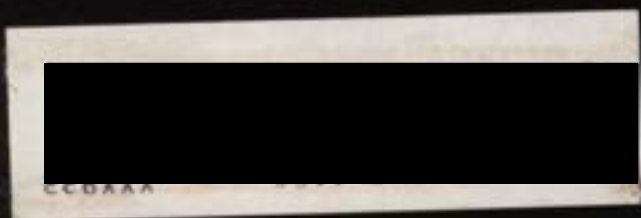


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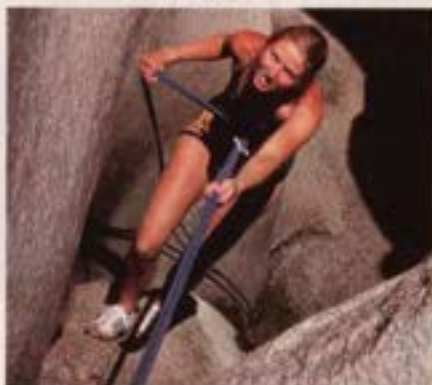
COVER: The Manas Tiger Reserve, home to the highly aquatic Bengal Tiger, is threatened by dam construction in neighboring Bhutan. For more on the threats facing parks worldwide, turn to page 36. Photo: Brian Parker/Tom Stack & Associates.

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#### SHOOT RAPIDS, NOT RAFTERS

I floated Mexico's Rio Grande de Santiago ("El Paso de Muerte," September/October 1984) in the fall of 1975 and feel I should point out a few things about the area, lest any unwary boaters attempt to duplicate Andrew Baldwin's adventure.

The river has been run at least several times without incident, but many locals carry guns and don't hesitate to use them. On my trip, while waiting for a ride at the take-out point, about 40 miles north of Tepic, one of my companions was abducted at gunpoint. In my successful attempt to prevent her from being raped and maybe killed, I was shot twice with a .38-caliber pistol, and barely lived to tell the tale.

Although the presence of construction crews working on the dam may have alleviated some of these conditions since I was there, I advise anyone heading for the area to be very careful.

*Andrew Scott*  
Berkeley, Calif.

#### THE CLUB'S ENDORSEMENT

The Sierra Club's endorsement of the Mondale/Ferraro ticket (September/October 1984) was a statement of the obvious, but a necessary one in a world where the pollsters are daily tabulating voters who seem not to know that protecting the environment is part of a President's job. I shall share this copy of *Sierra* with my neighbors.

*Thoreau Raymond*  
Coeymans, N.Y.

I hope the Club doesn't find it necessary to endorse a presidential candidate every four years, but if ever there were a time to do so, it is now. Let's help defeat Ronald Reagan and then return to our bipartisan ways.

*Jack Curtis*  
Los Angeles, Calif.

You would do well to stay out of endorsing candidates. So would a lot of labor unions who try to mold how their membership should vote. Environmentalists need all the

support and financial aid they can muster. You won't achieve that by supporting a President who promises more parks and wilderness and little else. You'll find that the voters (and your supporters) have many other things on their minds, and the environment is only one of them. A very important worry, but only one nonetheless.

*Daniel M. Jessup*  
Kodiak, Alaska

Congratulations to the Board of Directors for endorsing Walter Mondale. The action is the logical outcome of four years of struggle against an administration determined to sell the environment short.

*Pat Grossman*  
Cleveland, Ohio

The Pandora's box the Board of Directors has finally opened by enlisting this organization as a weapon in a presidential campaign will change the very nature of the Sierra Club.

This erosion of the character and noble spirit of the Club will plant a bitter dissent within our organization that all the anticonservationists have failed to accomplish from without.

We will have been our own worst enemy. What a terrible irony.

*Ferde Grofe, Jr.*  
Santa Monica, Calif.

#### BIGGEST CITY PARKS

What must the Pacific Northwest do to gain deserved recognition?

One of the largest parks located within the limits of an American city ("Questions & Answers," September/October 1984) is right here in Portland. Forest Park is 4,700 acres stretched out in a steep strip of land eight miles long and a mile and a half wide.

*Dean Williams*  
Bureau of Parks and Public Recreation  
Portland, Ore.

According to the San Diego Planning Department, Mission Trails Regional Park is approximately 6,200 acres in area, all lo-



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cated within the limits of "America's Finest City." That's some 62 percent larger than Fairmont Park in Philadelphia, cited first on your list.

Judith F. Lenthall  
 San Diego, Calif.

Your list of the ten largest American urban parks omitted Bidwell Park in Chico, Calif., which encompasses 2,400 acres. This would place it third on the list.

Mary S. Bergquist  
 Santa Fe, N.M.

Editor's note: *The list we gave of the ten largest city parks was provided by the National Recreation and Parks Association. Officials there concede that the list is by no means firm. Sierra welcomes further additions or amendments to "the top ten."*



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**THE LAST WORD?**

An editor's note in your September/October issue referred to reader protests over the Ansel Adams photo that graced your July/August cover, which you identified as "Half Dome, Thunderclouds, from Glacier Point, Yosemite Valley 1947." In that note you said that "members of Adams's staff attest . . . that the photo was indeed taken from Glacier Point."

I believe Adams's staffers are likely confusing Columbia Point on the Yosemite Falls trail with Glacier Point, which is on the south rim of the valley. Columbia Point is on the north rim, at an elevation of about 5,550 feet. Noting the formations on the left of your cover photo (Royal Arches and Washington Column), I must say that it was definitely taken from the north side. Glacier Point is about 7,200 feet in elevation, higher than both the arches and the column. Also,



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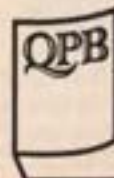
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Iceland: 16 days, 6/14, 7/5, 8/9 • Ireland: 23 days, 5/8 • Islands/Highlands of Scotland: 21 days, 5/30, 7/18 • Switzerland: 17 days, 7/19, 8/9 • Spain: 20 days, 4/19 • Greece: 19 days, 4/15, 9/16 • Isles of Greece: 16 days, 5/4, 10/12

### Asia & Africa

Japan: 23 days, 5/31 • Burma/Thailand: 23 days, 11/2 • Sri Lanka: 18 days, 2/15, 7/5, 11/15 • Nepal/Sikkim/Bhutan: 23 days, 3/14, 10/10 • Foothills of Western Himalayas: 19 days, 4/18 • Kenya: 22 days, 1/31, 7/16, 10/17 • Madagascar/Reunion/Mauritius: 24 days, 7/7, 10/6

### Oceania & Australasia

Australia/New Zealand: 28 days, 2/9, 10/5 • New Zealand/Milford Track: 22 days, 2/8, 11/15 • Papua New Guinea: 24 days, 5/18, 8/10, 11/2 • Australia: 35 days, 9/6

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one cannot see much of the northwest face of Half Dome from the south rim.

Woody McCauley  
South Pasadena, Calif.

## POPULATION BOMB

Anne Ehrlich's "Critical Masses" (July/August 1984) should be required reading for everyone on Planet Earth. It is clear that everything the environmental community has worked to preserve may still be lost if population growth can't be stopped soon.

Kathlene Parker  
Denver, Colo.

## OPEN SEASON

Hey, Pete McCloskey, whose side are you on? Your review of *A Season of Spoils* (September/October 1984) implies that the book has the wrong title, that the Reagan people may indeed have been correcting EPA excesses, that they were not specifically attacking the environment but only regulations (a semantic quibble if ever there was one), and that the book's major "difficulty" is its onesidedness. How does such a review belong in an exclusively environmental magazine like *Sierra*? I am puzzled and not a little hurt, for even McCloskey admits that the book is full of facts—enough facts to damn any administration.

Elaine Stansfield  
Los Angeles, Calif.

## CLOTHES ENCOUNTERS

C'mon. I mean cut me some slack fur shur. An article on "clothes for the urban wilderness" (September/October 1984) in *Sierra*? Isn't anything sacred anymore?

Of course I realize you must try to appeal to the widest audience. But the plastic picture alone set this whole article off as an artsy-craftsy special.

If I wanted artificial reality, I would turn Republican and purchase a life subscription to *Spring* magazine instead.

Steven Uptegraff  
Lansing, Mich.

How can you run an article on wilderness clothing and not give product information like other magazines do? For example, *Sierra West*, *Patagonia*, *Donner Mountain*, and *The North Face* did not advertise in the magazine, nor were their addresses listed.

Sylvia Marcin  
Honolulu, Hawaii

Editor's note: The products we mentioned can be found in outdoor equipment stores or ordered through catalogs. Write Eddie Bauer (Dept. BEA, Fifth & Union, Seattle, WA 98124), *Early Winters* (110-DP Prefontaine Pl. S., Seattle, WA 98104), or REI (P.O. Box C-88127, Seattle, WA 98188) for their free catalogs.



## Congress Gives Wilderness System a Boost

The 98th Congress has added more Lower 48 land to the National Wilderness Preservation System than any Congress ever before.

It has enacted at least 20 state wilderness bills totalling more than 8.3 million acres—or one fourth of the federal land designated for wilderness protection outside of Alaska. Most of the new wilderness is national-forest land, but it also includes some national-park and Bureau of Land Management (BLM) acreage.

The states with new wilderness laws are Missouri, Wisconsin, Vermont, New Hampshire, North Carolina, Oregon, Washington, Arizona, California, Utah, Florida, Texas, Mississippi, Pennsylvania, Georgia, Tennessee, Virginia, Arkansas, Wyoming, and New Mexico. At press time the fate of an Idaho bill was uncertain.



Congress protected 83 miles of California's Tuolumne River in wilderness legislation passed this fall. More than 3 million acres of national-forest and national-park lands are now safeguarded.

## Funding for MX Put on Hold

"For all purposes, it is my belief the defeat of the MX is well in hand," said House Speaker Tip O'Neill (D-Mass.) upon reaching an agreement with Senate Majority Leader Howard Baker (R-Tenn.) to delay a vote on the controversial nuclear missile

until next spring. The O'Neill-Baker agreement, which came after weeks of negotiation over the FY1985 Defense Department budget, provides \$1 billion to continue work on the 21 missiles that were approved last year, but requires two more af-

firmative votes by both the House and the Senate before any further production money is released.

President Reagan had originally requested immediate and unconditional funding of 40 more missiles this year. The Senate approved funding for another 21 missiles, but the House


agreed to only 15 new missiles—and that only if money is appropriated and authorized by Congress next year. According to the agreement, one negative vote by either house will block the funds.

## Buy a Slice of the Big Apple

For 28 years, the 15,000-square-foot lot on New York City's West 48th Street lay vacant and strewn with rubble. Six years ago, residents of the neighborhood got together and leased the land from the city, hoping to transform the eyesore into a garden. Today the Clinton Community Garden's large, grassy commons area is laced with tidy brick paths and more than 100 individual garden plots. A unique inner-city oasis in a noisy, crowded, built-up area of New York, the garden serves as a gathering place for everything from picnics to art fairs.

With Manhattan real-estate prices soaring steadily over the years, the city decided in 1981 to put the lot up for auction. The garden's neighbors and caretakers have enlisted the aid of the Trust for Public Land and other organizations in a campaign to save the garden by selling square-inch plots, complete with official "deeds," for \$5. The city has agreed to give the Committee to Save the Clinton Community Garden until December to raise the estimated \$1 million it needs to buy and maintain the lot.

While the committee has sold several thousand inches thus far with the help of media coverage and active volunteers, some 185,000 inches remain to be



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sold. Touted as "the ideal gift for the person who has everything," the square-inch plots can be had by sending \$5 for each to:

Clinton Community Garden, c/o Trust for Public Land, 254 W. 31st St., New York, NY 10001.



The work of hundreds of dedicated gardeners, Clinton Community Garden in New York City boasts a greenhouse, a communal herb garden, perennial and shrub borders, a "pick-me" flower garden, an arbor of fruit-bearing grapevines, berry patches, and trompe l'oeil murals.

## TVA's Dream Grows Dimmer

The Tennessee Valley Authority (TVA) once envisioned bringing light to the Southeast by means of the most ambitious nuclear-power program in the world. Seventeen atomic-power plants scattered throughout seven states would provide the federal utility's customers with 40 percent of their electricity. But four of those plants were cancelled in 1982, and the dream faded even further on August 29 when the TVA's three-man board of directors, citing cost overruns and declining demand for electricity, voted unanimously to cancel four more unfinished reactors and write off about \$2.7 billion in losses.

The TVA estimates that the total cost of completing the four facilities (two each in Mississippi and Tennessee) would have been \$17 billion. All but \$3 billion of that total would have represented overruns from the project's initial estimated cost.

The eight cancellations will cost TVA's ratepayers more than \$4 billion.

"The truth of the matter," said recently appointed TVA board member John B. Waters, Jr., "is that in the 1960s and early '70s the need for new capacity was overestimated, the cost for new plants was underestimated, and the price the public could and would pay for electricity was misunderstood."

Consumer and environmental groups, critical of the commitment to nuclear power that moved TVA away from its traditional hydroelectric and coal generation program, praised the board's decision. "TVA's nuclear program has profoundly affected the citizens of this valley," says Jim Price, the Sierra Club's Southeast Representative. "We applaud the decision from both the environmental and the ratepayer point of view."

The agency's nuclear program includes five reactors currently in operation and four still being built.

## Mondale Rallies Around Club Endorsement

Sierra Club President Michele Perrault officially announced the Club's endorsement of Walter Mondale for President at a rally in San Francisco on September 19.

"Since 1981, Ronald Reagan has managed to subvert every agency and law designed to protect the environment," Perrault said in her introduction of Mondale. "We want a President who will make living in America a pleasure, not a health hazard."

Several thousand people attended the rally, at which Mondale expressed his appreciation of the Club's support and took the opportunity to attack his opponent's environmental record.

"Never before in our history did the love of the land label politicians," Mondale stated. "There were no Democrats, no Republicans when it came to the environment, but then along came Ronald Reagan."

Mondale criticized Reagan for his appointments of James Watt and Anne Burford and for his failure to enforce environmental laws. "I will end the lawlessness—and that's what it is, lawlessness—that is destroying our environment," Mondale promised. "I will take a polluter to court, not to lunch."

On the other coast, the Sierra Club announced its endorsement of the Mondale-Ferraro ticket at a rally in Washington, D.C., on September 7. Walter Wells, volunteer coordinator for the Club's Potomac Chapter, told the crowd that the Club is ready to use its volunteer forces to defeat Ronald Reagan. "Sierra Club activists were very successful in regional and congressional election efforts in 1982," said Wells. "We are eager to bring the same enthusiasm and energy to the presidential campaign."

People interested in working for Mondale and Ferraro can call (800) 258-6700, the campaign's volunteer information number, for ideas on how to get involved. □



Sierra Club President Michele Perrault presents Walter Mondale (left) with a two-foot-tall redwood tree at a San Francisco rally held to announce the Club's first-ever endorsement of a presidential candidate. The tree will be planted, in Mondale's name, within the nearby Golden Gate National Recreation Area.



# The Times Square Affair

*A proposed redevelopment project could bring new life to Manhattan's blighted West 42nd Street. Or it could turn the lights out on one of America's most vibrant urban ecosystems.*



*Vulgar but vibrant, Times Square is the focus of an "urban renewal" scheme that features massive, impersonal office towers.*

JIM JUBAK

THE TACKY GLITTER of New York City's West 42nd Street has been a fascinating puzzle for half a century. The street was the center of New York's theater district until the 1930s, when the Depression and the rise of talking movies caused many "legitimate" theaters to convert to cheap-run cinemas. In the 1940s came a flood of lonely servicemen, with all that implies. Today Times Square, the blocks from 41st Street on the south to 43rd Street on the north, form a wedge that has resisted 20 years of urban planning.

Despite high-density zoning that would

support immense highrises, no major new building has been constructed in Times Square since 1945, and most of 42nd Street is empty above the ground floor. Often it's a scary place, even in daylight. Crowds of young men loiter outside the "grind" houses, movie theaters boasting the lowest prices in New York. Marquees advertise such slash-and-chop films as *Watch Them Die Slowly*. Pornography shops and S&M clubs abound. More police patrol this area than any other part of New York, yet the block boasts the highest crime rate in Manhattan. Drug deals, purse snatchings, robberies, and prostitution are part of the daily scene.

"It's vulgar, but it's vibrant," says Steve

Wilder, chair of the Sierra Club's New York City Group. "It has enormous energy and life both night and day. It may not be Park or Fifth Avenue, but it in no way typifies urban blight." Indeed, the long block that stretches from Times Square to the Port Authority Bus Terminal is among the most complex urban landscapes in America. But after more than 20 years of redevelopment and cleanup schemes that went nowhere, 42nd Street is slated for immense changes.

This decade's plan is the 42nd Street Development Project. A collaborative undertaking of the city of New York and the New York State Urban Development Corporation (UDC), a state agency, the project has been in the planning stages since 1980. Its

express goal, according to the UDC, is "to eliminate blight on 42nd Street between Broadway and Eighth Avenue, to revitalize this vital crossroads and integrate it into the theatrical, cultural, and commercial life of the city."

The \$1.6-billion project will anchor the east end of the area with four huge office towers, ranging in height from 29 to 56 stories and totalling 4.1 million square feet of office space. On the south and west, a 2.4-million-square-foot wholesale mart will abut the Port Authority Bus Terminal, the busiest bus station in the country. In between, nine theater buildings, some of which are historic landmarks dating from the turn of the century, will be restored to theatrical use or converted to retail or office space. A 550-room hotel will be constructed in the midblock area, and subway entrances and underground malls will be rebuilt.

Developers will contribute \$40 million toward theater renovation, subway-station modernization, and other public improvements. The three-block redevelopment will add an additional \$653 million in taxes to city coffers over the next 20 years. In the words of New York's governor, Mario Cuomo, "The 42nd Street Development Project will permanently change the skyline, the daily life, and the psyche of New York City."

The plan for the project shows the influence of William Whyte's pioneering analysis of the way people actually use street spaces. Whyte has studied in minute detail who uses a sidewalk or plaza, what draws people to a space, and what keeps people out; the project plan stresses inviting people into groundfloor retail space. Strikingly, in contrast to much current New York architecture, the project eschews open plazas in favor of the life of the sidewalk.

Even the ideas of Jane Jacobs, author of *The Death and Life of Great American Cities*, permeate the plan. Jacobs is an outsider who riled urban planners with her discussion of sidewalk life and the role of shopkeepers in creating livable neighborhoods. But she is the direct source of at least two aspects of the present plan: its emphasis on orienting groundfloor retail shops toward the street, and its recommendation of incentives for keeping shops open late into the night. Project planners hope that what Jacobs calls "mixed use"—in this context the juxtaposition of offices, shops, hotels, theaters, and restaurants—will bring different groups of people into the area at different times of day, thus maintaining the area's vitality.

When the project's 1,100-page final environmental impact statement (EIS) was issued on August 23, Gov. Cuomo stated, "I know in my heart it will be a change for the better for all New Yorkers." But others are not so sure.

"It's a Godzilla project, out to trample everything in its path," according to Fred Kent, president of New York City's Project for Public Spaces. The Club's Wilder, while observing that making cities more enjoyable reduces the tendency to flee them, thus relieving pressures on the countryside, has strong reservations about this particular plan. "The overwhelming majority of New Yorkers want 42nd Street cleaned up, but not by shoving its unattractiveness somewhere else," he says. "The city administration, ever desirous of new construction and shiny new spaces for white-collar workers, has decided that the East Side of midtown is now overbuilt and that a block like this one, with its excellent transportation facilities, is ripe for development."

Kent believes that the plan pays only lip service to the ideas of Whyte and Jacobs. "It's an architectural development," he says. "They tried to dress it up with lights and banners, but as a street-oriented space the project's a bust." Kent feels the retail complex is not really designed for retail and will serve only to intensify the feeling of mass created by the office towers. "I think of it as urban renewal for the 1980s," he says. "They are macro-developers thinking in macro terms. It's very different from retrofitting—the environmental approach, if you will."

The Sierra Club's New York City Group has another concern: The city is in serious violation of the Clean Air Act's carbon-monoxide standard, and one of the "hot spots" is in the project area. It is acknowledged in the EIS that creating new office space will draw more traffic, exacerbating the carbon-monoxide problem. In mitigation, planners offer the city's solemn promise to staff the area with traffic-enforcement agents (to discourage illegal parking) and to make slight adjustments in the timing of traffic signals (to improve vehicle flow). "New York City can no longer shoehorn an infinite number of people and vehicles into midtown Manhattan just because it means construction and a larger tax base," says Wilder. "New projects must fit into their neighborhoods successfully, rather than being plopped there in a way that solves only the sponsor's problem. We have to admire the idea of creating office space where there is already a concentration of transportation services, but it's still important that additional traffic not clog streets that are already congested."

Terence Williams, president of the New York Chapter of the American Institute of Architects, is critical of the way the project has been sold. "The fact that 4 million feet of office space were going to be dumped in a very sensitive area was made palatable by very strict design standards developed before the project plans were drawn up," he

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
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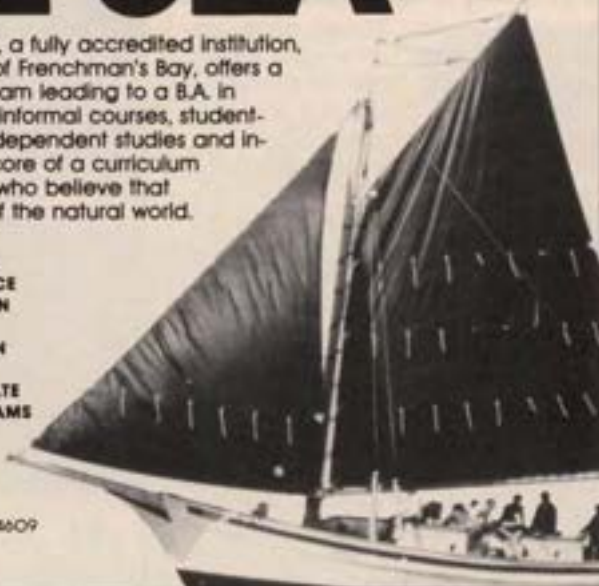
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says. The standards were intended to make sure that new buildings fit in with the context of the Times Square area. Instead, Williams feels, "the context is not maintained by the current design, which does not, in fact, follow the guidelines. You have four massive buildings, totally out of proportion for the site, that will end Times Square, the positive Times Square."

