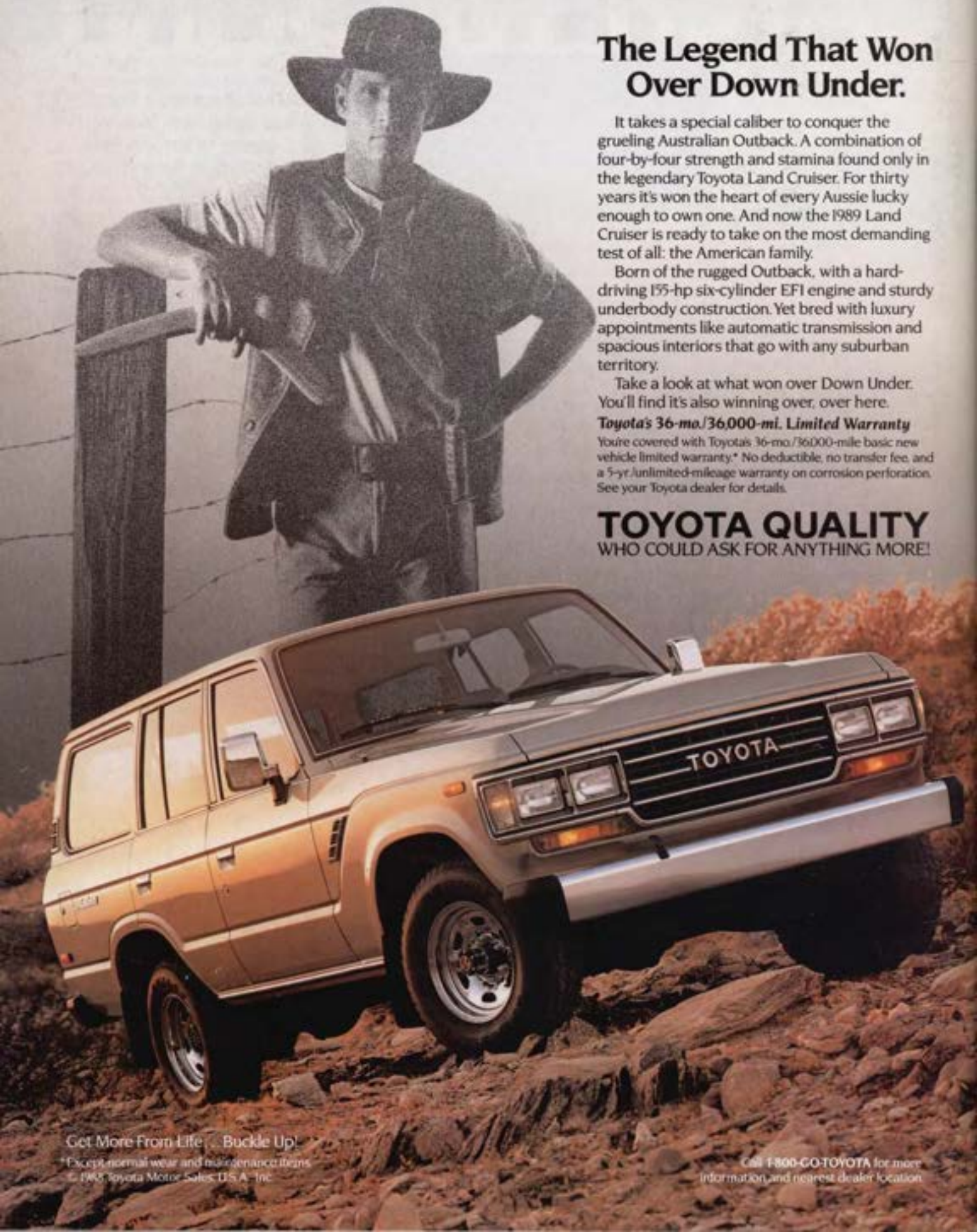

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