What happened to the design standards? Williams feels that the city and the UDC simply caved in. "The developer, George Kline of Park Tower Realty, said he didn't want to follow them because they weren't economically viable," he says. City and state "are really tied in with the developer now," Fred Kent feels. "The so-called public agencies don't really serve the public on this project. They just want to get it built."

Veronica Hackett, senior vice-president at Park Tower, couldn't disagree more. "There are a lot of people who have this love for the Great White Way and who are afraid that we'll destroy its vitality," she says. "Well, most of them haven't been on 42nd Street in 15 years."

Hackett defends the design of the office towers by pointing out that Park Tower works with the very cream of American





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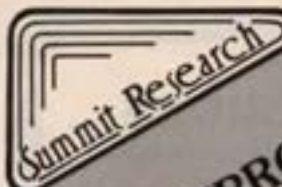
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*In its heyday, Times Square was the hub of Manhattan nightlife. To some the area is a paradigm of urban blight—but one that may be more harmed than helped by a proposed redevelopment project.*

architects, namely Philip Johnson and John Burgee, designers of the four buildings. And that, of course, is another debatable issue. "The Burgee designs are boring," says the Club's Wilder. "I'm afraid these buildings will bring a blank curtain down on Times Square, killing it in order to save it." And there was notable dissatisfaction among architects who entered a recent competition, sponsored by the Municipal Art Society, to find an alternative design for the center of Times Square. One entry was in the form of a cartoon depicting a crane and wrecking ball destroying the Johnson and Burgee buildings.

"But you must blend the vitality of Times Square with the desires of a corporate tenant," counters Hackett of Park Tower. "They want the space to work for them. They want it to be safe, and they don't care much about anything else." And she dismisses those who criticize the scale of the project as being unfamiliar with the real



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world. "The only way to accomplish what needs to be accomplished is a massive project," she notes. "It has to physically happen all together. Urban renovation just doesn't get done piece by piece. It's been tried that way, and it doesn't work."

Meanwhile, arguments over design standards and the bulk of the project failed to address the concerns of the people who live and work in the area around the development. To the west lies the low-to-moderate-income neighborhood of Clinton, itself gradually being renovated building by building. To the south, the Garment District houses New York's fashion industry, one of the city's last bastions of manufacturing.

Residents of Clinton worry that redevelopment next door will mean gentrification of their neighborhood. Higher rents would put many of these families out on the street, speeding Manhattan's conversion to an exclusive address for the upper class. Down in the Garment District, higher rents will put an end to one of New York City's few remaining concentrations of manufacturing in the city, charges Jay Mazur, general secretary/treasurer of the International Ladies Garment Workers Union. His industry hasn't been calmed by statements from city and state officials that imply that manufacturing is doomed in Manhattan no matter what anyone does. No one has any reliable solutions to offer Clinton's residents or the garment workers; urban planning has been generally unsuccessful in redeveloping neighborhoods without displacing current residents in those and surrounding areas.

If the project is approved by the New York City Board of Estimate, the UDC and the city will proceed with the negotiation of leases, and the UDC will proceed with property acquisition. Groundbreaking for major portions of the project is expected by 1986, with completion of the entire project scheduled for 1991.

In its totality, the 42nd Street Development Project mirrors all that's right with American urban planning and architecture—and all that remains to be learned. It testifies to the shift in power in American cities away from cash-strapped city governments toward regional development agencies and real-estate developers. It highlights issues of urban carrying capacity, neighborhood preservation, and scale that still have not been adequately addressed. Ultimately, the plan may best illustrate a simple yet ironic truth: We probably understand less about the ecology of our cities than we do about the wilderness around them.

*Jim Jubak, former editor of Environmental Action, recently completed a Bagehot Fellowship in business journalism at Columbia University. For more on the ecology of cities, see Rebecca Falkenberg's review of The Granite Garden on page 89.*

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# Forest Service at a Loss

*Who benefits when the nation's timber is sold at a deficit to the federal Treasury? Everyone, says the wood-products industry. Only the industry, say environmentalists.*

IT WAS THE LURE of a movie actress that drew reporters, television cameras, and a standing-room-only crowd to the congressional hearing on Idaho wilderness. The magnet was Mariel Hemingway, who lives in Idaho, where her famous grandfather, Ernest, settled decades ago. Hemingway's tearful testimony before the House Subcommittee on Public Lands dominated the news reports of that hearing and drew national attention to the relatively small Idaho wilderness bill written by the state's congressional delegation.

But it was a much less alluring witness whose testimony was particularly damaging to the wilderness bill—a measure that conservationists across the nation had consistently opposed.

Bob Wolf does not look like the sort who would ignite a revolution; he seems more like a genial, white-haired grandfather. But it was Wolf who dropped a bomb on the U.S. Forest Service and the forest-products industry in March 1984. Before his retirement as the resident timber expert with the Congressional Research Service of the Library of Congress, Wolf completed a cash-flow analysis of timber sales from the national forests of Idaho and 38 other states. The timber industry quickly attacked Wolf's research, because it led to an incendiary notion: In many cases, the sale of timber from the national forests amounts to a taxpayer subsidy of the wood-products industry.

This is not the first time someone has suggested that timber from publicly owned forests is being sold at a loss to the Treasury. Similarly dramatic findings were made by the Natural

Resources Defense Council (NRDC) in its 1980 study "Giving Away the National Forests." But Wolf's research was especially credible because he is so thoroughly schooled and experienced in forestry, having done nearly every job that exists in the wood-products industry. He has worked for the Forest Service, the Bureau of Land Management, the Bureau of the Budget, the General Accounting Office, the Senate, and the Library of Congress.

Wolf's report reached some rather startling conclusions. According to his calculations, the Forest Service's timber-sales program shows a minimum deficit of \$1.6 billion for the 11-year span 1973-1983. Except for California, Oregon, and Washington, there were not very many states where federal timber sales generated a positive cash flow during the 11 years of the study. National forests in Oregon were tops in the money-making category; California was second, and Washington was third. Other "profitable" forest states were Pennsylvania, Arizona, Florida, Texas, South Carolina, Mis-



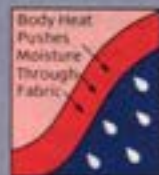
Forest expert Robert Wolf tells Congress how current Forest Service policies are costing taxpayers many millions of dollars.

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Mississippi, and Louisiana. Idaho's national forests had consistently negative cash flows, as did those of Colorado and Utah. Alaskan timber sales appeared to be the most heavily subsidized.

Shortly after Wolf's analysis was completed, the General Accounting Office (GAO) published a report titled "Congress Needs Better Information on Forest Service's Below-Cost Timber Sales." The GAO's analysis was perhaps not as comprehensive as Wolf's, but the agency surveyed 3,244 timber sales made during 1981 and 1982 in four Forest Service regions (one Pacific Coast and three Rocky Mountain). The GAO determined that 27 percent of the 1981 sales it examined did not generate enough revenue to cover the costs associated with making the sales; in 1982 that figure rose to 42 percent.

The Forest Service has not taken the Wolf and GAO reports lightly. The agency issued an eight-page response to the questions raised about its "below cost" timber sales. The gist of this white paper is that because funds are allocated to the agency for purposes much broader than just to sell timber from the national forests, timber-harvesting functions cannot be subjected to strict cost-accounting measurements. "The 155 national forests are not tree farms, devoted solely to growing trees for profit," the Forest Service responded. "The sole criterion for a national-forest timber sale is not whether the direct receipts will exceed direct costs." The agency also argues that some of its biggest costs—building roads for timber harvest, for example—are of benefit to other multiple uses the lands are meant to accommodate, such as wildlife management and recreation. The Forest Service says also that a decision to sell a particular stand of timber is based on more than economic considerations—that timber cuttings also create clearings for wildlife, prevent forest fires, deal with insect infestations, and maintain watersheds.

Like the Forest Service, the wood-products industry argues that if all the costs of national-forest timber sales are to be accounted for, then so should all of their benefits. Among them, argues industry, are contributions to local economies, recreation, and wildlife habitat.

"In ten years, we've gone full circle," says Tim Mahoney, a Sierra Club Representative in Washington, D.C. "We used to be told that it's nice to be emotional about wilderness and wildlife issues but that real economic considerations had to be made, and those favored timber harvesting. So then we used some more-sophisticated techniques and found out that most of the logging is not economical. Now the Forest Service tells us that it is not managing the forests for cost-





This Oregon timber, held at a mill in Eugene, is nearly unique—its sale contributed to the federal Treasury rather than requiring a subsidy.

effectiveness, but rather for multiple use."

Wolf argues that the Treasury would be far better off if many timber sales were avoided, noting that a good deal of money could be saved in road-construction funds. "The Forest Service budget for 1985 contains a \$100-million contribution to timber harvesting from other agency programs," he says. "Between \$40 million and \$50 million is for road maintenance. If you did not cut timber, you would avoid three quarters of those costs, because they are for repairing the soil damage generated by cutting."

Environmentalists agree that the timber-sales budget adversely affects other Forest Service programs. According to figures compiled by The Wilderness Society, the agency's proposed budget for fiscal year 1985 would reduce spending for management of fish and wildlife habitat by 11 percent from 1981 (in terms of constant 1985 dollars). Spending for protection of soil and water quality would be down 22 percent; for trails and road maintenance, down 39 percent; and for recreation management, down 40 percent.

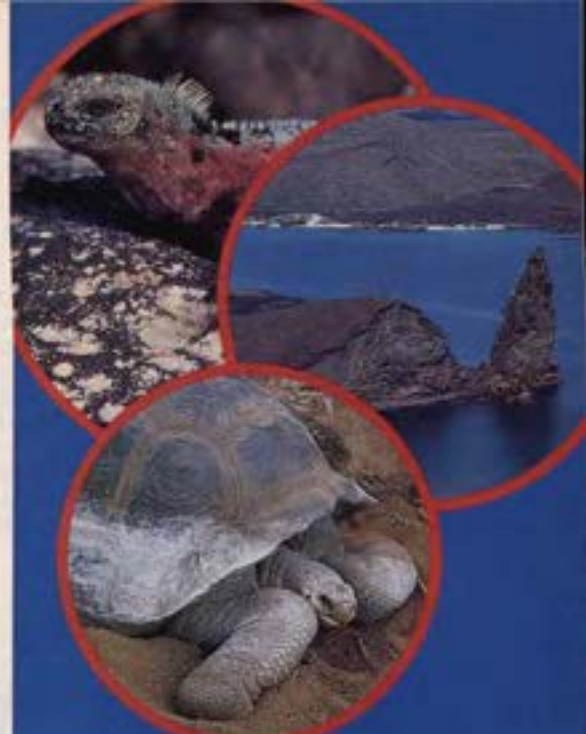
The question of whether the national forests are losing money on timber sales bears on many forest-management questions, and the reports by Wolf and the GAO have serious implications for the wilderness debate as well. Environmentalists charge that Forest Service practices allow roads to be built in previously roadless areas, which eliminates the possibility that those areas will be eligible for future wilderness designation. No less an authority than former Interior Secretary Cecil Andrus has said, "If you would statutorily outlaw deficit timber sales,

you would resolve the wilderness issue." In other words, if the Forest Service were to let cost-effectiveness rule its timber-sales program, the agency would quickly decide that certain unproductive lands should be left alone, in their natural state, while others should be managed as commercial timberland.

That decision-making process is, in fact, required by the National Forest Management Act. Section 6(k) of the statute directs that "in developing land-management plans pursuant to this Act, the secretary [of agriculture] shall identify lands within the management area which are not suited for timber production, considering physical, economic and other pertinent factors to the extent feasible, as determined by the secretary, and shall assure that, except for salvage sales or sales necessitated to protect other multiple-use values, no timber harvesting shall occur on such lands for a period of ten years. . . ."

This important section of the statute defines what are called "marginal lands"—those on which the economic and/or environmental costs of timber harvesting outweigh the benefits derived from the harvest. The governing statute says that when such lands are identified, the Forest Service must take them out of production for ten years.

A confrontation is already shaping up over this question as the Forest Service begins to complete its forest-management plans. The NRDC and the National Audubon Society have challenged management plans for four national forests in Colorado, claiming that the regional forester has decided to double annual timber harvests from the four forests gradually, despite the



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fact that the lumber cannot be sold at a profit. The NRDC says timber cut in these forests returned as little as ten cents on the dollar in 1982.

More forest-management plans are being completed, doubtless containing other challenges to the agency's adherence to Section 6(k) of the National Forest Management Act.

Meanwhile, there is a parallel debate in progress among professional foresters over the definition of commercial forestland. While the description is somewhat diffuse, a general rule of thumb says that if a forest is growing at a rate of 20 cubic feet of timber per acre per year, it is commercial timberland. But one school of foresters would like to raise that figure much higher, to 50 cubic feet of timber per acre per year.

This question arose during the Idaho wilderness hearing. Representative Jim Weaver (D-Ore.) asked Bob Wolf how much of Idaho's forestland was growing timber at a rate of more than 50 cubic feet per acre per year. Wolf answered: "I would estimate about one third of the national-forest land, about 3 million acres." Conversely, two thirds of Idaho's national-forest land—some 6 million acres—was not growing trees at a rate many professional foresters say defines timberland as commercially viable. Weaver quickly grasped the logic of Wolf's answer and said, "If we didn't harvest timber in Idaho, the federal Treasury would be richer."

One of the ironies in this debate is that Republican legislators, who are generally fiscally conservative, do not like to see cash-flow tests applied to the national forests. For instance, Rep. James Hansen (R-Utah) sought to discredit Wolf's research by questioning his credentials.

"What is your background in accounting?" asked Hansen.

"I know enough about accounting to know that I have to take in more in a year than I spend in a year," replied Wolf.

The disagreement over whether and how to account for the costs associated with federal timber sales shows no sign of diminishing. The 99th Congress, which convenes in January 1985, is likely to find before it a bill mandating that cost-accounting procedures be adopted by the Forest Service.

Bob Wolf has left his position as one of Capitol Hill's foremost information specialists. But he managed to spark a debate that will rage for years to come: one that, no doubt, will affect national-forest management policy well into the future.

*Steve Forrester, a Washington correspondent for newspapers in the Pacific Northwest, publishes two newsletters on Northwest politics and international trade.*

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More than two years ago the Environmental Protection Agency declared Kingston a "priority" health-hazard area and began hauling away several thousand drums from the site's surface. Satisfied that the crisis had been averted, the EPA stopped its cleanup operation and engaged private consultants to begin studying what to do about the unknown number of buried drums.

But the water remains tainted, and Bailey and her neighbors continue to use bottled water. "It's out of fear," she says. "We don't want to get cancer."

No one doubts that Kingston is just the tip of a toxic iceberg. The EPA expects to find as many as 22,000 such abandoned dumps in the nation, an estimate that started out much lower but has been revised steadily upward. The agency also believes that as many as 2,200 of the sites could require urgent cleanup, at a cost the congressional Office of Technology Assessment (OTA) says could reach \$40 billion. Experts in many state governments believe the predicament is even more serious—that up to 7,000 dumps could pose an immediate health hazard.

And the problem is growing. The EPA has estimated that the United States continues to generate at least 150 million tons of toxic waste annually. According to a 1983 OTA survey, the states, using a broader definition of hazardous waste, collectively gauge the amount to be closer to 275 million tons. Whichever estimate is used, the volume is staggering: roughly one ton per capita, a great deal of it going to improperly designed disposal facilities.

In an effort to start mopping up this toxic history, Congress passed the Comprehensive Environmental Response Compensation & Liability Act in 1980. Better known as the Superfund, the legislation focuses federal attention on abandoned or uncontrolled hazardous-waste sites and "emergency" toxic spills. The Superfund gives the EPA authority to remove wastes when there is imminent danger to the public, and to require responsible parties to clean up uncontrolled sites. Financed by the federal government and by a tax on certain petroleum and chemical products, the Superfund was given an initial five-year appropriation of \$1.6 billion.

But the Superfund got off to a sputtering start under the scandal-ridden regime of former EPA Administrator Anne Burford. Rita Lavelle, Burford's assistant in charge of the program, believed in cajoling rather than compelling her corporate friends to clean up their dumps.

In March 1983, Burford was forced to resign amid controversy over the Superfund, including allegations that she had ma-

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nipulated program money to help Republican candidates in the 1982 elections. A report released in September by the House Energy Subcommittee on Oversight & Investigations concluded that, in their handling of the Superfund, Burford and Lavelle "disregarded the public health and environment by adopting a 'go slow' approach to the cleanup of toxic-waste sites." The report also found that President Reagan's refusal to give the subcommittee certain EPA documents during the investigation of Burford and Lavelle "thwarted" the panel's efforts "to oversee the administration of our nation's hazardous-waste law and imperiled timely legislative amendment to such laws."

Burford was replaced by William Ruckelshaus, a savvy politician who immediately set about polishing the EPA's tarnished image. Ruckelshaus publicly ordered his technical staff to begin cleanup efforts, and EPA publicity men now trumpet his accomplishment: The agency has identified 546 "priority" toxic dumps (including Kingston) that it considers most dangerous and in need of immediate cleanup. The EPA says it has removed at least some chemical threats from more than 120 of the sites and begun studies at many others. In addition, the agency boasts it has hauled away chemicals from more than 200 dumps not on the priority list.

In fact, the EPA has cleaned up and closed a mere six of the 546 priority sites since the Superfund was enacted almost four years ago. Only \$136 million—8.5 percent of the \$1.6 billion allocated—has been used for site-specific actions. And, as the Kingston example shows, an area isn't necessarily safe just because the EPA has begun cleanup operations. "What the EPA has done is hardly what I'd consider a cleanup," says Bailey. "In fact, the amount they've done since Burford and Lavelle left is so little, it's hardly worth mentioning."

Ruckelshaus acknowledges that the \$1.6 billion in the current Superfund is grossly inadequate to handle the nationwide cleanup effort. The agency calculates that the money could clean up only about one third of the sites on the list—not to mention potentially thousands of other dumps in need of cleanup—and that the waste removal could continue well into the next century. "When we look at hazardous-waste dumps, we're looking at a public-health engineering enterprise of almost unprecedented magnitude," says Ruckelshaus. "It's not something you can dispose of with a stroke of the pen or a casual promise."

At the same time, Ruckelshaus has argued that Congress should wait until late 1985 before deciding what revisions of and additions to the Superfund should be made. "I think it would be wise," he says, "for the country to get as much experience under our

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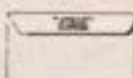
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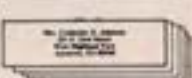
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belt as we can, and then go see what changes are going to be needed."

Ruckelshaus is following the lead of President Reagan, whose 1984 State of the Union message pledged his support for a Superfund reauthorization, and who later vowed that the government "will take all necessary steps to protect the American people against the menace of hazardous waste"—but has done nothing to make good on his promises.

Environmentalists believe that part of the solution lies in a dramatically expanded Superfund. "The current administration, from the White House to the EPA to the Office of Management and Budget, has shirked its responsibility," says Blake Early, a Sierra Club Representative in Washington, D.C. "It is up to Congress to see that the public is adequately protected."

On August 10 the House of Representatives passed the Superfund Expansion & Protection Act of 1984 by a vote of 323 to 33. The bill provides a \$10.2-billion, five-year extension of the original \$1.6-billion Superfund, with most of the increased funding coming from fees paid by chemical feedstock companies. The legislation establishes both a mandatory schedule for the EPA to clean up its "priority" sites and a timetable for listing new sites. The bill also allows citizens to sue the EPA or any state or local agency to force compliance with cleanup requirements. The legislation has come up against a "wait till next year" attitude in the Senate, however, which voted to delay any decision on the bill until next year.

Even if Congress does overcome the administration's opposition and reauthorizes the Superfund, there's still the problem of active dumpsites. An EPA study reports that 38 percent of the millions of tons of waste generated each year goes to often-unlined pits, ponds, and lagoons; 57 percent is flushed down deep wells; and the remaining 5 percent goes to landfills or treatment facilities. Across the nation, these sites are contaminating community drinking water, forcing the closure of individual wells, and damaging human health, crops, livestock, and sewer systems.

No one knows exactly how many active hazardous-waste dumpsites are now in oper-

ation. The EPA estimates 5,000; the OTA, 8,000. The significant fact is that only 207 of these have received final operating permits from the EPA. The thousands of others operate under "interim status" permits, which require only such basic procedures as monitoring groundwater and fencing the site. But even these requirements are not being met. The General Accounting Office reported in September 1983 that 78 percent of these "interim" facilities were not in compliance with permit requirements.

The EPA itself concedes flaws in the system, verifying that thousands of tons of dangerous wastes have been hauled from illegal dumps and moved to new sites, only to leak into the environment again. More than 60,000 barrels of chemicals were removed from a dump in Seymour, Ind., under a consent order environmentalists have blasted as a sweetheart deal. The hauler was Waste Management, Inc., of Oak Brook, Ill., also a generator of some of the wastes at the site. Waste Management moved the barrels to some of its property in Ohio, where state officials have now discovered a massive leak. "Thus," notes one EPA hazardous-waste expert, "Waste Management has been paid to dump the same wastes twice in succession in two different leaking sites."

Overseeing these wastes, from the point of generation to the point of disposal, is governed by the Resource Conservation & Recovery Act of 1976. Both the House and the Senate have passed reauthorization bills, and the President is expected to sign the compromise bill into law.

Environmentalists believe that Ruckelshaus's policy of permitting "acceptable risk" from hazardous chemicals is linked to the administration's opposition to tighter toxic controls. As Ruckelshaus puts it, "We must accept the fact that risk from toxic substances cannot be eliminated in an industrial society."

And while the bureaucrats debate what constitutes an acceptable risk, chemicals fester in the backyards of America.

Frank O'Donnell's "Acid Rain Controls: Is There a 'Sensible' Compromise?" appeared in the November/December 1983 Sierra.

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## Wet and Wild in Canada

*The Canadian Heritage Rivers System will be one year old in January. River lovers hope the new federal system can overcome its problems and fulfill its promise.*

**F**LOATING QUIETLY ON an isolated river such as the Bloodvein, deep in Manitoba's muskeg country, there comes a feeling that time has managed to stand quite still. The thrum of a distant helicopter takes on the sound of a drumming grouse, and even the contrails of high jets can look like long, thin clouds. One appears to be in pure wilderness, untouched and unapproachable. But this can be a dangerous notion.

Not so long ago, all of Canada's wild rivers seemed safely tucked away from civilization by thick quilts of wilderness: a kind of preservation by isolation. But during the last few years, new highways and improved road systems have facilitated access to remote areas in Canada. The recently completed

Dempster Highway has opened up the northern Yukon, once a part of the greatest wilderness left in North America. A more competitive floatplane-taxi service has allowed entry to river systems that used to be all but impossible to reach, and interest in river trips has grown significantly. But it's not only increased visitation from tourists and sportspeople that threatens Canada's formerly remote waterways. Winnipeg, Calgary, and other large and growing cities have become thirsty and are on the lookout for cheap hydropower to meet their rising demand for electricity.

Gradually, the protection of isolation is giving way and the myth of an unapproachable Canadian wilderness is fading. A sad fact is becoming apparent: Although many rivers



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in Canada remain as wild as any in North America, many others are in jeopardy, and no river anywhere will be preserved without forethought and planning.

Recognition of this fact came to Canadian officials slowly, but it came. The establishment of the Canadian Heritage Rivers System (CHRS) was announced on January 18, 1984, by Federal Environment Minister Charles Caccia. "Some of our rivers have changed little since man first saw them thousands of years ago," said Caccia, "but many others have been developed and exploited with no thought given to the consequences." The advocates of wild rivers in Canada hope that the CHRS will provide a forum not only for considering these consequences but also for preventing them in the first place.

The idea for the CHRS was appropriately born among the pools and rapids of some of Canada's most beautiful and remote rivers, around the campfires of a series of "wild river surveys" conducted on some 65 rivers between 1971 and 1974. The concept of a federal system offering some type of protective status was formed only after the signs of overuse of a few rivers and the fragility of those that remained wild became obvious.

The first official move toward the creation of such a system was made in 1978, after the original river surveys were completed. Hugh Faulkner, then the Federal Minister of Indian Affairs and Northern Development, urged that all levels of government work together to prepare a joint proposal for what

he called the "Canadian National Rivers System." A task force was commissioned, made up of a representative from each province and territory, and serious study began.

One of the first acts of the commission was to convene the International Wild River Workshop. Held in Jasper in 1978, the workshop gave the Canadian task force a chance to trade notes with experts from the United States and to discuss in detail the workings of the U.S. Wild & Scenic Rivers System, then in its tenth year of operation. "We have had our eye on the U.S. system from its beginning," says Ted Will, former coordinator of the task force. "We watched its successes and tried to learn how to avoid some of the problems it had gone through."

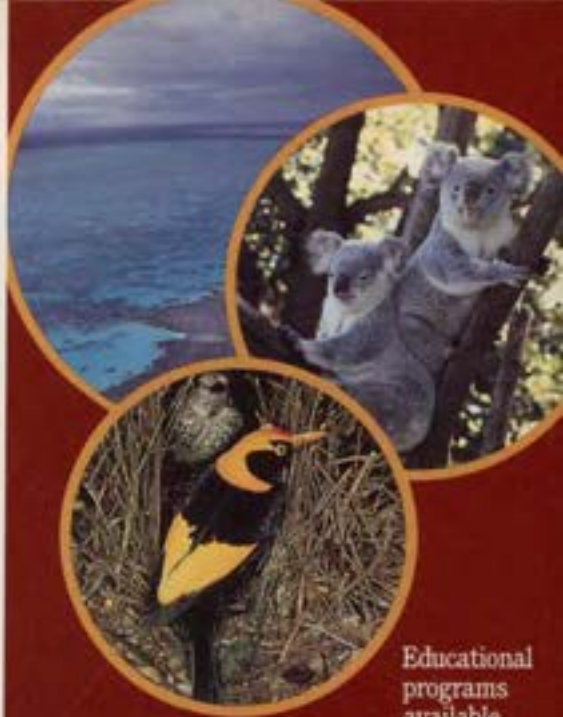
Despite the focus on the U.S. system, the CHRS has been faced from the beginning with some uniquely Canadian problems. "One of the reasons the system took so long getting off the ground," Will points out, "is that initial proposals failed to recognize the jurisdiction of the provinces and didn't adequately deal with the distribution of power." With these problems worked out, a final proposal was drafted in 1981. Two years later the independent provinces and territories reached an agreement, and the CHRS became an official reality soon after.

The provisions and guidelines of the system reflect both the intricacies of the Canadian government and the uniqueness of its waterways. Unlike the U.S. system, under which a river can be designated as "wild,"

## SIGHTINGS



In July, members of Congress toured Idaho's controversial de facto wilderness areas, accompanied by Gov. John Evans (center). Flanking the governor in this photo taken at Three Rivers Resort in Lowell are Rep. John Seiberling (D-Ohio; left), who chairs the House Public Lands Subcommittee, and Rep. Larry Craig (R-Idaho), author of an ungenerous measure that conservationists have labeled a "wilderness destruction bill." The fate of Craig's bill was unknown at press time.



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"scenic," or "recreational," the CHRS recognizes only a single category: heritage rivers. A river nominated by the province or territory through which it flows is then considered on the basis of three qualifying criteria:

- **Natural Heritage.** The river must be an outstanding example of a natural river environment, in terms of its geology, botany, and wildlife.
- **Human Heritage.** The river must be of outstanding significance in the historical development of Canada, containing historical or archeological works or considered part of a route of discovery or trade.
- **Recreation Value.** The river must offer outstanding recreation value (including wildlife viewing, boating, and camping).

A nominated river need meet only "one or more" of these three criteria to be considered for inclusion in the CHRS. In addition, the river must meet what are called "Integrity Guidelines," which require that it be "of sufficient size" and that its water quality be and remain high enough to maintain a pristine ecosystem.

**T**O DATE, eight rivers have been nominated, ranging from the Alsek, in the Yukon Territory, to Ontario's French River. The first river is expected to be officially included in the system in early 1985, but the fact that none has yet been designated causes some conservationists to be skeptical. "It is politically popular in Canada right now to announce conservation measures," says John Alan Lee, conservation chair of the Sierra Club's Ontario Chapter, "but long after the announcements, nothing has actually been done on the ground."

Thus, while the system is in place, all is not rosy. There are several other problems looming on the horizon. Though the 1983 proposal did receive the backing of a majority of Canadian provinces and territories, it did not bring a unanimous shout of joy. So far, four provinces have refused to participate in the river-nomination process. At least three of these—Quebec, Alberta, and British Columbia—contain a multitude of rivers that would qualify for the system; conservationists say these must necessarily be included if the system is to make any serious gains in protecting Canadian rivers.

Lack of participation by these provinces could have other consequences as well. Many rivers that haven't yet been nominated (but are seen as potential candidates) flow through a participating province and across the borders of one that is not participating. Without cooperation from these provinces, management of these rivers could be stymied, perhaps even to the point of excluding the remainder of each river from the system. Of the eight rivers cur-

rently nominated, only the Clearwater, which flows through Saskatchewan and Alberta, would be affected by a nonparticipating province.

Other worries stem directly from the provisions—or the lack of them—in the documents governing the system. Wording in the "Objectives, Principles and Procedures" document is vague and provides few guidelines for managing a river once it is designated. Part of the reason for this has to do with the makeup of the Canadian federal government, and deals with the provinces' fear of losing control of their native resources. Although the CHRS is a federal program, participation is voluntary, and funding and management responsibility for a designated river (except when the river is on federal land) remains with the provinces. The guidelines say only that a management plan must be developed that will "ensure [the river's] development, management, and use consistent with the objectives of the System"; no activity or development is expressly forbidden.

Furthering these concerns is another passage in the guidelines, called "Procedures for the De-designation of Canadian Heritage Rivers." Under this section, a river may be removed from protection at the request of the managing agency in the event the river has "deteriorated" to the point that it no longer conforms with the "Integrity Guidelines."

"A major weakness of the new system is that it is self-contradictory," says the Ontario Chapter's Lee. "It would not make sense to designate an area a national park and yet include in the designation the caveat that should it deteriorate, it can be declassified and sold off." Likewise, if a management plan is required to ensure that a river will be handled in such a way as to meet the objectives of the system, how could a designated river deteriorate out of contention? The system's guidelines don't say.

Time and experience in Canada and elsewhere have taught us that without at least a formal attempt at river preservation (such as the CHRS), wild rivers are an endangered species. Even with such programs in place, rivers are being dammed, diverted, and abused faster than they are being protected. The creation of programs such as the Canadian Heritage Rivers System is just the put-in point of what could prove to be a long, slow paddle to preservation.

For more information on the Canadian Heritage Rivers System, contact Parks Canada, ARC Branch, 10 Wellington Street, Hull, P.Q., Ottawa, Ontario, K1A 1G2. □

*Jeff Rennie has published articles in Canoe and Wild America. He wrote "Homestake II: Conflict Beneath a Cross of Snow" for the May/June 1984 Sierra.*



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In making that unprecedented endorsement, the Sierra Club declared to the nation what government must do to protect those areas that make up our unique environmental heritage. As government and the issues have both become more complex, so we too have seen the need to grow more sophisticated and politically informed. Today the Sierra Club can proudly call itself America's foremost environmental organization.

This year we were instrumental in moving legislation that added more land to the National Wilderness Preservation System than ever had been added by any previous Congress—more than 8 million acres in 20 states. These recent victories are a tribute to the work of dedicated Club volunteers and staff around the country, and reflect the skills that the Club has developed over time.

The new wilderness areas also testify to a newfound political clout for environmentalists in general and the Sierra Club in particular. The Club's support and endorsement of candidates in the 1982 congressional elections marked a turning point in our increasing political sophistication. Scores of members of Congress now have firsthand experience with the potent volunteer impact of the Sierra Club. Candidates for Congress from both parties now routinely seek out our local volunteer leaders, and work hard to gain our endorsement and support.

As a result, we now have friends in federal, state, and local government to whom we can turn when we seek support for bills to protect wilderness, wildlife refuges, wild and scenic rivers, marine sanctuaries, and national parks. We can also count on these leaders to introduce legislation that promotes the conservation of energy and non-renewable resources.

The politicians we supported in 1982 have returned the favor. Now they and others are looking for our help in 1984. And it is a job we should be glad to do. With even more friends in the House and Senate we can finally look forward to passage of the clean-air and clean-water bills, to an end to acid rain, and to

the reduction of offshore oil-drilling endangering our coasts. We will need a stronger, environmentally committed Congress if we hope to pass a Superfund bill that will clean up the thousands of toxic-waste sites around the country. We will need legislators unafraid to stand up to any administration that attempts to reverse the environmental laws for which the American public has fought so long and hard. We cannot tolerate the election of those who would use the power given them unwisely or unfairly, to increase the level of risk to public health and the environment or to exalt special interests at the expense of the nation's spirit and values.

The Sierra Club is committed, this year as in 1982, to electing the most environmentally sound government possible—at local, state, and federal levels. We understand that concern for the environment will not be the only major factor in these important elections. But it is also clear that in some races a candidate's stance on environmental issues will spell the difference between victory and defeat.

This year Sierra Club chapters and groups across the country have rallied more strongly than ever to the environmental cause. In addition to working for the Mondale-Ferraro campaign, Club activists are involved in literally hundreds of local and congressional races. In North Carolina, former Club President Denny Shaffer is leading environmentalists who are working to defeat Sen. Jesse Helms (R). More than 300,000 Sierra Club brochures supporting the challenger, Gov. James Hunt (D), have been distributed by Club members across the state. In Oregon, Club members are rallying to help Rep. Les AuCoin (D) in his fight to beat back a \$700,000 challenge from a timber-industry executive. AuCoin is the author of appropriations-bill language setting a moratorium on environmentally dangerous offshore leasing. In Kansas, Club members are working to elect Jan Meyers, a Republican state senator running for an open congressional seat. Meyers has been a leader in Kansas for hazardous-waste control and clean air.

Every Sierra Club member can help magnify our impact. Every letter written, every friend recruited, every local action planned and executed contributes to our strength. And so does every vote cast. Thus, I urge each Club member to vote on November 6. I also ask you to urge your friends and neighbors to vote for what they believe in. Our government works best under the watchful eye of a caring public.

Perhaps John Muir said it best: "Through all the wonderful eventful centuries . . . God has cared for these trees, saved them from drought, disease, avalanches, and a thousand straining, leveling tempests and floods; but he cannot save them from fools—only Uncle Sam can do that."

—Michele Perrault



Photo: Alan



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# WORLD PARKS

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The amount of land that the nations of the world have set aside as national parks has never been greater, but the threats to such areas are growing too.

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MICHAEL McCLOSKEY

**T**he number of national parks and protected areas throughout the world has grown rapidly since World War II. In the past decade alone, the number of such areas increased by 82 percent. Today more than 8 billion acres have been set aside to protect their natural values.

These billions of acres bear witness to the extraordinary vigor of the national-park idea, which began in the United States in 1872 with Yellowstone's 2 million acres. The parks concept, which Wallace Stegner has called "the best idea we ever had," has seized the imagination of people throughout the world—and not just in prosperous nations. In fact, the better part of this recent growth has occurred in developing countries, during a time of increased population growth and development pressures. To a degree, the Third World looks upon having a system of national parks and protected areas as an indication of a country's level of development.

The park idea presupposes that the area within a park's boundaries is kept natural, and is thus closed to commercial exploitation—logging, mining, dams, power projects, grazing, hunting, and trapping—and that tourism will be restrained to maintain the quality of the natural systems. These standards for protection grew out of the U.S. experience. They have been adopted by the International Union for Conservation of Nature and Natural Resources (IUCN) and have been affirmed at each of the three world congresses on national parks. Known as the "New Delhi standards" because their most elaborate articulation occurred when the IUCN met in that city, they are used to determine whether a country's level of protection for a national park is sufficient. Most countries are committed to living up to these standards, but the pressures for compromise are unremitting. It is one thing to set aside a park; it is quite another to defend that park when the threat of development draws near.

Parks need friends who will fight to keep them

*An impala-framed sunset in Tanzania's Ngorongoro Conservation Area evokes the exotic nature of many of the world's parks. The preservation of those qualities has become a major concern of the Sierra Club and conservationists around the world.*



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PERU



FRANCE

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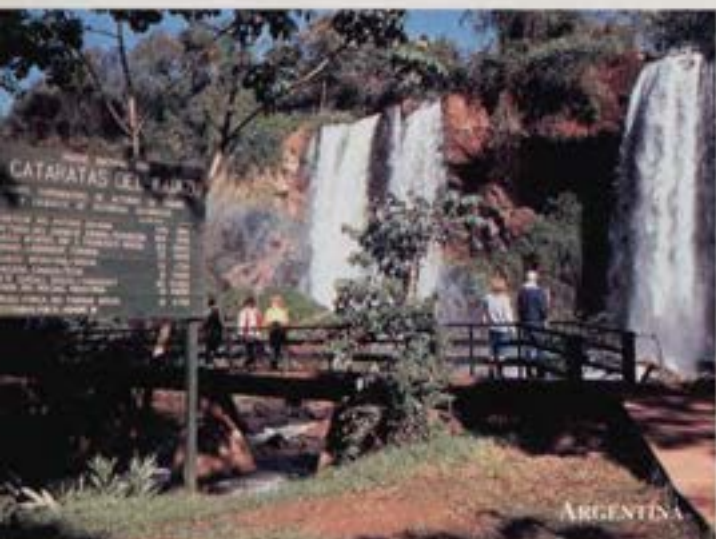


BRAZIL

Loren McIntyre



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ARGENTINA



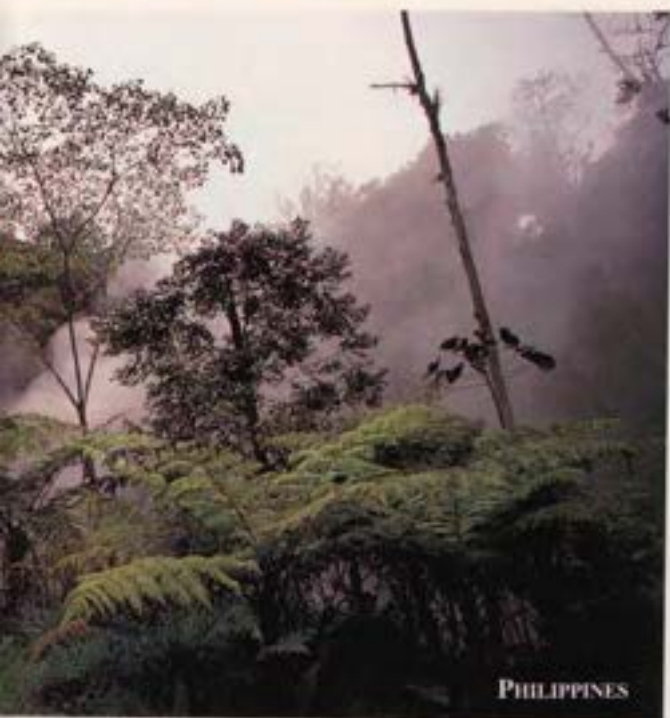
AUSTRALIA

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Loren McIntyre

PANAMA



PHILIPPINES

**PERU.** *Manu National Park faces the four-pronged threat of oil and mineral exploration, a canal project, logging, and construction of a road along the Manu River.*

**FRANCE.** *Many mountain streams in Vanoise National Park will terminate in a series of reservoirs unless someone stops the construction of three hydroelectric dams.*

**PHILIPPINES.** *Illegal logging, permanent settlements, and reclassification have severely affected about half of Mt. Apo National Park.*

**BRAZIL.** *Araguaia National Park faces major threats from settlements, road building, and poaching.*

**INDIA.** *A hydro project outside Gir National Park threatens the only remaining habitat of the Asiatic lion.*

**PANAMA.** *Livestock grazing, water projects, and road construction imperil Darien National Park.*

**AUSTRALIA.** *A new road in Cape Tribulation National Park may lead to further development of an otherwise wild area.*

**ARGENTINA.** *The footnote on this sign in Iguazu Falls National Park sums up park problems worldwide.*



INDIA



PANAMA

Dr. Arno LeBeault

intact. The park movement in the United States has come to realize that the act of declaring an area a park does not ensure its survival. John Muir and the Sierra Club learned that lesson only too well when the Hetch Hetchy Dam was built in Yosemite National Park—despite our best efforts to block it. In the early years, the American conservation movement was often too weak to fight off incursions into the national parks. It is only in the last 20 years that we have become more successful. We have kept dams from being built in the Grand Canyon and in Dinosaur National Monument. But even today we are battling—to keep a major molybdenum mine out of Misty Fjords National Monument, and to prevent a nuclear-waste dump from being sited next to Canyonlands National Park. Our new national parks in Alaska have too few rangers to patrol their boundaries adequately. And the list could go on.

It is small wonder, then, that conservationists in other countries are embattled in defending their parks. There are billions of acres to defend; the forces of development are moving into high gear; and conservation movements are just emerging in many countries. Few of the citizens' organizations in most countries have ever waged successful conservation campaigns, and many of them must operate under governments that are less democratic than ours. Outside of the United States there have been few models of successful campaigns to defend parks. But in defending their Southwest Tasmanian national parks against proposed hydroelectric dams, Australian conservationists have shown recently that these battles can be won in other countries. Their great victory has given heart to defenders of parks everywhere.

When the Sierra Club's Vice-President for National Parks, Dr. Edgar Wayburn, and I attended the Third World Congress on National Parks in Indonesia in 1982, we observed the need for concerted action firsthand. Many of the delegates pleaded for help to defend their parks against hydroelectric dams and other threats. They sought to publicize these issues outside their countries in hopes of holding their governments up to the glare of world opinion; and they desperately sought resolutions of support from the expert bodies that make up the world conservation movement. To respond to these entreaties, we collaborated with other conservation leaders to suggest that the IUCN develop a list of the Endangered Parks of the World. Similar to the endangered-species list, this new catalog would be used to publicize the most severely threatened areas throughout the world. We carried the idea to the floor of the Congress and got it adopted.

As a result, the IUCN's Commission on



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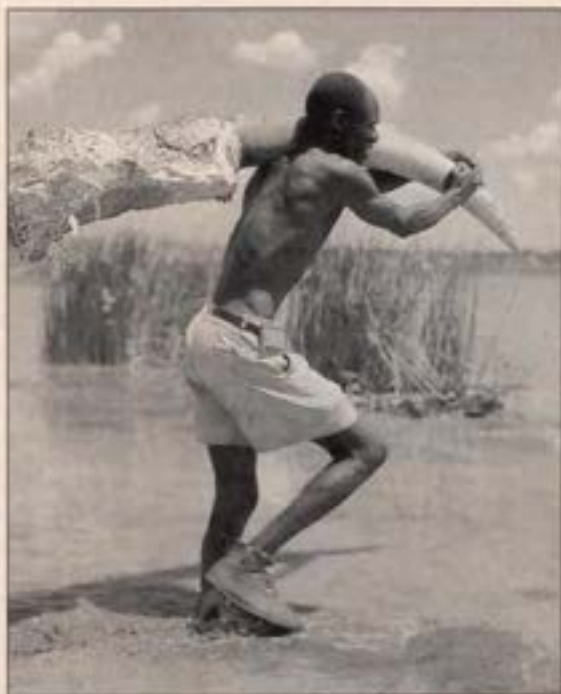


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National Parks and Protected Areas (CNPPA) has now embarked on the job of documenting the most egregiously threatened areas and preparing a draft list. The final list will focus on the ten most threatened parks among the 3,000-some areas on the United Nations List of National Parks and Protected Areas. In making its selections, the CNPPA will consider the importance of an area, how imminent and severe the threat to it is, how large an area is affected, and whether there is still time to act on the park's behalf.

If the commission were not limiting its list to focus world opinion, the roll call of endangered parks would be long indeed. In its initial listing,

*AFRICA. The richness of the continent's wildlife populations is typified by the animals found in Ngorongoro Conservation Area. Clockwise from the top: African elephants, black-winged stilt, wildebeest, African lion, crowned cranes, silverback jackal, lesser flamingos, and zebra. Throughout Africa, poachers (right) continue to slaughter elephants and rhinos for their tusks and horns and other animals for food.*



© Ernie A. Bauer

the CNPPA identified 37 candidate areas. Another recent survey, by professors Gary Machlis and David Tichnell at the University of Idaho, quizzed managers in 135 parks around the world and uncovered more than 1,600 threats to just those parks. A 1980 study enumerated more than 4,000 threats to the 330 units in the American park system alone. Many of the threats documented in these studies are subtle and limited in their impacts. But others are dramatic and pose real questions as to whether major areas will continue to be viable as parkland.

The CNPPA reports that parks in most parts of the world face severe problems of this second type. A number of protected areas in Southeast Asia are threatened by hydro dams, among them the Silent Valley and Gir national parks in India; the Manas Wildlife Sanctuary in Bhutan and the adjoining Manas Tiger Reserve in India;

and the Thung Yai and Huai Kha Khaeng wildlife sanctuaries in Thailand. Other areas in Southeast Asia are suffering from incursions by commercial logging operations, most notably Klias National Park in Malaysia (Sabah), which has been stripped of protection, and Mt. Apo National Park in the Philippines.

In South America, a number of national parks in the Argentine Andes are imperiled by a resumption of logging in adjoining reserves. Biologically rich Manu National Park in Peru is threatened not only by commercial logging, but by oil drilling and mining, roads, and a canal project. Costa Rica's Corcovado National Park has been invaded by a horde of gold miners, while its La Amistad and Talamanca national parks face the construction of a crude-oil pipeline to serve U.S. markets. This pipeline would invade a World Heritage Site.

In Africa, Tai National Park in the Ivory Coast is also a reluctant host to gold prospectors, as is the Mt. Nimba Strict Nature Reserve, which also faces the prospect of iron-ore mines. Both of these parks are on the U.N. list of World Heritage sites. The waterfowl habitat found in Djoudj National Park, a World Heritage site in Senegal, is seriously threatened by a dam. And the Mkomazi Game Reserve in Tanzania is reportedly being turned into a cattle ranch, with six indigenous species lost already.

In Europe, Vanoise National Park in France faces threats from three proposed hydroelectric dams as well as from ski-lift construction. A hydro project and pollution from a nearby lead-processing mill cloud the future of Durmitor National Park in Yugoslavia, another World Heritage site. And in Czechoslovakia, air pollution has severely damaged half the forests of Krkonnose National Park.

Air pollution also poses serious threats to many national parks in North America, the Indiana Dunes National Lakeshore being one of those most severely affected. In Canada, the Wood Buffalo National Park, which is a World Heritage Site, could be damaged by a proposed hydro dam on the Slave River. Other severely threatened North American parks were mentioned earlier.

National parks can fall prey to problems other than those stemming from commercial exploitation and pollution. Some countries, for example, are too poor or too wracked by civil strife to maintain their park systems. Bolivia is now able to do little to manage its system of 15 parks and protected areas; Ngorongoro Conservation Area in Tanzania suffers from neglect and underfunding; and in Boma National Park in Sudan and Gorongos in Mozambique, the park-service staffs have been put at risk by civil wars. Throughout Africa,

burgeoning populations and grinding poverty have put many parks in a politically precarious position. Human encroachment combines with trophy hunting and an illegal ivory trade to put severe stress on park animals and management.

In the final analysis, each country that has established a protected area needs to decide whether it wants to make good on its intentions. The political will to defend an area must be summoned from within. But the rest of the world does have an interest in the outcome. In some cases treaty obligations are involved, as is the case with World Heritage sites and the waterfowl refuges protected under the Ramsar convention. And even where treaties do not apply, each nation can be viewed as a trustee for

the human race, a steward whose duty it is to help preserve the natural values that comprise mankind's common heritage. As beneficiaries, those who live elsewhere should be able to discover what is going on and to voice their concerns. Indeed, one could infer such rights from the United Nations' new Charter for Nature, which establishes legal ideals that may ripen into enforceable standards (so-called "soft law").

In practical terms, many nations are quite sensitive to world opinion. They want to be regarded as living up to world standards and expectations. Besides, adverse publicity can affect a country's foreign relations and bear on the future of its terms of trade, financial assistance, and its position in international bodies. In fact, in many countries publicity is the primary tool available to conservationists who wish to affect public policy. International publicity elevates the importance of an issue even more and increases the clout of conservationists in a given country.

Finally, citizens of the United States bear a responsibility for many of the world's threatened parks. United States dollars or agencies can to some degree be behind the kinds of threats recounted here. American companies may be the developers; our nation may be a key market; or our foreign-aid dollars may be financing the dam, road, mine, or other development. Wherever that is the case, U.S. citizens can play a direct and legitimate role in influencing the actions of American institutions and the use of the nation's resources. Citizens in other developed countries may have similar opportunities. And where international institutions such as the World Bank are involved, we all have a right to question the roles our member countries play.

As part of its International Program, the Sierra Club is committed to helping conservationists in other countries defend their parks. We want to help the IUCN mobilize world opinion in this cause, with special emphasis on the most threatened parks. We want to encourage our members and the public to visit these areas and to learn about their problems firsthand. We will publish articles about specific areas (see, for example, "Aloha Kahauale'a?" on page 52 of this issue) and will suggest things that you can do to help—though the means may be indirect in many cases. We will update ongoing struggles and encourage correspondents to forward further information.

After nurturing the national-park idea for almost a century now on the North American continent, the time has come for the Sierra Club to be in the forefront of efforts to protect parks everywhere. □

*NORTH AMERICA. A World Heritage Site, Wrangell/St. Elias National Park in Alaska, may have over 2.4 million acres opened to sport and trophy hunting. Grand Teton National Park (bottom) in Wyoming suffers from grazing, elk hunting, and noise pollution generated by jets landing at Jackson Hole airport. Plans are also afoot for a new dam at Jackson Lake.*



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Ladies	4-6	8-10	12	14-16	18-20

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# THE X COMMANDMENTS OF WINTER PHOTOGRAPHY

PHOTOGRAPHY IS FAR SIMPLER than it used to be. Nineteenth-century travelers hired extra mules to carry all the paraphernalia they needed to develop glass plates on the spot. They were also obliged to understand the interrelationship of light and film if they hoped to get a meaningful result from their exposures—or, in fact, if they hoped for any result at all.

Today we live in a different world. Anyone can take sharp, well-exposed photos at least some of the time. My pride in having shot a cover for *National Geographic* was dispelled when a self-portrait taken by Koko the Gorilla graced the cover of a later issue. Koko used a fully automatic SLR camera.

I can't criticize Koko's cover shot or choice of camera. I certainly couldn't have improved on the image by using the old methods of figuring exact exposures or by fussing with a whole lot of controls that Koko didn't have to think about. Automatic cameras enable one to capture perfect or near-perfect images, but only in certain light conditions. I use these electronic wonders myself when there is good, even light (as there was on Koko's cover day). Then I can set my dial on "A" for automatic and free my mind to concentrate on esthetics.

Winter photography is a different matter. If I leave my camera on automatic in winter, the results I get are unacceptable. I have to go back to the old ways—not to the mules and all the heavy equipment, but at least to thinking out the situation in terms of film and light. Subjects set against snow in direct sunlight offer a range of contrasts well beyond the ability of standard color films to record. An automatic exposure that your meter tells you is perfect will render faces black and snow a burned-out white.

Winter also takes its photographic toll in other ways. The automatic shutter that works so perfectly at room temperature ceases to function when the thermometer drops to 20 degrees, because the batteries it depends on go dead. Many automatic cameras never even get out into the cold. They are easy to carry for summer backpacking, but aren't feasibly taken along on a winter skiing trip unless you have a suitable padded case—for the camera's sake and your own.

Many of the guidelines I follow for winter photography work in the summertime as well, but they may require a major change in a person's photographic habits. For example, if you want a definitive photo of a situation, don't expect to get it on one frame of film on your first try. Film is the cheapest item in most travel budgets, even those of professional photographers. When a situation works for you, work it. Frame a number of compositions, and take several different exposures of each. Then, in the comfort of your home, you can choose your favorite shot. On the other hand, if you think a photograph is barely worth taking, it probably isn't. I've never had a lukewarm situation suddenly erupt in Technicolor on film.

Remember that your eyes can distinguish details within a range of brightness of 2,000 to one, whereas the best color slide film—

Kodachrome 25—barely gives an 8-to-1 range. Select subject material that falls within this narrow range, or that will permit you to work with the deep shadows and bright hot spots that result from exposures that are made outside this range.

Perhaps the best advice I can give aspiring winter photographers is to learn from your mistakes as well as your successes. If you look at your bad pictures and you don't know exactly why they are bad, then you need to try the following exercises.

First of all, find out what your photos look like when they are shot at the "wrong" ASA. (Manufacturers rate their films in terms of sensitivity to light, assigning higher ASA numbers to "faster" films—that is, films that require less light than "slower" films to record a given image satisfactorily.) The right ASA speed for you may not be what is marked on the film container. Camera meters vary; personal preferences do too. I like dark, saturated colors—so I purposely underexpose more than some photographers do.

To determine your personal ASA for your own camera, you need to run a 36-exposure test roll. This is best done without snow in even, natural light. Find half a dozen different situations that are typical of what you shoot and make six exposures of each at ASA ratings above and below the marked rating of the film you're using. (For example, with a roll of film rated at ASA 64, shoot test exposures at ASA 32, 40, 64, 80, 100, and 120.) By studying the results, you will find out not only what ASA you should set your camera for, but also what happens to film during various degrees of over- and underexposure.

Now take things one step further by bracketing whole stops of exposure. (A "stop" is one shutter speed or aperture setting above or below your previous setting.) With another roll of film, shoot seven different snow scenes—with and without people—and make five exposures of each one. The first exposure should follow the reading of your meter and be shot at your determined ASA; the others should be one and two stops over- and underexposed. You'll be surprised by the range of shadows and light that you capture, and you'll note that whereas scenics often profit from considerable *underexposure*, portraits of well-tanned skiers may require two full stops of *overexposure*.

If you have a manual camera, or a manual setting on your automatic camera, you can beat the system by taking a meter reading of just the area that is important to you. Walk up to a person's face, or—if you're trying for a candid—set your meter by taking a reading from the back of your hand. If you're shooting a pure scenic in which snow texture is important, take your meter reading directly from the snow; recognize when you do this, however, that all trees, people, and other darker subjects show up as silhouettes even though your eyes see plenty of detail.

Once you've done these exercises and studied the results, you'll be well on your way to recognizing the cause of any problem areas in your winter imagery. To help you do even better, I've codified the Ten Commandments of Winter Color Photography.



*A world of winter subjects: a peak in the Canadian Rockies (top right), an ancient bristlecone pine, a view across Pakistan's Hispar Pass (left), and the familiar mass of El Capitan (above).*

**I** *Thou shalt use thy camera sparingly in the sunshine between the hours of ten and two—or a black shadow will be cast over the faces of thy subjects, and pure-white snow will turn as barren as the desert.* When the sun is high, its light becomes too harsh to allow good resolution of detail of both white snow and darker objects, such as people.

**II** *Yea, though thou skiest down the Valley of Death, thou shalt fear no evil to thy cameras in a padded case or daypack.* That way, even hard falls are unlikely to harm either camera or photographer. I've hurt myself and my cameras numerous times when I've fallen or tripped while carrying them without a padded case, but I've never had a problem, even doing an eggbeater at full speed, with my gear tucked

away inside a fannypack or padded shroud.

**III** *Spare thy camera thy personal decadence and energy-consumptiveness in extreme cold.* Human beings need to have a portable tropical microclimate to survive, whether it be a heated building or merely a few inches of clothing. A good sled dog isn't allowed to sleep on his master's warm bed, and your camera shouldn't be either. The moisture inside a camera thrust from a warm vehicle or tent into freezing air will condense into ice. Keep your camera in your pack at night, not next to your sleeping bag.

**IV** *Thou shalt bracket several exposures of every scenic.* Taking two or three differing exposures of land-

scapes with snow is a mandate even for the experienced pro.

**V** *Thou shalt not use high-speed films while the sun shines in the heavens.* The finished image will be harsh with films rated above ASA 100, because color films with higher ASA speeds have higher contrast. This means that lights get lighter and darks get darker. When snow and midday light team up to present you with very high contrast, film that accentuates contrast will give your pictures a burned-out look.

**VI** *Be not led into temptation to portray both faces and details of landscape at the same time under a high sun.* Color film can render tones of both people and snow satisfactorily only in indirect light



Snow and ice offer the winter photographer variations on tried-and-true themes, including scenics (left and above), "portraits" (top left), and action shots (right).

or during the magic hours of dawn and dusk, when the sun's angle is very low. Decide that you'll take enough of a close-up so that the bright background won't distract, or else step back and expose for that background, knowing that your subjects will become semi-silhouettes instead of recognizable faces. Remember that attempts to strike a middle ground invariably fail.

**VII** • Forget not thy camera when the heavens are filled with clouds. Muted light will fill every detail of human experience without shadow, while preserving a suggestion of the landscape. Clouds act like one great big white umbrella, sending wonderfully even light everywhere. This is not what you want for the big scenic, but it's ideal for moods and portraits.

**VIII** • Thou shalt not use thy electronic camera where temperatures fall much below freezing—or thy camera will be struck dead, and darkness will fall upon the face of thy film. Electronic ("automatic") cameras depend on battery power to operate the shutter, even on manual settings. Some provide the option of a single mechanical shutter speed in case of battery failure, but even this is very limiting. Why not simply use a mechanical camera in the first place?

**IX** • An eye for an eye is the rule for focusing action. If a subject's eyes appear sharp, all other blurring seems to be motion and is visually acceptable. But if the eyes are out of focus the entire photo appears that way.

**X** • An ASA number shall not be used in vain as a Holy Unchangeable Figure. Camera meters vary; preferences vary; techniques vary. Discover for yourself the number that gives you the best results. Most pros shoot ASA 64 slide film at 80 or 100. This is especially important in snow. To obtain fine detail in the snow, you must somehow underexpose from the average reading given by a meter, which is geared for proper exposure only on an 18-percent-gray surface. The amount of underexposure depends on the scene's inherent contrast. □

Photojournalist Galen Rowell won the Sierra Club's Ansel Adams Conservation Photography award this year. He has published six books of photography, including *Mountains of the Middle Kingdom* (Sierra Club Books, 1984).

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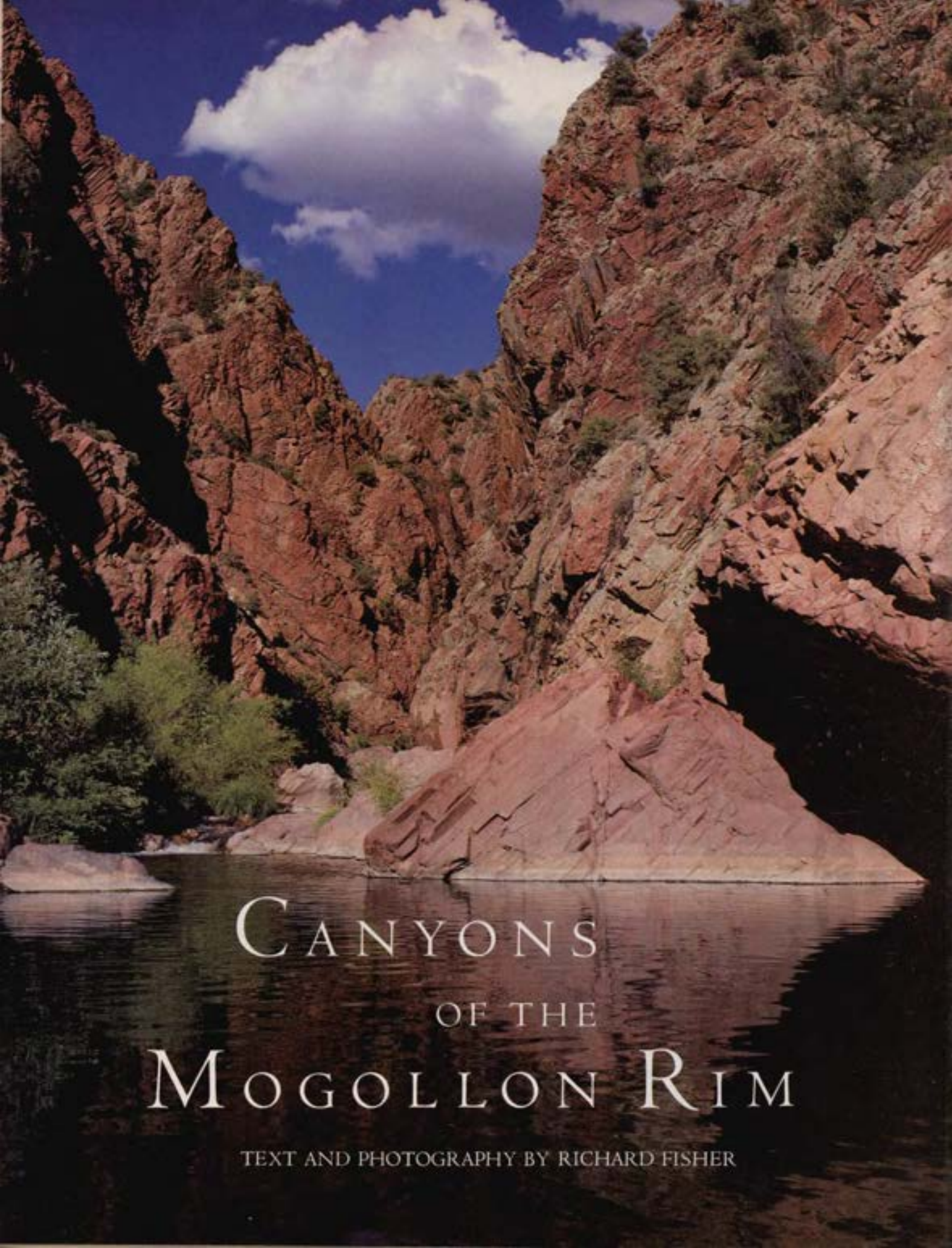
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CANYONS  
OF THE  
MOGOLLON RIM

TEXT AND PHOTOGRAPHY BY RICHARD FISHER



IT IS A LAND of seemingly impossible contrasts. One can drive from the desert of the

Lower Sonoran zone to the pines and firs of the Canadian zone in 20 minutes. Forested peaks rise 2,000 feet above the desert floor, which in turn is interrupted by severe canyons lush with vegetation, cascades, and emerald pools of water.

This 200-mile-long maze of canyons and jumbled ridges is Arizona's Mogollon (*Moggy-own*) Rim. Stretching in a broad arc from Flagstaff to southwestern New Mexico, the rim forms the abrupt southern edge of the forested Colorado plateau. South of the rim, the earth is scarred by canyons that form the roughest terrain north of the Mexican border. So rugged is the area that mapping has been done only from the air, and even technical maps often rely on educated guesswork. Many adventurous Arizona backpackers have yet to explore the area's most spectacular formations.

Yet the rim's inaccessibility no longer guarantees its preservation. The water that flows from the rim through its canyons feeds two major river systems—the Verde to the northwest and the Salt to the southeast. Once irrigation for ancient Hohokam and Pimi Indian farms, the water now feeds Phoenix and its agricultural environs.

To maximize the volume of water released by the canyons, agricultural lobbyists are backing a desertification program that would remove the chaparral and streambed vegetation to reduce water loss through evapotranspiration. This could be devastating to the rim's ecosystem, since between 70 and 80 percent of the wildlife in the region depend on the streams and surrounding plant life for their survival. Though only a two-hour drive from Phoenix, the Mogollon Rim is Arizona's most productive wildlife area. The bears, mountain lions, bald and golden eagles, deer, and bighorn sheep that roam the canyons face the threat of elimination if such a program is carried out.

Ironically, the biggest threat to the rim has been its own anonymity. Both outdoorsmen and conservationists know so little about the natural splendors of the Mogollon Rim that the canyons were at one time dropped as proposed wilderness areas from the U.S. Forest Service's RARE III survey. But activists from the Sierra Club and other groups in the Arizona Wilderness Coalition worked hard to restore as many of these areas as possible, and a number of them were included in the Arizona wilderness legislation that passed both houses of Congress this

year and was signed by President Reagan on August 28.

When I first decided to explore this El Dorado, the only resources I had were the crude topographic maps developed from aerial photographs. Literature on the wild canyons was nonexistent, and local trekkers offered only hazy allusions to crystal pools and towering cliffs. The maps themselves were of little comfort, as place-names such as Hell's Gate, Hardscrabble Canyon, Devil's Windpipe, and Deadman Mesa seemed ominous warnings of things to come. It was no accident that I chose the relatively benign-sounding West Clear Creek area for my first trip.

From the northern edge of the Mogollon Rim, West Clear Creek is the second major canyon system, flowing south to the Verde River. The best way to approach the canyon is from the rim itself, accessible by car to within four miles of the river's source.

Accompanied by two friends, I decided to shortcut the four-mile hike by descending into a side canyon that seemed likely to offer access to the creek. Down we climbed, over gigantic boulders and dried-up waterfalls. After a mile of tough bushwhacking, our descent ended abruptly at a series of impassable rock "boxes"—vertical drops of several hundred feet that actually box in canyons. Our only alternative was to retrace the grueling route to the rim and then try the main canyon.

By the time we reached the rim, our canteens were empty and the sun had slipped below the horizon. We were thirsty, and—not wanting to spend the night in a dry camp—we decided to take another shot at the creek. A blind shot.

Our descent in darkness could best be described as "falling into a canyon." The near-vertical slopes were covered with a deep mesh of cactus, brush, and rocks. In a controlled plunge we moved through the undergrowth with stroking arm motions. At times we were almost swimming as the sea of growth suspended our nearly prone bodies.

One mile later we reached the bottom, scraped, dirty, and exhausted. Moments after that we were in our sleeping bags. But the initiation wasn't over yet. As I drifted toward sleep, I was roused by a soft rustling coming from my pack beside me. Though it was only a foot away, the pack was invisible in the darkness of the canyon. I grabbed my flashlight and rolled over, expecting to catch a pocket mouse munching merrily on a granola bar. I flicked on the light . . . and froze in fear. There I was, eyeball to eyeball with a blacktail rattlesnake. Fortunately, one of us

had the wits to move. It was the rattler, who turned and continued exploring my pack.

When I finally defrosted enough to move, I used my hiking stick to pick up the little intruder, who for the first time let out an angry rattle. The canyon was so narrow at that point that the only way to prevent our unwanted guest from returning was to toss it into the creek and hope it would swim out somewhere downstream.

In the odd, muted light of dawn in the canyon, we awoke to find ourselves camped beside a lovely travertine spring, enveloped in lush Arizona jungle. The spring fed a verdant carpet of watercress and elephant grass, and a thick canopy of grapevines suspended by ancient sycamores arched high over our heads. The lime-rich water had formed a half-mushroom lip overhanging the stream, creating an enchanting waterfall framed with blue-green ferns.

That day began our quest for the sculpted canyons of lore. One mile up the canyon we ran into our first "water box," a pool difficult to bypass and too deep to wade. We maneuvered our packs around the box with ropes, then swam across the frigid pool. A quarter-mile later we found our El Dorado—cliffs soaring into the hot Arizona sky, emerald water flowing between walls of sculpted sandstone, and cool, crystal-clear pools, each larger and more beautiful than the last.

In we plunged, swimming pool after pool, turning in circles to take in each new surprise. One heavily faulted crevice held three huge timbers lodged high above the water between the faces of rock. Wondering how the barkless poles could have settled in such an unlikely spot, I realized that floodwaters reaching heights 60 feet above normal must have stripped the bark from fallen trees and deposited them high on the canyon wall.

During the summer months, flash floods are a real danger in canyon country. The creeks are best explored in mid-autumn, when the water is low and relatively warm. Though we were lucky to have no rain on this trip, we faced another summer backpacking hazard—the heat.

On our third day out, we broke camp before first light, to avoid the searing morning sun on our climb out of the canyon. We wrestled with catclaw, prickly pear, manzanita, and desert holly every inch of the way up. Though the sun hadn't risen, the sweat streamed down our faces and backs, stinging our eyes and hanging in annoying droplets from our noses.

Exhausted and thirsty, we collapsed near an overhanging boulder in a clearing half-

way up the canyon. I imagined a mountain lion crouched atop the boulder, waiting for its prey to pass beneath—an image drawn from western mythology. The more I looked around, the more plausible the scenario became.

We had followed a faint game trail up from the creek and were now sitting on a trace frequented by deer. My curiosity got the best of me, and with a little snooping I discovered a carpet of twigs and grasses hidden beneath the boulder. A little more prodding uncovered a set of fragile bones and skull fragments, complete with tooth marks. A lion had killed a white-tailed buck on this very spot! It probably ate its fill, then covered its kill for safekeeping, returning several times to eat. After abandoning the bones, the cat covered the area with grasses and twigs, according to lion custom.

We rinsed the dust and pollen from our throats, then pressed on. The sun met us just as we topped the rim, and we breathed a sigh of relief. The four-mile hike back to the truck would be a pleasant jaunt compared to the mile we had just put behind us.

**T**HE GEOLOGY of West Clear Creek Canyon, along with that of the other major canyons of the Verde River's tributaries, bears a marked similarity to the layered geology of the Grand Canyon. Here the layer of volcanic basalt that caps the Mogollon Rim forms a hard but permeable shield that protects the softer strata beneath from erosion. As the abrasive force of flowing water cut canyons through the rim, it laid bare the colorful contours of lower strata: the compacted fossils of the Kaibab limestone; the buff, cross-bedded lines of the Coconino sandstone, composed of compressed sand dunes that formed jutting cliffs and long, narrow pools; the brilliant reds, pinks, and browns of the Supai formation, which created the largest pools, rimmed by soft, rounded rock.

But as one travels southwest along the Mogollon Rim, the geology of the canyons changes. The canyons that feed the Salt River in southeastern Arizona are varied and unpredictable. The Supai formation, Coconino sandstone, and Kaibab limestone don't fall into neat layers but are scrambled, with volcanic granite and rhyolite mixed in. This can make for difficult backpacking.

Of the Salt River canyons, Black River Canyon is the one best suited to the novice backpacker. It divides the White Mountain and San Carlos Apache Indian reservations, and a permit is required for entry. Once you're in, the river lies directly below the basaltic rim. Easily reached, in springtime it is the best fishing spot in all of Arizona for smallmouth bass and rainbow trout.

Another Salt River canyon of note is Cibecue Canyon, north of the Black River in the heart of White Mountain Apache land. Entrance without permission results in confiscation of all your gear by Apache rangers packing .45-caliber peacemakers.

The last challenge in my exploration of the rim canyons was a crevasse in the heart of the Tonto National Forest, midway along the Mogollon Rim. In the mid-1800s, what is now the national forest was a vast grassland, but overgrazing has since reduced the land to washed-out hills with a thick coat of thornbush. As a result, Tonto Creek runs red and muddy with each heavy rain, taking about two weeks to clear.

During quite a few years spent exploring the canyons of the Southwest, I found only five people who had hiked Tonto Creek top to bottom, from Bear Flat to Gisela. I'd heard it was the toughest trek in the state—and I soon found out why.

Right from the start my solo "nature walk" turned ominous. Slipping on a cliff, I tore the nail from an index finger. This was no place to be caught less than whole. Thoughts of five days of climbing with only three good fingers on one hand made me reconsider the trip. But after splinting my damaged digit and doing a short healing dance, I decided to press on.

Two days later, deep in the bowels of Hell's Gate in the rain, I had everything *but* my finger to worry about. Stuck in the narrows of the canyon, I'd be a sitting duck if a flash flood struck. With great care I worked my way along the slippery cliffs and boulders. Finding a small clearing above the water, littered with Apache grinding stones, I made camp and waited out the rain.

The next day the sun broke through and I re-entered Hell's Gate. I had thought that, with its 1,000-foot walls and bottomless pools, Hell's Gate had been named for the difficulty involved in reaching (or leaving) the area. But on closer inspection I concluded that the canyon was named for its coloration: a swirling, twisted mass of red, brown, and black lava frozen into fiery cliffs. This forbidding gate admits the explorer into a tangled mass of boulders, water, submerged snags, and unscalable cliffs. Every

hellish obstacle to travel the demons could devise is there.

Maybe this fierce geological terrain is the reason Tonto's diverse wildlife survives and flourishes. Nowhere outside of Yellowstone National Park have I encountered so many signs of wild creatures. Eagles and black hawks soar overhead. Tracks of javelina, deer, racoon, and bear are constantly visible. Once, while I was busy studying my compass, a bear casually strolled by and disappeared into a nearby thicket.

As I moved through the canyon, ducks, blue herons, and grebes were flushed off the water. Surreal colors surrounded me—green rock with purple lines, blood stone, and black basalt.

After covering 30 miles in five days, I came to Tonto's last hurrah. The canyon's western end is guarded by an area of vertical white cliffs interspersed with huge, polished boulders, waterfalls, and deep pools. There were no signs of human intrusion, even though this portion is the closest of all the rim's canyons to an urban area.

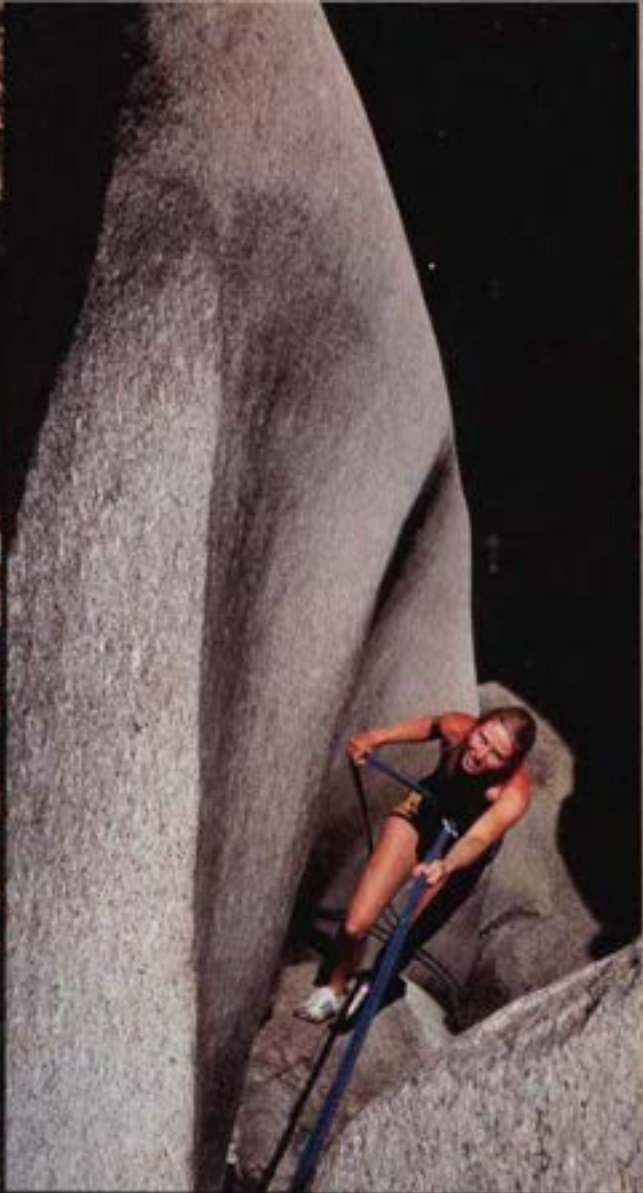
It took hours to work through the last mile. Wet shoes made climbing and descending polished 40-foot boulders a tricky task. Each boulder crossing was followed by a swim, a cliff traverse over a waterfall, and a drop down toward the next pool. Huge, angular white rocks rimmed with slick green algae jutted out of the pools like shark's teeth. I felt like Jonah being spewed unscathed from the belly of a great whale.

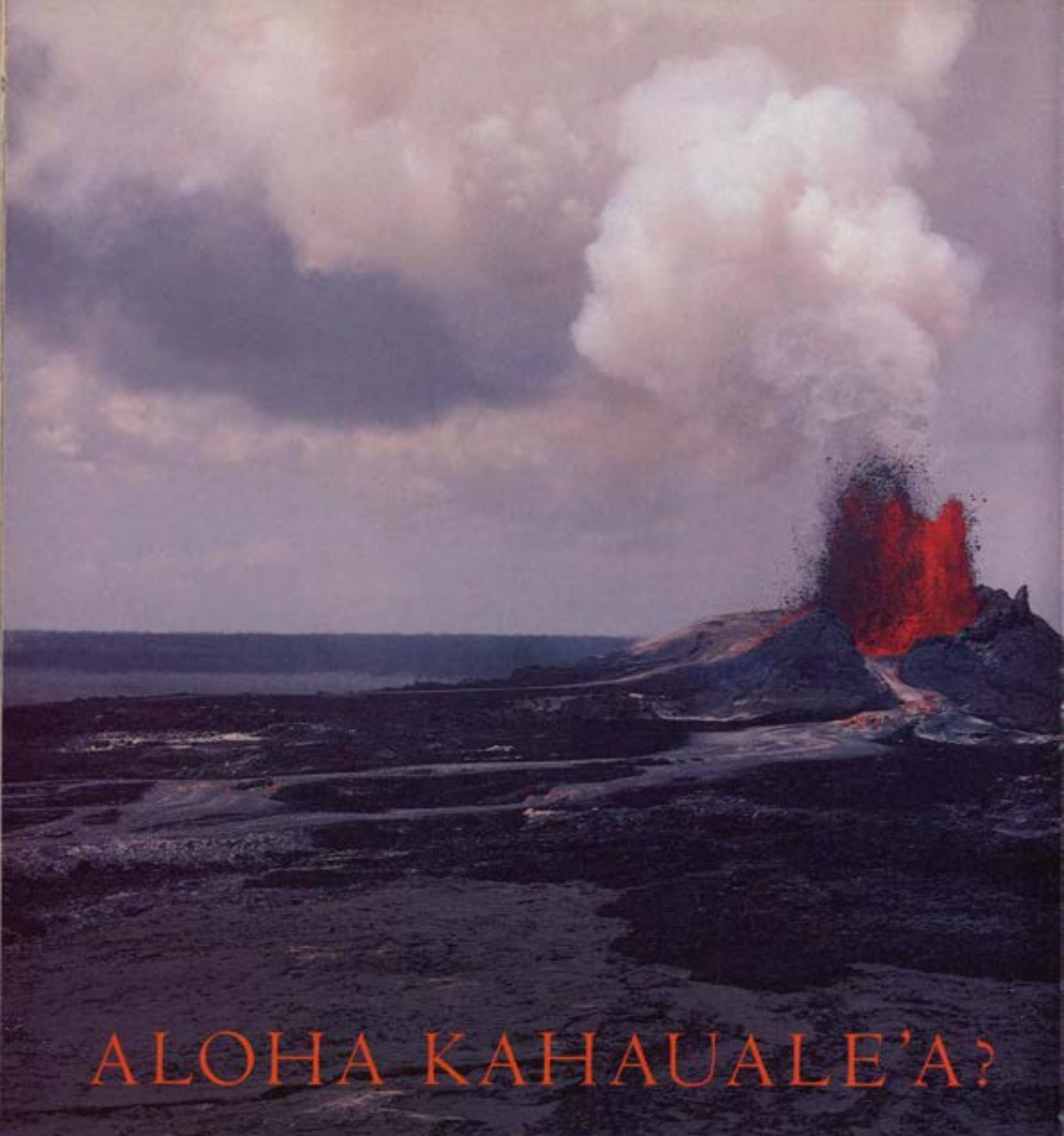
I sometimes feel lucky when I leave these canyons unhurt. In my years of mountaineering and wilderness exploration I have never found terrain tougher or more hazardous than in the canyons of the Mogollon Rim. Canyoneering, like mountaineering, becomes a skill unto itself. Special shoes are needed—footgear that can stand up to constant wading yet perform well on wet rock walls and polished boulders. Gear must be designed to aid the trekker through riverine as well as desert terrain. Yet the best of equipment will not quicken the pace. A careful one mile per hour is the fastest anyone can travel.

But each time I stand on the edge of a canyon, my imagination is not burdened by the dangers I might face; instead it is filled with visions of wild places yet to be discovered. As I plunge over the edge, I can see a shimmering waterfall, a deep, placid pool, or maybe a bear track in the soft sand. □

*Richard Fisher is director of Wilderness Expeditions, Ltd., an outdoor-education program for disabled and disadvantaged youth. He has led many expeditions in Arizona's canyon country.*







# ALOHA KAHUAUALE'A?

A massive geothermal development threatens the borders of Hawaii Volcanoes National Park. Only molten lava and some dedicated conservationists stand in its way.

## KENNETH R. KUPCHAK

**O**N JANUARY 3, 1983, an eruption began on the middle east rift zone of Hawaii's Kilauea volcano, in the Puna district of the Big Island, not far from the well-known centerpieces of Hawaii Volcanoes National Park, the Kilauea Caldera and Mauna Loa. The Puu O eruptions have yet to cease; nearly two years after the middle east rift opened up, sending curtains of fire dancing in a line across the landscape, a 500-foot cone of coagulated lava and cinders has been thrown up. Some volcanologists believe this eruption could go on for five years—not at all an unusual lifespan for such phenomena in this relatively young part of the world.

The area over which the eruption's lava is flowing is called Kahauale'a. This 22,000-acre tract shares a 12-mile-long border with Volcanoes National Park, and parts of it have been long sought after as an addition to the park. Of particular concern to conservationists and the National Park Service alike is the parcel designated by the NPS as Tract 22. These 5,000 acres of closed-canopy endemic rainforest are immediately adjacent to the national park, which has been declared an International Biosphere Reserve by the United Nations partly because of the unique interaction between active lava flows and the rainforest system that takes place there. Scientists active in numerous disciplines (particularly evolutionary biology) come to the park and to Kahauale'a to study the pristine rainforest environment.

But other interests have identified what they feel may possibly be Kahauale'a's more strictly utilitarian advantages. A very real prospect exists that the rainforest of Tract 22—and the unspoiled character of Kahauale'a in general—will be severely disrupted in the near future: not by the molten lava flowing over the land from the ongoing eruption, but by the construction and operation of a giant geothermal-energy production facility. Designed to capitalize on the significant power potential of volcanically heated steam, the proposed facility (its developers say) will operate for a minimum of 20 years—more than enough time than is needed to profoundly disturb the rainforest ecosystem. It will emit tons of noxious and/or toxic gases into the surrounding atmosphere, thoroughly degrade the visual environment, and firmly establish the damaging precedent of industrial development on supposedly protected lands in Hawaii.

Kahauale'a was classified as a "conservation district" under what in the early 1960s were considered pioneeringly progressive statewide land-use controls. As such, it is under the management of the state Board of Land and Natural Resources (BLNR), an


agency mandated by law to "maintain or enhance the conservation of natural or scenic resources." Kahauale'a should certainly be considered a likely candidate area for stringent preservation measures. But because of pressures brought to bear on state government agencies and officials by one of Hawaii's biggest landholding trusts, it is now easier to undertake large-scale geothermal development on conservation district lands than on nominally unprotected and less sensitive lands.

That this is true testifies to the great influence wielded in Hawaii by the Campbell Estate, the trustees of which are obliged to manage the estate's considerable assets on behalf of the descendants of James Campbell, a Scotsman who emigrated to Hawaii in the 1800s and built up a great fortune before his death in 1905. The estate—which contains holdings, mainly on Oahu, valued at many millions of dollars—has proposed to have True/Mid-Pacific, oil drillers based in Wyoming, develop 250 megawatts of electricity from geothermal resources they assume are located within Kahauale'a in general and within Tract 22 in particular.

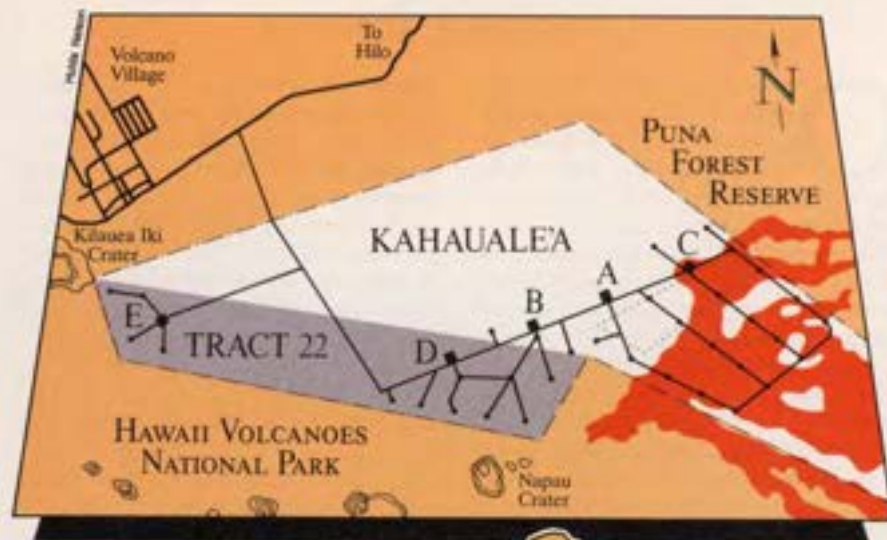
There are great dangers involved—both to the public health and to the vulnerable rainforest ecosystem—in developing geothermal resources in this location. But there is still another reason to call into question the wisdom of such a massive development as the Campbell Estate proposes, for 250 megawatts is ten times as much electricity as the Big Island of Hawaii is projected to require for the foreseeable future. Although Oahu, the island that is home to more than 80 percent of Hawaii's population, has projected power requirements in the 1,200 MW range, it has no near-term geothermal resources of its own, and no interisland grid exists whereby electricity generated on the Big Island can be transmitted to Oahu.

Only the Campbell Estate's trustees are completely sure why they continue to push ahead with the Kahauale'a project. But the threat to the region's wilderness values and its plant and animal life is clear to all who oppose the project—as is the fact that alternatives are both close at hand and easily manageable.

The Campbell Estate proposes to use Kahauale'a's land, without restriction as to location, for as many as five geothermal power plants. Two hundred wells will be sunk to provide access to volcanic steam; half that total will sit within a thousand feet of the national park's boundary area, and many will be sited within Tract 22 itself. Development plans for the gigantic project include 29 miles of criss-crossing roads, miles of geothermal-fluid pipelines many



*The developers who plan to build a huge geothermal energy project on the boundary of Hawaii Volcanoes National Park claimed they could operate for 20 years before an eruption would interfere. Within months, lava pouring from a breach in the cinder cone above the Pu'u'a'ilona O vent had inundated one of the proposed project's well sites.*



LEGEND:

- Lava Flow
- Zone Permitted by BLNR for Geothermal Exploration
- Drilling Sites (6 per site)
- Power Plants
- Roads
- Pipelines

Well site "C" of the proposed geothermal project is now covered by 60 feet of lava (above). Two other well sites are within Tract 22, the area conservationists hope to see made part of Volcanoes National Park.



feet in diameter, numerous multiacre silica dropout ponds, and cooling-tower complexes at each plant that soar many hundreds of feet, each with steam plumes reaching an additional 200 feet in the air. Drilling operations will be continuous—24 hours a day, seven days a week—for years on end; noise levels associated with the drilling are expected to exceed 100 decibels.

Drilling rigs will top out at 175 feet above ground level, 130 feet above the surrounding forest canopy. Christmas-tree drilling rigs will be lighted 24 hours a day in a manner ornithologists assert will be life-threatening to the dark-rumped petrel and Newell's shearwater, two endangered bird species that frequent Kahauale'a.

As the result of a 17-day hearing on the proposed project, the BLNR found that nine endangered or threatened species frequent or abide in Tract 22. Under the direction of Dr. Michael Scott, former head of the U.S. Fish & Wildlife Service's Mauna Loa field station, one of the world's most comprehensive surveys of fauna and flora was conducted on the Big Island; the survey area included Kahauale'a and Tract 22. Dr. Scott noted that Tract 22 serves as an essential habitat for the O'u, one of the rarest of the endangered Hawaiian honeycreepers.

In addition, an endemic fern, *adenophorus periens*, common in the Hawai-

ian forest in the last century, is now found in reproducing numbers only in the project area, including Tract 22. (This testimony came from Dr. Charles Lamoureux, a botanist hired by the Campbell Estate.) Maintenance of the closed-canopy endemic forest is believed essential to the propagation of the species. As noted above, the Campbell Estate is proposing that a minimum of 29 miles of criss-crossing roads be constructed within this forest. Dr. Lamoureux acknowledges that the roads, well pads, and plant sites alone will deplete a minimum of 10 percent of the fern's aggregate population.

Dr. Lamoureux refused to render an opinion regarding the damage *a. periens* would suffer from the project's acknowledged "edge effect." (When an ecosystem is disrupted—say, by a road cut through a formerly pristine rainforest—the disruption is not limited to the roadcut alone, but extends into an area on either side of it.) But another expert—Dr. Hampton Carson, a member of the National Academy of Sciences—testified that a 200-yard edge effect on either side of the roadcuts associated with the project would not be unexpected. This could result in the loss of 25 percent of the fern population, a proportion that Dr. Lamoureux acknowledges would greatly reduce the species' prospects for survival.

Although Hawaii's Department of Plan-

MARY EVANSON, 62, is fastening hogwire fencing to a metal post at an elevation of 7,000 feet. A native of Hawaii and former director of a preschool on the island of Oahu, Evanson is Outing Director of the Sierra Club's Maui Group. Working with her along the fence line is a varied crew of other Sierra Club volunteers, local Boy Scouts, and national-park employees.

"When I first heard about the fencing crew," says Evanson, "I thought, an old woman like me can't do that. Then I found out not only that I could, but that I enjoyed doing it. I've become more and more attached to this place, and I love it. The more I see the damage from the goats and pigs, the more important I feel this fence is."

"This place" is Haleakala National Park, atop east Maui's 10,000-foot Haleakala volcano. Originally established in 1916 as an outlying unit within what was then called Hawaii National Park, Haleakala became an independent unit in 1961. Still a poor relation to the larger park on the Big Island of Hawaii, "Haleakala is struggling to convert its image and staffing from that of a small, national-monument-type area protecting a geological curiosity to that of a national park that rates among the prime biological preserves of the United States," says park research scientist Lloyd Loope.

The park, which at 44 square miles is small by Park Service standards, harbors an amazing variety of plants—some 370 native species. Ninety percent of these

The silversword is one of numerous plants unique to the Haleakala region.



# Workers in the House of the Sun

STEVEN YATES

are found only in Hawaii, and a quarter of them live only on Maui; some are found only in Haleakala's crater. Evolution during millions of years in isolation has resulted in many bizarre and beautiful plant forms, such as the silversword group and endemic lobeliads. The park is also home to six endangered bird species.

But the native species have deadly rivals. Goats—along with cattle, sheep, and pigs—were brought to the Hawaiian Islands at the end of the 18th century by the English explorers Cook and Vancouver. Hawaii's plants, evolving for millions of years in the absence of herbivores, had lost the thorns, nettles, and toxic alkaloids of their ancestors, leaving them without defenses against introduced mammals.

Thriving in a land of succulent plants, without winters or predators, the hooved creatures spread ever deeper into the native forests, trampling, browsing, and overgrazing the unique vegetation as they went. By the time serious control measures were finally initiated (in the 1920s), many of Hawaii's native forests had been destroyed.

Haleakala National Park has been removing goats from its premises for more than half a century. But with no boundary fence to restrain them, the goats simply drift back in from private ranchlands and from the state forest reserves on Haleakala's southern and western slopes. To the south, overgrazing has turned a dryland forest—Hawaii's rarest and most varied type of plant community—into a stony desert. The park is also threatened from the west by expanding populations of introduced axis deer at the same time it is being invaded from the north and east by feral pigs. Estimates of the park's population of feral animals range from 3,000 to 5,000, about 100 per square mile. According to park scientist Loope, nine species of endemic plants have been lost from the park, four of which are found nowhere else on Earth. "But in spite of the damage," he says, "Haleakala National Park remains one of the best refuges left for a native biota that will be virtually eliminated outside the preserves within another century."

When park superintendent Hugo Huntzinger arrived in 1974, the park was so small that resource-management problems had not even been properly

documented, let alone tackled. But Huntzinger took the long view.

"In 1974 and '75 I began to convert some warehouse space into housing for seasonal workers, volunteers, and researchers," Huntzinger remembers. "By 1980, when I hired Lloyd Loope as our first research scientist, we already had added lab and office space to support his program. In 1975 I also hired three University of Hawaii students as backcountry rangers. I bootlegged funds from other programs and funneled them into our expanding management program. As a result, Haleakala now has a solid base to support a major effort to reverse



Wild goats and other introduced animal species threaten Haleakala's native plants.

the destruction of its natural resources."

Also in 1975, Huntzinger read a story in the newspaper about some volunteers working with state forestry on Maui. "I thought we could use some help around here, too," he recalls. The volunteers were part of the newly formed Hawaii Service Trips Program (HSTP) of the Sierra Club's Hawaii Chapter. Huntzinger contacted Lorin Gill, who had helped to found the chapter and organize HSTP.

Between 1976 and 1978, HSTP volunteers came to the park half a dozen times on service trips. Ron Nagata, who led three of those trips, was hired as a seasonal ranger in 1978, and three years later he became the park's first permanent resource-management ranger.

The big break came in 1983, when Washington finally released a special fund of \$300,000 so that a three-year project to fence the crater district could begin. If funding continues, Superinten-

dent Huntzinger will no longer have to worry about each and every expense. "In the meantime," he adds, "the efforts of volunteers—plus a dedicated park staff—will be the key to establishing a productive and ongoing program to save the park's resources."

Completion of the boundary fence will be only the first crucial step in a long-term plan to clear the park of goats and pigs. Controlling the pigs in Kipahulu Valley will be even more difficult. There the park plans to build two fences across the split-level valley's difficult terrain. Public hunting may be allowed in the lower elevations; trapping and hunting by park employees will be used to control populations in the critical mid-elevation koa forest; and, if acceptable compounds can be developed, toxicants may be used in the isolated upper valley.

Volunteer effort is still essential to many aspects of the park's management. Terry Quisenberry, an active member of the Club's Maui Group, was recently hired as an intermittent park employee. His main duty is to coordinate volunteers, and in his spare time he still brings Sierra Club groups up to the park to clear trails, pull exotic seedlings, and refurbish the crater cabins.

Honolulu's Donna Awakuni has been involved with HSTP since 1979, the year after she joined the Hawaii Chapter's High School Hiker program—also started by Lorin Gill. Now a student at the University of Hawaii, where she helped start the University Hiking Club on the campus, Awakuni is vice-chair of the HSTP Executive Committee. This summer she led two off-island trips, one to Hawaii Volcanoes National Park and one nine-day stint to help fence Haleakala's Kaupo Gap.

"It's been a great experience for me," she says. "We've done trail work on Oahu and the other main islands, and fencing in both national parks. We work hard and have some great parties. Best of all, I think, is turning on the new people—especially the high-school kids—to hiking and the outdoors, and showing them that they can make a difference."

Steven Yates, formerly a seasonal hydrologist with the U.S. Forest Service, is an environmental writer and photographer whose work has appeared in Audubon and National Wildlife.



*The interaction between Hawaiian rainforest and periodic flows of lava from volcanic eruptions is of particular interest to scientists. Conservationists are working to preserve the Kahauale'a district, in part to keep it available for use as a living laboratory.*

ning and Economic Development advised the U.S. Department of Energy in June 1982 that "a geothermal resource production field is not a permissible use in a [conservation] district," later that year the BLNR granted the Campbell Estate the right to explore for the assumed geothermal resource in Kahauale'a. This decision by the BLNR is being appealed by the Sierra Club, the Hawaii Audubon Society, the Volcano Community Association (Volcano being the town nearest the project site), and 26 other individuals and groups. The National Parks and Conservation Association has also intervened in support of these efforts. By appealing, these groups seek to preserve the integrity of Hawaii Volcanoes National Park's wilderness and International Biosphere designations and to facilitate the acquisition of Tract 22 by the Park Service. In so doing they will also prevent the industrialization of Hawaii's conservation districts.

Geothermal energy production is not the issue here. No one responsibly denies that Hawaii legitimately needs to develop some of its geothermal potential to help wean itself from a dependence on foreign oil higher than that of any other state. But the Sierra Club and other appellants have produced evidence that sufficient, confirmed, and safer geothermal resources exist outside of the conservation zones, on nonconservation lands in lower Puna.

Thermal Power, operator of The Geysers geothermal area in California, is the Campbell Estate's prime competitor in the race to provide for Hawaii's geothermal energy needs. Thermal Power has already drilled two successful geothermal wells in lower Puna that are from 1,500 to 3,500 feet lower in elevation than the estate's proposed site, and the company is now proceeding with its third well.

Jerry Denton, past project manager for Thermal Power, believes that between 100 and 200 megawatts of electricity can be produced from the reservoir that Thermal Power is now tapping. Thermal Power has a lease on an additional area slightly uprift from its present operation, from which it expects another 100 to 200 MW. Even the most conservative estimate of power to be derived from these operations yields a megawattage many times higher than the Big Island's projected needs for the foreseeable future. Furthermore, aside from the fact that Thermal Power's well can be located substantially lower than the Campbell Estate's, its lands are not located in a conservation district. Being at a lower elevation near present agricultural operations also provides Thermal Power with a luxury that the estate acknowledges it cannot utilize at Kahauale'a—waste heat. The direct heat from the power plants' wastewater could still be used to dry fruits and vegetables, heat greenhouses, stimulate aquaculture, and be processed for recoverable minerals. All of these things are illegal or prohibited at this time within conservation districts.

Dr. Richard Moore of the U.S. Geological Survey, who has recently completed the most comprehensive geological survey yet conducted in lower Puna, notes that although Thermal Power's lease area is subject to possible volcanic eruptions, its level of risk is approximately one seventh that of Kahauale'a. According to Dr. Moore, during the last 2,000-year period, eruptions have occurred on the average of once every 20 years in lower Puna, but every three years at Kahauale'a.

The last word on the use of Kahauale'a may in fact belong to Hawaii's volcano goddess, Madame Pele. For it was within weeks of the close of BLNR hearings on the Camp-

bell Estate's permit request—and promptly upon each adverse ruling by the agency and the courts—that she poured forth her lavas in the series of eruptions that began in January 1983. A ridge of overlapping lavas developed right in the heart of the proposed well field. An expert witness testifying on behalf of the project had claimed that no lava would reach any of the power-plant sites in 100 years. Within a year, the site of proposed Power Plant "C" was inundated.

Had the project been on-line at that time, the following would have occurred:

- Ninety-six well sites would have been buried by lava.
- One of five proposed power plants would have been obliterated. (A 60-foot-thick bed of lava now stands directly above that site.)
- Two of the power plants would have been shut down almost continuously since January 1983, and two more would have been off-line periodically.
- Wells serving the shut-down plants would have free-vented toxic geothermal fluids into the atmosphere and onto the national park and the forests of Tract 22.
- Millions of investment dollars would have been lost, not only by the investors, but also by those industries dependent upon the project's electricity.

Acquisition of Tract 22 would add unique Hawaiian rainforest to Hawaii Volcanoes National Park. (Less than 1 percent of the park is now rainforest.) The various endangered and threatened plant and animal species in the area could be tended to by the Park Service and the Fish & Wildlife Service. Because fair value would be paid to the trust for the land if it were acquired by the park, the Campbell Estate's trustees would be able to fulfill their obligations to the trust's beneficiaries. Several approaches have been made to the estate in this regard for more than a year—but to date they have failed to respond directly. Indirectly, word has filtered back that the trustees cannot publicly or politically proceed along this path . . . but no reason has been supplied.

Acquisition of Tract 22 will be extremely difficult to manage without the support of Hawaii's senators, Democrats Daniel K. Inouye and Spark M. Matsunaga. This approach, however, can be pursued only with some trepidation, because one of the Campbell Estate's trustees has played a prominent fundraising role for one of the senators. Therefore, pressure from outside Hawaii—from Sierra Club members and other conservationists on the mainland—may be necessary if this pristine area is to be preserved and adverse impacts on the national park avoided. □

*Kenneth R. Kupchak, an attorney in Honolulu, is lead counsel in the case against the Campbell Estate's proposed geothermal project.*

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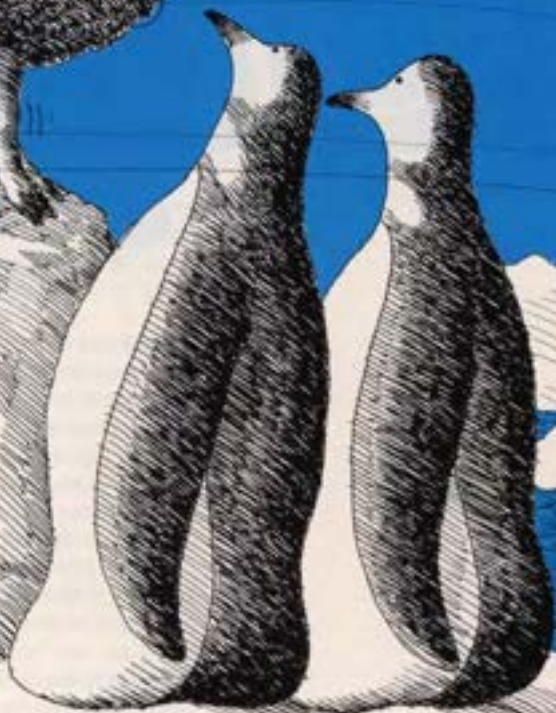
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# HIGH-TECH POLLUTION



SILICON VALLEY—as the belt of industrial suburbs at the southern edge of San Francisco Bay is widely and aptly known—is the home of America's booming high-technology electronics industry. Governors, mayors, and chambers of commerce throughout the United States see Silicon Valley as a model for reindustrialization, in which clean, light, "sunrise" industries replace heavy, dirty, "smokestack" industries as the cornerstone of American economic prosperity.

It's easy to see why the electronics industry has developed a "clean" image. Its well-landscaped factories resemble modern college libraries. Production takes place in "clean rooms" where the air is filtered and the workers wear surgical gowns. Electronic products don't breathe exhaust or drip oil, and in many applications, such as automobile engine control, microprocessor chips actually lower energy consumption while reducing polluting emissions.

Appearances do not tell the whole story, however. On December 7, 1981, water officials quietly shut down a contaminated drinking well operated by the Great Oaks Water Company just 2,000 feet from an underground storage tank at Fairchild Semiconductor's plant in South San Jose. Officials estimated that 14,000 gallons of 1,1,1-trichloroethane (TCA), a degreasing agent used to clean silicon "chips" and printed-circuit boards, plus 44,000 gallons of toxic waste materials, had been leaking from the tank undetected for a least a year and a half. Fairchild officials explained that the liquid-level indicator on the 6,000-gallon tank had malfunctioned, and had been giving incorrect readings for years.

The public was not informed of the Fairchild contamination until seven weeks later, when an environmental reporter for the *San Jose Mercury News* broke the news to a startled public. When the plant's residential neighbors learned about the presence of TCA in their drinking water, they blamed the area's unusually high concentration of birth defects and liver and kidney problems on that exposure, and more than 200 people filed multimillion-dollar suits against the pioneering high-tech firm.

Industry leaders and government officials were "surprised" by the discovery of leaks. Before 1982 only a handful of activists in Silicon Valley had raised the issue of high-tech pollution, and their warnings had been largely ignored. The 1975 finding by the Environmental Protection Agency that trichloroethylene (TCE), a more toxic relative of TCA, causes liver cancer in laboratory animals raised few eyebrows among industry leaders, government officials, or the mass media. "At that time, there were so many things people didn't know," says Steve Heikkila, an engineer with the San Francisco Bay Regional Water Quality Control Board. "There was no reason then for industry officials to consider the possibility of a leak when they were thinking about siting."

LENNY SIEGEL

*Illustrations by John Hersey*



Silicon Valley residents were alarmed by the situation, and their alarm has only grown over time. Followup tests disclosed leaking underground containers at 65 of the 79 industrial sites being monitored in the valley. Tests of well water in Mountain View and South San Jose showed traces of contamination, a discovery that led to the shutdown of wells in those areas. In the wake of the Fairchild incident, many companies, concerned about the cost of lawsuits and cleanups, began to consider installing double-walled tanks resistant to leaks. As of this writing, Fairchild Semiconductor has spent more than \$15 million to clean up a spill for which it has never admitted responsibility.

Not long after the Fairchild spill hit the front pages, fire chiefs from Santa Clara County's cities and fire districts met to develop a model ordinance that would help prevent future leaks, reduce chemical hazards, and ease their increasingly difficult job of responding to emergencies. Major electronics firms decided to cooperate and immediately asked to be represented. The chiefs welcomed five of the industry's trade associations into the task force, but did not invite labor, environmental, or other community groups.

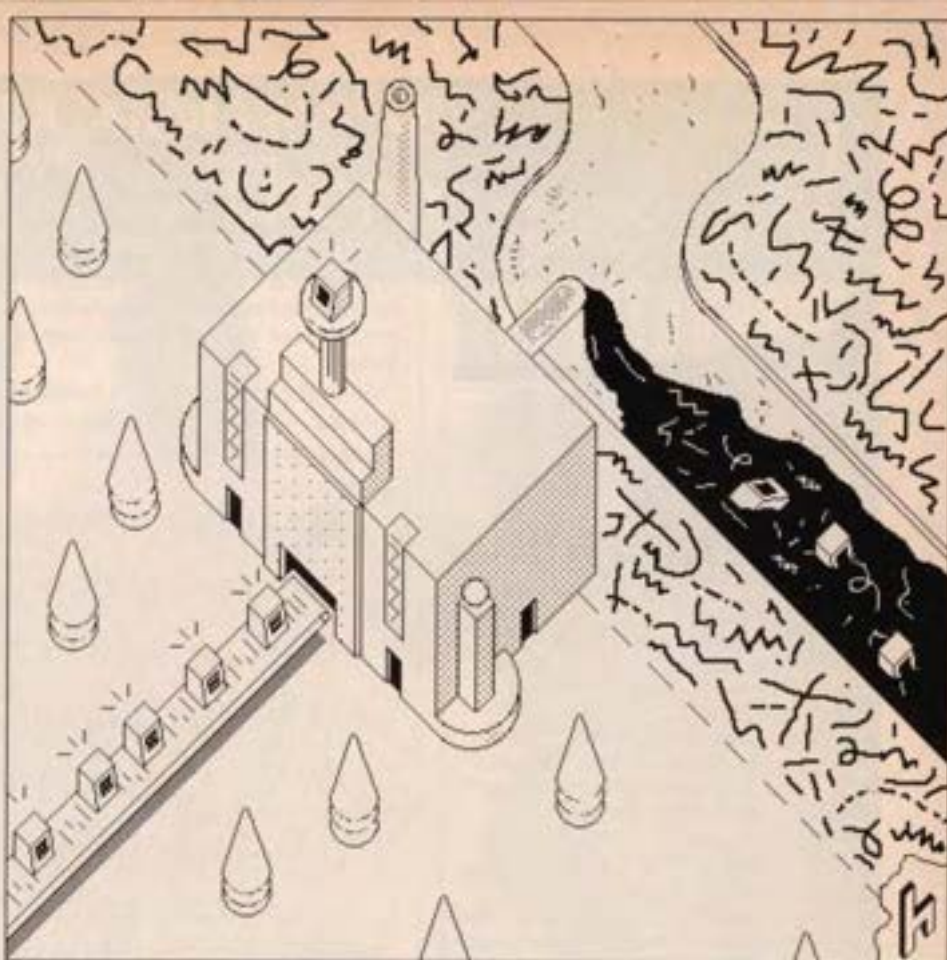
In July 1982 the task force held its first "public" hearing, with no advance notice to the public. The chambers of the Sunnyvale city council were jammed with high-tech representatives, but also in attendance were about a dozen activists who had learned of the meeting by monitoring an industry-association newsletter. Their comments were not taken too seriously at the time, but led by the Central Labor Council of Santa Clara County, a regional branch of the AFL-CIO, they formed the Silicon Valley Toxics Coalition to keep the public informed and to organize support for the new measure.

The basic outline of the model ordinance was released at the July hearing. The proposed laws would require that all new underground tanks used to store hazardous chemicals include an outer, or secondary, container. Existing storage tanks, some located under buildings, could remain in place but would be monitored closely. If found leaking, they would have to be replaced with double-walled containers.

The electronics industry backed the principle of secondary containment and endorsed the proposed ordinance. Through its participation in the task force, the industry had won a large number of modifications designed to make compliance easier and less costly.

The Toxics Coalition turned out scores of people at a series of later hearings. By the time the model ordinance was hammered into final form several months later, the coalition had won strong language providing for public disclosure and protecting the rights of "whistle-blowing" employees; it also had fought off pressure from petroleum companies, which wanted to exempt gas stations from the ordinance. The county-wide Intergovernmental Council adopted the recommendations of the coalition, and virtually all Silicon Valley communities have enacted the model ordinance into law.

But the crisis is far from resolved. This past June, residents of the semirural North Bayshore area of the Silicon Valley city of Mountain View learned that they too had been drinking, bathing, and washing with private well-water contaminated by TCE, apparently originating from a leaking tank at nearby Teledyne Semiconductor. The levels of contamination found ranged from low concentrations to 400 times the "acceptable" level set by state officials. In addition, three electronics firms in nearby Sunnyvale were issued "cleanup and abatement" orders from the water board regarding leakage that is believed to have occurred at least two





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years ago. State officials believe the TCE spill has traveled at least 1,500 feet northward and now threatens private wells. All told, the water board in June reported at least 120 other locations where toxic solvents or gasoline are known to have leaked from underground storage tanks in the Bay Area, two thirds of which are in the Santa Clara Valley.

Soon after the discovery of contaminated drinking water in North Bayshore—the

wells way out to begin with. Well, the companies are often reluctant to put wells any farther from the leak than they have to; some don't want them outside their property lines. It's all a process of negotiation, and it takes time."

And time, according to Ted Smith, head of the Silicon Valley Toxics Coalition, is something the valley does not have. "We're sitting on a toxic time-bomb. Fortunately, the deep underground aquifer that stores

 Officials throughout North America are touting their communities as Silicon Mountain, Silicon Beach, or Silicon Valley East, but few residents of the nation's many would-be "silicon" regions have heard about the hazards of high technology. 

third such incident in Silicon Valley in three years—worried residents from Mountain View and Sunnyvale crowded into a church auditorium to hear experts explain the potential consequences of human exposure to the leaking chemicals. Anita Zimmerman, a former electronics worker suffering from on-the-job exposure to toxic chemicals, drew enthusiastic applause when she asserted, "Our health is worth more than anybody's profit margin, and our children are worth more than anybody's chips."

Silicon Valley residents wondered why wells had not been tested for contamination in areas where leaks were known to have occurred. Teledyne reported its leak to the regional water board in November 1982, and the consultant who confirmed the leak warned in August 1983 that the plume threatened private wells in North Bayshore. Yet no one tested those wells for nearly a year.

According to the water board's Heikkila, who is working on cleanups in Mountain View and Sunnyvale, monitoring wells is an expensive and time-consuming project. "First we have to go through negotiations to persuade the companies to construct wells that will monitor the leaks," a process he says costs about \$5,000 per well and up to \$400 per sample of groundwater. "We want to minimize the cost to the companies but still be able to find the level of contamination. . . . Then we have to agree on where to put the initial monitoring wells. Some people ask why we don't put the monitoring

and supplies water for the bulk of the valley's residents still appears clean. But these plumes of extremely dangerous chemicals are drifting around underground, seeking an abandoned agricultural well or some other quick path to our water supply. If that happens, the aquifer may be permanently poisoned."

It might appear that although chemical leaks in the valley have contaminated soil and groundwater within 50 feet of the Earth's surface, most public aquifers, which are 200 to 700 feet below ground, are safe. Yet one of the dangers peculiar to Santa Clara County is the literally thousands of private wells, many long-since abandoned and boarded up, that can carry toxic chemicals from shallow groundwater to deep public water sources. At present no one knows where all these wells are located.

In fact, there is still much that is not known about the extent of water contamination in Silicon Valley. According to Heikkila, leaks are "always turning up. People removing old tanks or installing new ones are constantly reporting leaks and the possibility of polluted groundwater. When we did the initial survey for leaks we hit the most likely industries, but there are some that have not been monitored yet, or where these incidents have not occurred. Of course, the more we investigate, the more we find." And when leaks are found, it is not always clear who is responsible. This leads to what Ted Zuur, toxic-waste representative for the Sierra Club's Loma Prieta Chapter, calls "the same

old story . . . finger-pointing exercises."

While the Toxics Coalition continues to push for more action, state agencies such as the San Francisco Bay Regional Water Quality Control Board appear to have their hands tied. Last year the state budget for toxics control was cut back \$1.8 million, and this year the electronics industry, the Toxics Coalition, and Silicon Valley legislators all urged California Gov. George Deukmejian (R) to restore the \$6.7 million he had cut from the 1984 state budget. At a meeting of the coalition in a Sunnyvale church this July, activists implored the EPA to assist in the cleanup, but received no promises.

In August, Harry Seradarian, director of toxics and waste management for the EPA's western region, appeared at a meeting of the Toxics Coalition to announce that more than a dozen chemical spills in the area had been recommended for inclusion on the federal government's Superfund cleanup list—but he would not say which of the county's 80 major chemical spills made it onto the tentative list. Like EPA Administrator William Ruckelshaus, when he spoke to coalition leader Ted Smith in July, Seradarian told the group that his hands were tied in the matter. The *San Francisco Chronicle* reported Seradarian as saying, "We don't understand the full extent of the contamination. . . . I can't agree to magically clean up these sites. It takes time."

Meanwhile, the Toxics Coalition had joined with other organizations, including the Sierra Club, to push through the state legislature a secondary-containmentment bill, weaker than the local ordinance, introduced by Assemblyman Byron Sher (D-Palo Alto). Assembly Bill 1362, which became effective January 1, 1984, does not require existing tanks to be upgraded for secondary containment. It requires plants storing toxic materials to obtain permits, to monitor tanks for leaks, to report leaks to local authorities within 24 hours of discovery, and to allow inspection of tanks. The draft legislation required companies to upgrade existing tanks, but that provision was dropped in the face of opposition from the electronics and petroleum industries. Although the high-tech industry supported the local ordinance it helped to create, neither it nor the petroleum industry supported A.B. 1362.

Yet there are some who, citing the record of cleanups for other toxic spills around the country, consider the electronics industry far more cooperative than the petroleum or chemical industries. Silicon Valley industrial leaders, they argue—more sophisticated than administrators of other industries, or even their counterparts elsewhere in the country—seem to have accepted early in the game the inevitability of regulation.

Larry Borgman of Intel, a high-tech firm

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in Silicon Valley, notes that electronics firms are known for their "fast-moving, problem-solving" mentality. He says, "I think the proper question to ask is why others have not moved to solve their problems." Peter Burnes, waste inspector for the Palo Alto Regional Water Quality Control Plant, answers the question a little differently. "The population here is more sensitive than in other areas. Industry has to respond."

Burnes may have a point. One of the interesting features of the Toxics Coalition's push for regulation is the collaboration of labor and environmentalists in Silicon Valley, two groups that are often seen as having opposing interests. "It's happening all over," says Martin Manley, political director of the Santa Clara Central Labor Council. "It's not as unlikely an alliance as people think. The same chemicals that are polluting the public's drinking water are affecting workers on the job. So if you take that part of labor concerned with toxics on the job, and environmental groups concerned with toxics in the community, and if you define your goals clearly enough, I think you can get a lot of people to work together."

Labor is a significant constituency in Santa Clara County—according to Manley, the valley counts 100,000 union members among its population—and labor has been active in the community for a long time. Workers in electronics, who are underrepresented in an industry Manley says is "famous worldwide for being vehemently anti-labor," are supported by other unions in the Central Labor Council. "I believe we're strong enough to make a difference here," Manley asserts.

Labor found partners among Bay Area environmental groups, and environmentalists in turn found a forum in the Toxics Coalition. "It's true that enviro people and labor don't usually sleep together," says Ted Zuur, "but in toxics they realize they have a common problem, so they have been combining their strength. Ted Smith has welded the groups in the Toxics Coalition together into a formidable organization." Groups such as the "watchdog" Citizens for a Better Environment (CBE), Friends of the Earth, and the Sierra Club's large and influential Loma Prieta Chapter joined with labor to instruct people about the dangers of toxic chemicals and to bring the issue to the attention of residents, local government, and the media.

Yet despite widespread coverage of electronics pollution in the San Francisco Bay Area press, the news of Silicon Valley's problems has hardly leaked outside. As officials throughout North America tout their communities as "Silicon Mountain," "Silicon Beach," or "Silicon Valley East," few living in the nation's many would-be "sil-

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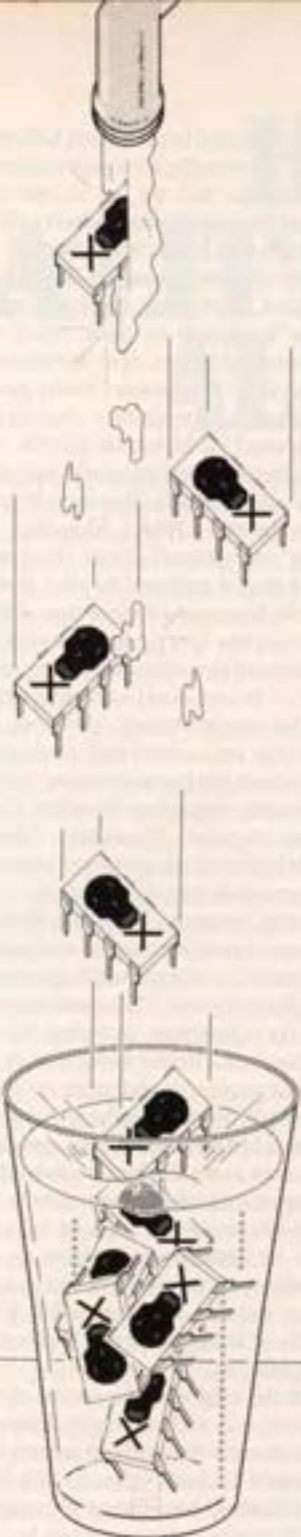
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for the country's top engineers, scientists, and programmers is high, and Silicon Valley has become a center for high-technology because it has always offered a quality of life that attracts these specialists from throughout the country and the world. According to Peter Giles, president of the Santa Clara County Manufacturing Group, "The perceived and real attractiveness of the area is important to industry as a means to attract and retain people." But how can a high-tech firm lure a young electrical engineer from St. Louis or New York if his or her children have to drink poisoned water in Silicon Valley, once called the "Valley of Heart's Delight"?

Furthermore, the problems of high-tech pollution do not end with leaking underground storage tanks. The electronics industry faces many other, less publicized problems, including waste disposal. In December 1983, CBE's San Francisco office released a report revealing widespread violations throughout the Bay Area of standards for pretreating sewage, noting in particular that one quarter of the 543 industries discharging waste in Silicon Valley were cited for violations in 1982. The city of San Jose withdrew five sewage permits in February and gave four warnings, while the EPA in July ordered 32 Silicon Valley firms, primarily makers of printed circuits, to conform to pretreatment standards immediately or face fines of up to \$10,000 per day.

Although electronics companies recycle some toxic solvents, most solid hazardous wastes are transported to landfills 60 to 200 miles away. Not surprisingly, there have been several incidences of improper transfer and disposal of these wastes, including a tank-truck leak in September 1981 that forced 4,000 residents and schoolchildren to evacuate San Ramon, northeast of the Santa Clara Valley.

Finally, air pollution, though not attributable primarily to high-tech firms in the Bay Area, is another waste product associated with the electronics industry. The Bay Area Air Quality Management District estimates that semiconductor firms in the Silicon Valley produce ten tons per day of "ozone precursors," or smog-producing emissions. Eight large firms produce 74 percent of that total.

So, despite the industry's responsiveness (relative to other industries), the Toxics Coalition is not appeased. Ted Smith says, "They have poisoned our water. They've polluted our air. They consistently try to weaken or delay regulation. That hardly makes them responsive."

Martin Manley agrees. "It's true that there's a difference in attitude between the electronics and oil industries where regulation and compliance are concerned—oil is far worse. But it's electronics that's causing

icon" regions have heard about the hazards of high-technology production.

The Toxics Coalition hopes to change that situation. "We want to put out the word," says Manley. "Silicon Valley is going and telling the whole planet about how electronics is the industry of the future; well, we want to debunk the myth that it's a clean industry."

Therein may lie the explanation for the industry's relatively compliant attitude. High-tech firms may need chemicals, but they need people even more. Competition



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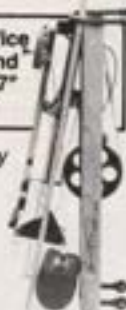
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all the grief around here. Silicon Valley is not unique in the country for a superabundance of gas stations; but we are unique in the density of the electronics industry: It's the largest high-tech center in the world."

And in the San Francisco Bay Area, at least, there is growing evidence that the public is beginning to think twice about letting electronics firms into its hometowns and backyards. In Sonoma County, north of San Francisco, community organizations have opposed all high-tech growth, citing both the threat of pollution and Silicon Valley-style congestion as reasons to reject the industry. In early 1984 a Mountain View producer of printed-circuit boards announced that it planned to shut down its plant, which employed more than 400 people, because the firm could not comply with the community's orders regarding sewage cleanup or its secondary-containment ordinance. No one protested. However, when CTS Printex announced that it was moving its plant across the bay to Fremont, residents there quickly organized Sensible Citizens Reacting Against Hazardous Materials (SCRAM) to block the proposed move.

Concerned citizens in most locales around the country, however, seem to feel that the electronics industry should be accepted, but under conditions that would help ensure its responsible behavior. This means that comprehensive regulations, including the funds to enforce them, would have to be in place before companies "grandfather in" ineffective methods of handling hazardous materials. In addition, electronics production must be kept a safe distance from residential neighborhoods and environmentally sensitive natural resources, such as vulnerable sections of underground water supplies. And because most planners recognize the need for suitable housing within a short commute of industrial areas, it all calls for careful planning.

But in the long run, the record of leaks, spills, dumping, and venting in Silicon Valley demonstrates that without assertive public agencies—backed by the combined effort of well-informed community organizations—the electronics industry cannot be counted upon to make public health and safety a high priority. Martin Manley notes that the experiences of Silicon Valley ought to serve as "a warning to everybody that you shouldn't assume high-tech is a panacea for the problems in your community. You have to do some planning, look at the consequences, look at the needs of the community, and work from there." □

*Lenny Siegel is director of the Pacific Studies Center, a public-interest information center in Silicon Valley. He is coauthor of the forthcoming The High Cost of High Tech (Harper & Row).*



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## ON THE ROAD TO PEACE

### *The Sierra Club Makes Its Way*



The dangers confronting all the world's peoples motivated these folks to participate in a cross-country "Walk for the Earth" earlier this year. The trek took seven months to complete.

#### BOB IRWIN

*Every issue that Sierra Club people are worried about will cease to exist if they do not do something about the environmental threat of nuclear war.*

—Dr. Helen M. Caldicott

**E**XACTLY THREE YEARS AGO this dire warning from the then-president of Physicians for Social Responsibility appeared at the head of this column. Since that time a growing number of Sierra Club members as well as other environmentalists have heeded her words. Yet despite the growing signs of interest in this issue among the membership, many still ask if the Club should get involved. And if it does, how? Or should the arms issue rightfully be

left to the peace groups exclusively? Here's how three Sierra Club leaders respond to these questions.

Michele Perrault, Sierra Club President, feels that love and respect for the Earth have always served as the Sierra Club's heart and soul, its fundamental *raison d'être*. They're what makes the Club work and gives it strength, she says. John Muir was trying to protect a part of the Earth he loved—Yosemite Valley—when he founded the Club 92 years ago. Today his Club is poised to move toward assuring not just protection of the planet but its very survival. That step, Perrault says, is a natural and necessary extension of the Club's traditional conservation program: a step toward the ultimate in environmental protection. Should that fail, all 92 years of Sierra Club efforts fail with it—for all time.

Shortly after Michele took office in May of this year, she told the *Oakland Tribune* that she intended to "involve the Club more deeply in the antinuclear-weapons movement." And because of the Club's unique ability to influence Congress, she said, it is able to provide critically needed lobbying help to the peace movement. She urges would-be activist members to begin to inform themselves now about all the nitty-gritty aspects of the arms issue.

Steve Rauh, the crusading young editor of the San Francisco Bay Chapter's newsletter, *The Yodeler*, began his campaign to get the Club involved in peace and disarmament issues in 1979. Rauh insists that the enormity of the nuclear war issue can be handled, that it is not a "bottomless pit" for the Club, as some of its leaders have feared. Steve believes that we environmentalists can deal with the problem—"impossible" as it may seem—in the context of our other, traditional concerns. We have always promoted the idea that the human community must seek to live in balance with nature, he says. As that idea gains acceptance, our culture will eventually recognize that nuclear weapons epitomize mankind's growing separation from nature.

It has been argued that the Sierra Club can play no politically viable role in curbing the arms race, because it is not one of our areas of concern or competence. Rauh disagrees. He cites the Club's pivotal role in stopping the MX racetrack-basing plan proposed by the Carter administration. On the day the Sierra Club took a public stand against that deployment mode, a Carter official told Rauh later, "word went through the White House that the jig was up." Why, Rauh asks, couldn't the Club play the same role on peace and disarmament questions as well? "We must not forget," he points out, "that when a long-established and respected organization such as the Sierra Club takes a



public stand on a question, it tends to legitimize that concern. It also can provide the sustained, organized effort necessary to a successful campaign"—something, Rauh notes, many of the small, newly formed peace groups are not capable of doing. The Club itself is not yet able to focus much energy on the nuclear arms issue, and Rauh stresses the importance of funding at least one full-time coordinator.

Ellen Winchester, long-time Florida Chapter activist, is a former member of the Board of Directors (1976-1981); she currently serves as chair of the Club's National Energy Committee. She sees that committee's efforts to phase out nuclear power and speed the transition to renewable resources as actions for peace. Looking forward, she plans to focus on having the Club work to free the world from the specter of nuclear war. She agrees with Steve Rauh that the first order of business is to recruit and assign a full-time person to organize the effort. But she would go further. If the Club fully believes in the importance of the issue, she argues, it should be willing to hire staff necessary to do the job. It should not have to leave the funding up to the Committee on the Environmental Impacts of Warfare (as policy now directs), but rather make it a line item in the budget.

What can individual members do if their chapter or group has no peace or disarmament committee for them to join? Winchester urges them to educate themselves on as many facets of the nuclear arms issue as they can. After that, they can begin to educate others—either by speaking on the issue or by writing articles and letters to the editor. Also, they can write to the Council on the Consequences of Nuclear War (3244 Prospect Street, NW, Washington, DC 20007) for help in the form of brochures, videotapes, and reprints of scientific papers. Some of these materials have been obtained by the Impacts of Warfare Committee and are available from Information Services at Club headquarters.

The Sierra Club first expressed its concern over the wide-ranging effects of military activities on the environment in 1974 with the publication of the Club's International Committee report "Air, Water, Earth, and Fire: The Impact of the Military on World Environmental Order." In 1978 that committee also prepared an Earthcare Center background report for a United Nations special session on disarmament.

It was not until three years ago, however, that the Board of Directors took its first tentative step toward adopting a comprehensive policy on the environmental effects of this nation's defense projects and activities. In November 1981 the Board accepted the report of the Task Force on Environ-

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*The walkers for the Earth planned their route along major highways as a way to ensure high visibility for their ambitious project.*

mental Effects of Military Projects, established a year earlier to take the pulse of the Club on the question. (See "Nuclear War as an Environmental Issue," *Sierra*, November/December 1981.) In its survey the task force found a consensus regarding the validity of the issue, and it was able to answer the objections some leaders had raised regard-

ing the effects the policy might have on the Club: internal dissension, hostility from the outside, diversion of resources, and doubts as to whether Club action could make a difference. The Board extended the life of the task force for six months, instructing it to define the scope and responsibilities of a standing committee on the issue.

From that time to the present the Board has taken three significant actions:

- In May 1982 it established the Committee on the Environmental Impacts of Warfare as a standing committee of the Club. (The issue had been broadened, from "effects of military projects" to "impacts of warfare.") The committee was to "assist the Club in finding

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means to prevent unlimited warfare and . . . [the] deployment of . . . nuclear bombs, bacteriological agents, and chemicals." It would advise the Board and implement specific Board-approved projects.

- In January 1983 the Board approved a general bilateral nuclear freeze and opposed the spending of public funds for "further testing, producing, or deployment of destabilizing nuclear weapons systems." This broadened the Club's opposition to the MX to include any basing mode for the missile. (The BOD had formerly opposed only the racetrack system.)

- In March 1984 the Board—by an 8-to-5 vote—authorized "additive" fundraising by the committee. The purpose was twofold: to educate members and promote discussion, and to develop proposals for action. Any proposed action program, however, would require Board approval before it could be implemented.

Many Sierra Club people rank the nuclear arms race at or near the top of the list of the Club's conservation issues. Steve Rauh and Ellen Winchester certainly believe it belongs there. If the Club does indeed agree, then, they say, the issue deserves adequate funding and should not have to depend on whatever can be raised outside the budget.

Club members are now in the process of determining the organization's conservation priorities, and the Board will make the final choices at its December meeting. What it decides will determine the degree to which the Club at the national level will pursue the

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## SIGHTINGS



Just before the California primary, Walter Mondale took time out from a fundraising dinner in Beverly Hills to discuss environmental issues with Bob Hattoy (left), the Sierra Club's Southern California Representative.

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## SIGHTINGS



New York's governor, Mario Cuomo (D), hands one of the Sierra Club's acid-rain postcards to Jenny Freeman, an organizer for the Club's Atlantic Chapter, to help kick off the chapter's postcard campaign. The chapter has since gathered more than 5,000 completed postcards. This photo was taken on August 14, the day Cuomo signed the state's Acid Rain Deposition Control Act—the nation's first legislation designed to reduce sulfur-dioxide levels in the atmosphere.

"ultimate environmental issue." Whatever the Board's decision, effective Sierra Club efforts against the "ultimate threat" won't cease; they will continue at the grassroots level, through the work of chapters, groups, and individuals.

One such activist has just completed a dramatic, seven-month peace project—on his feet. On the first day of April, 35 pairs of feet shook the soft sands of northern California's Limantour Beach off their boots and headed east across the continent, their goal the hard macadam of Pennsylvania Avenue in the nation's capital. Doug Alderson and 34 other Sierra Clubbers and friends were setting out on their 3,800-mile Walk for the Earth—for its ecology, for its peace, and for its Native Americans, whose lives and spirits ever have been closely tied to it.

For the past ten years the 27-year-old Alderson has been one of the busiest of the Florida Chapter's activists, serving as lobbyist, public-lands chair, and outing enthusiast. That experience, plus his work for peace and his deep interest in Native American spirituality, led him early in 1983 to the idea for the Walk. Its goal was simple: "to spread and share love and respect for our planet" and to offer "viable options to the war being waged on our Earth and native peoples."

During the Walk, Doug mailed excerpts from his journal to his hometown paper, the

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Tallahassee Democrat. On that first day out from the sands of Point Reyes National Seashore he chose the following entry from the journal of another walker, ten-year-old Michael Perdue from California:

*First day was easy. We only did three miles. It was great. An Indian gave us an eagle-feather ceremony, and then we took the first step together. I was beating the drum. I met a boy named Shawn. He was only walking the first day. It was a hot day. After the first day, it was dark and we had a meeting. Afterward we went to bed.*

This was part of what the walk was about, Doug noted—"the younger generation and those who would follow."

Doug's journal entry from June 13 read: "While crossing the Animas River into Durango, Colo., we see one of the country's largest and most dangerous uranium mill tailings (mound). Created decades ago from uranium processing for the Manhattan Project (which led to the bombing of Hiroshima and Nagasaki), the tailings have been eroding into the Animas River ever since, and wind has carried radioactive dust over the surrounding city.

"After settling into a campground, we meet with town officials who are seeking more money to clean up the site. They are also investigating relocating the mound and burying it.

"The problems that we see don't prevent us from having a good time. Part of our role is to show how to celebrate life in a clean, peaceful manner and to strive for compatibility with each other."

Doug and Michael were not the only journal-keepers along. Another was Suzanne Schmidt, who left her home in Palo Alto, Calif., (and her post as nuclear-disarmament issues representative of the Club's Loma Prieta Chapter) to join the walk. She sent progress reports to a number of chapter newsletters, including her *Loma Prieta* and the Bay Chapter's *Yodeler*. In August the Florida Chapter's *Pelican* ran a story she had mailed after the seventh week of the group's trek through "the varied beauties of the deserts of Nevada, Utah, and Arizona." Under a hot sun they traversed vast expanses of sand, rock, and sagebrush, along lonely roads, past distant, colored mesas. They slaked their frequent thirst and talked with people they met as they passed through occasional oases and towns. Highlights of their odyssey, as chronicled by Schmidt, included a descent into 110-degree desert at Vermilion Cliffs and swimming in the 45-degree Colorado at Lee's Ferry, in the Grand Canyon; learning from and sharing with Hopi Indians at a mental-health conference in their villages; meeting with her son, daughter-in-law, and grandson, and

then going with them to spend two days in Flagstaff, where the walk was publicized on radio and TV; and attending a conference of uranium workers at Red Valley Charter House, where she learned about the hundreds of abandoned uranium mines and the effect they've had on the Navajo miners and their families. The walkers were struck by the gentleness and integrity of these people left to deal with their frightening, unwanted legacy.

Several weeks later—and several hundred miles eastward along the route—Doug Alderson's parents, Jean and John, met the trekkers in South Dakota on the Redbud Indian Reservation of the Sioux. The trail of the Walkers for the Earth had converged temporarily with that of a small band of West Europeans, also heading east on a walk for peace. Along the way—when they had receptive onlookers—the latter group chanted "Americans Yes, Missiles No!"

The Walk for the Earth has had its share of problems—mountain blizzards, desert heat, a plague of grasshoppers out on the Plains, and biting bugs and sticky heat farther east. But the biggest problem, says Jean Alderson, has been money. It's still not too late to send tax-deductible donations to help the Walk repay its debts. Checks payable to the Native Culture and Ecology Research Foundation should be sent to Walk for the Earth,



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You don't have to walk 3,800 miles to make a statement against the nuclear arms race and its threat to the planet. You can work with your chapter or group on projects that will foster awareness of the urgent need for peace. Or you can work on your own to spread the message in your community. The following are a few examples of what Sierra Club-affiliated chapters, groups, and individuals are doing at the grassroots level.

The Bay Chapter has produced "The Ultimate Environmental Issue," a 15-minute slide show with audio. Club members donated their services at every step in its production. A \$100 expense for typesetting legends and titles was the only direct monetary outlay. Six sets are now available for distribution. For information, contact Nancy Erb at (415) 339-2578, or write to the Bay Chapter office (6014 College Ave., Oakland, CA 94618). If you don't feel up to producing a show (lots of work and time), you might volunteer to arrange and/or present this show or others, including films, in your community.

Exhibits can be effective tools for educating the public about the nuclear issue. Again, the Bay Chapter took the lead with the exhibit it displayed in San Francisco as part of the "Vision of America at Peace" during the Democratic Convention in July. The exhibit, which the chapter continues to display at fairs and other public events, is available for Clubwide use. For information, contact Madge Strong in care of the Bay Chapter.

Coalitions open the way for Sierra Club people to focus constructively on the peace issue. The Wyoming Chapter has worked with coalitions in the northern Great Plains in opposing the MX, and the Mackinac and John Muir chapters have worked with other groups to prevent construction of Project ELF, a nuclear-submarine communications system proposed for the northern Great Lakes region. Redwood Chapter members volunteered in a six-weekend voter-registration drive conducted by the Santa Rosa (Calif.) Peace Center. Adrienne Swenson, the Peace Coalition's chair (and Redwood Chapter member), recommends that each chapter or group organize nuclear arms committees and work out a mutually helpful partnership with a coalition or leading peace organization in its area. And, yes, she has taken her own advice: She has organized a nuclear disarmament committee in the chapter's Sonoma County Group.

A growing number of Club newsletters now regularly cover the nuclear arms issue, some carrying in-depth articles on nuclear weapons and warfare. Three years ago the Bay Chapter's *Yodeler* had the field to itself, but at least 11 more chapter newsletters are



now devoting space to the issue. If your chapter's newsletter has neglected this issue, let the editor know. Or you might submit an article of your own, or a letter to the editor urging coverage. If your newsletter gives the issue good exposure, by all means let the editor know you appreciate it.

Individuals can make a difference. As the saying has it: "If you do nothing, you know nothing will happen. If you do something—maybe something will happen."

New England Chapter leader Abigail Avery included this quotation in her response to the first task force query on the arms issue, directed to Sierra Club activists in July 1981. The words were the reply of a neighbor of hers, Sarah Holden, who had been asked at the Lincoln (Mass.) town meeting what impact a nuclear-freeze resolution could possibly have on the Soviets.

We can hope with Sarah Holden that "maybe something will happen." In the meantime, here are some suggestions for further reading:

- "Darkness at Noon: The Environmental Effects of Nuclear War" by John Birks, and "Forming Coalitions for Arms Control" by John W. Lewis and Coit D. Blacker, both in *Sierra*, May/June 1983.

- "What Is It About?" by Thomas Powers, *The Atlantic*, January 1984.

- "Fire and Ice: The World After Nuclear War" by Ellen Winchester, *Sierra*, January/February 1984.

- "Nuclear Winter" by Anne Ehrlich, *Bulletin of the Atomic Scientists*, April 1984.

- "Nuclear War and Climatic Catastrophe" by Carl Sagan, *Foreign Affairs*, Winter 1983-1984.

- "Nuclear Winter: Global Consequences of Multiple Nuclear Explosions" and "Long-Term Biological Consequences of Nuclear War"—both in *Science*, Dec. 23, 1983. □

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"Oooooooooooooooooo!"

Illustration by permission of Chronicle Publishers, San Francisco

## 1985 SPRING Outings



Anza-Borrego Desert Base Camp Trip, California

**S**PRING IS JUST AROUND THE CORNER, and once again the Sierra Club has planned a variety of outings to help its members enjoy that special time of year. You'll find backpacking trips for the experienced hiker or the beginner, base camp trips that involve camping outdoors or staying in rustic wilderness lodges, and water trips with rafts, boats, or canoes. Ski trips, service trips, a highlight trip, and two outings in Hawaii are also offered.

Sierra Club trips average 12 to 30 members and are generally

organized on a cooperative basis. Trip members help with camp chores, including food preparation and cleanup, under the direction of a staff member.

Please read the following trip descriptions carefully and send in the coupon "For More Details on Outings." Reservations are being accepted now for all spring trips. Make sure you read the Reservation & Cancellation Policy thoroughly (page 82) before applying. The January/February issue of *Sierra* will contain a complete listing of 1985 Outings.

**[25] Aztec-Mayan Tour, Mexico—March 24–April 13.** *Leaders, Carolyn and Bob Marley, 2601 E. Glenrosa, Phoenix, AZ 85016. Cost: \$1,300.* Would you like to learn about the pre-Cortez Aztec-Mayan civilization, encounter a non-English-speaking culture head-on, camp in primitive areas, and exercise control over the pace of your trip with companions of similar interests? Join us and tour southern Mexico by van, originating in Mexico City. As we travel to the tip of Yucatan and return, we will visit the magnificent archaeological sites of Tula, Teotihuacan, Tulum, Chichen Itza, Palenque, Monte Alban, Mitla, and many more. Modern Mexico will also be encountered as we purchase our food, cook our own meals, and camp whenever possible on beaches or in the countryside. Up to seven nights will be spent in motels.

**[27] Easter Vacation on Maui—March 29–April 6.** *Leaders, Eunice and Ned Dodds, 2013 Skycrest, Walnut Creek, CA 94595. Cost: \$430.* Old Hawaii or new, Maui offers a lot to the car camper. Those who choose may backpack 10,000-foot Haleakala Crater, departing from Baldwin Beach, while everyone else may go to Wainapanapa on the wet side. Three nights later we'll move to west Maui for relaxing on Fleming Beach and exploring old Lahaina. An easy second backpack will be available for hikers, or you may return to Baldwin Beach. Then it's home again with fond memories of a pleasant tropical interlude.

**[28] April in Hawaii—March 29–April 6.** *Leaders, Lynne and Ray Simpson, 1300 Carter Rd., Sacramento, CA 95825. Cost: \$430.* A celebration of the arrival of

spring! This camping trip will explore the "Big Island" of Hawaii: the volcanic moonscapes, tropical forests, and sandy palmed beaches. Central commissary menus will feature Pacific Basin favorites. Day and overnight hikes are planned.

**[29] Natural History of the Anza-Borrego Desert, California—March 30–April 6.** *Leader, Bob Miller, 11713 NE 150 Pl., Bothell, WA 98011. Cost: \$335.* Join us on this week-long desert adventure in an area rich in scenery and in Indian and early Spanish history. Enjoy the flexibility of a base camp from which to explore the backcountry of California's largest state park, and to observe the flora and fauna of the living desert in the springtime.

**[30] Cedar Mesa Highlight, Utah—April 22–27.** *Leader, Jerry Clegg, 9910 Mills Col-*

lege, Oakland, CA 94613. Cost: \$375. The area: the high mesa southeast of Canyonlands National Park. The purpose: To explore all features of this tableland from its dark canyons and half-lit but airy Indian ruins to its bright summits. In homage to a night sky that displays more stars than any other, most camps will be fireless. Fit hikers who like cross-country trekking and who do not suffer unduly from acrophobia are welcome. Our last meal will be a Fellini-style dinner atop Muley Point—one of the planet's great viewpoints.

**[31] Lake Powell by Houseboat/Arizona by Bus—May 5–18.** Leader, Margaret Malm, 1716 Maple St., Santa Monica, CA 90405. Cost: \$990. This trip starts with a relaxing week exploring Lake Powell in houseboats. There should be spring wildflowers to contrast with the colorful canyon walls, and we'll spend as much time as possible exploring side canyons, slickrock slopes, and other "targets of opportunity." We will enjoy the beauty that is left, as well as get some idea of what has been lost forever. We'll then board our bus to enjoy Ari-



Spring in bloom along the Rogue River Trail, Oregon

zona's Mogollon Rim country, Chiricahua National Monument, and other areas. The trip begins and ends in Phoenix.

**[32] Rogue River Trail Wilderness Lodges, Oregon—May 13–18.** Leader, Mark Minnis, 14900 Galice Rd., Merlin, OR 97532. Cost: \$455.

**[33] Rogue River Trail Wilderness Lodges, Oregon—May 29–June 3.** Leaders, Jim and Susanna Owens, P.O. Box 5, Agness, OR 97406. Cost: \$455. Hike the historic Rogue River Trail through the Wild Rogue Wilderness, carrying only a daypack. Other gear will be carried by raft, which will follow the trail along the river. We will stay in rustic wilderness lodges each night

with clean beds, hot showers, and fabulous home-cooked meals. Two layover days will be spent at Half Moon Bar, where we can enjoy the beauties of spring and the abundant wildlife of the Rogue River Canyon. Bring your cameras; spring birds and flowers will highlight this trip.

**[34] Zion Park Base Camp, Utah—May 25–June 1.** Leaders, Carolyn and Bob Marley, 2601 E. Glenrosa, Phoenix, AZ 85016. Cost: \$230. Join us for this combination base camp and backpack trip in Zion National Park as we experience spring in the color-country of Utah! The lush, green foliage of the Virgin River, rust-red coloration of towering sandstone walls, and blue desert skies create a brilliant color harmony. Dayhikes will be taken to Upper and Lower Emerald Pool, the West Rim Trail (including Angel's Landing), the East Rim Trail past Weeping Spring, and the Kolob section of the park. Weather permitting, a two- to three-day backpack will be scheduled in the Zion Narrows to explore the major tributaries. Outstanding western meals will be communally prepared by our group in the base camp.

## BACKPACK TRIPS

**B**ACKPACK TRIPS offer the greatest freedom for exploring the wilderness because everything you need is on your back. Young and old are today showing an eagerness for the adventure, solitude, and personal challenge of backpacking. Sierra Club trips provide all these rewards as well as the example of how to backpack knowledgeably and comfortably. Backpacking is a strenuous activity, however. For a trip of a week, the starting load may weigh from 35 to 40 pounds, but the exhilaration and extra physical effort make you feel more a part of the wilderness. With today's new designs in backpacking equipment, almost anyone in good health and physical condition can enjoy backpacking.

All trips require members to help with the cooking and camp chores, although the leaders provide commissary equipment and food. Trip members bring their own packs, sleeping bags, shelter, and clothing.

Trips are rated as leisurely (L), moderate (M), or strenuous (S), or levels in between, by the individual leader. The ratings are made as accurately as possible on the basis of total trip miles, cross-country miles, the aggregate climb, the difficulty of the terrain, and its elevation.

Strenuousness is measured also in less obvious ways. On desert trips members are often required to carry liquids that signifi-

cantly 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 the leader approve each trip member based on responses to questions about previous backpacking experience and equipment. 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 the trip. Unless otherwise stated, minimum age on backpack trips is 16, although qualified youngsters of 15 are welcome if accompanied by a parent.

**[35] Cone Peak—Ventana, Coast Ranges, California—March 23–31.** Leader, David Reneau, 4109 Pacific Ave., Paso Robles, CA 93446. Cost: \$170. The Santa Lucia Mountains offer high ridges with ocean views, colorful wildflower displays, and rugged forested canyons. From the coast we hike through wildflower-filled meadows and climb through groves of the rare Santa Lucia fir to the open vistas atop Cone Peak (5,155). Hiking along the Coast Ridge and adjacent valleys will take us to the redwood forests of Big Sur. One layover day in Lost or Indian valleys will allow time for nature study, relaxation, or exploration. (Rated M)

**[36] Canyons of Death Valley, Cottonwood Mountains, California—March 31–April 6.** Leader, Geoffrey Faraghan, 9 Bell Waver Way, Oakland, CA 94619. Cost: \$200. In the spring, while the neighboring Sierra is still covered with snow, Death Valley is pleasantly warm. Starting below sea level near huge sand dunes, we will be driven from Stovepipe Wells up alluvial fans to the mouth of Marble Canyon. Hiking up through the canyons, we will see complex geology, Indian petroglyphs, cactus, wildflowers, wild burros, and possibly desert bighorn sheep. In high valleys (4,000–6,000) we will find yucca trees and our two food and water caches. At 7,000 feet, along old sheep trails, there will be fantastic views of the Inyo, Panamint, Grapevine, and Funeral mountains. We then descend through Dry Bone Canyon to the floor of Death Valley. (Rated M-S)

**[37] Lost Valley, Ventana Wilderness, Coast Range, California—April 5–13.** Leader, Bob Berges, 974 Post St., Alameda, CA 94501. Cost: \$160. Tramp the ridges and explore the wooded valleys of Big Sur River country. Mid-April dates should provide a display of wildflowers to complement ocean views and pleasant

Vine swinging, Moraine State Park, Pennsylvania

Donald Gibson



walking. A 50-mile loop from Arroyo Seco includes Willow Springs, Pine Ridge, Indian Valley, and Lost Valley. Travel is alternately up and down in Ventana, but we will undertake it in moderate, daily bites. (Rated L-M)

**[38] Pines to Palms Novice Backpack, California—April 8–13.** *Leader, Louise French, 1690 N. 2nd Ave., Upland, CA 91786. Cost: \$170.* Mt. San Jacinto towers 10,000 feet above the brooding California desert; an island of cool forests in the sky. We will ride the Palm Springs tram to 8,000 feet and hike to the top for a nonpareil view from the desert to the sea. We'll then walk gradually downhill from alpine meadows to Sonoran desert, through a varied display of spring flowers. Beginners are welcome to learn the many skills of backpacking, and experienced individuals will find this a nice conditioning hike. (Rated L-M)

**[39] Galiuro Wilderness, Galiuro Mountains, Arizona—April 14–20.** *Leader, Sid Hirsh, 4322 E. 7th St., Tucson, AZ 85711. Cost: \$160.* Primeval, exceptionally rugged, and utterly beautiful—that's the Galiuro Mountains in southeastern Arizona. Our route takes us up and down steep slopes with brightly colored soils and oddly shaped rocks, on dry brushy ridges with magnificent vistas, and into forested canyons with flowing streams. Moving days range from 5 to 15 miles on good trails, seldom-used trails, and no trails. Campsites will be from 4,000 to 7,200 feet. One of the few signs of man that we will see is an old gold mine near Rattlesnake Canyon, site of an historic shootout in 1918. There will be a layover day in Redfield Canyon. (Rated M-S)

**[40] Kanab Canyon/Thunder River, Grand Canyon, Arizona—April 27–May 4.** *Leader, Peter Curia, 1334 W. Willetta, Phoenix, AZ 85007. Cost: \$185.* The scenery in this area is perhaps the best that the Grand Canyon offers to the off-trail adventurer. There are the expanse of the Esplanade, the redwall narrows of Jump-up, the usually muddy, and always sinuous Kanab Creek, the sculptured floor in Scotty's Hollow, the murmur of Whispering Falls, and finally, the explosive headwaters of Thunder River. The terrain is difficult and there are no layover days, but the memories that go with you are forever. (Rated S)

**[41] Rainbow Plateau, Utah/Arizona—April 27–May 4.** *Leader, Jim De Very, 5307 E. Hawthorne St., Tucson, AZ 85711. Cost: \$270.* Lying west of Navajo Mountain on the southern shore of Lake Powell, the Rainbow Plateau is sandstone-dome country laced with narrow canyons and separated by high mesas. The trip will begin and end by boat. Along the way we will visit Forbidding Canyon, Aztec Creek, Cummings Mesa, and Rainbow Bridge. This trek through the Navajo slickrock will consist mostly of cross-country hiking. (Rated M-S)

**[42] Parunawep Backpack, Zion Park, Utah—May 12–18.** *Leaders, John Ricker and Lynn Krause, 2610 N. 3rd St., Phoenix, AZ 85004. Cost: \$220.* The Zion region, named by the Mormons and interpreted as "the heavenly city of God," has some of the most spectacular and interesting canyons in the Navajo sandstone formation. Parunawep follows the east fork of the Virgin River into Zion National Park. Our first three days will be spent wading through a 1,000-foot-deep gorge, followed by a walk out by an old Mormon ranch. The second half of the trip will be from the 8,000-foot Kolob Plateau down La Verkin Creek for a view of the seldom-seen Kolob Arch. We will exit by way of the Kolob Fingers. This trip will be all downhill. (Rated M)

**[43] Sierra San Pedro Mártir, Baja California, Mexico—May 13–22.** *Leader, Wes Reynolds, 4317 Santa Monica Ave., San Diego, CA 92107. Cost: \$280.* Join us on a 31-mile hike in the highest mountain range in Baja California. From the pine-and-aspen wooded area of Vallecitos, we pass through rolling hills and arroyos, traverse the open alpine meadows of La Encantada and La Grulla, and visit oak woodlands. On a layover day, it may be possible to see both the Pacific Ocean and the Gulf of Mexico from a nearby peak at 9,650 feet.

The last night in Mexico we will stay at the Meling Guest Ranch in the chaparral-covered foothills of the Sierra San Pedro Mártir. (Rated L)

**[46] Land of the Noonday Sun, Nantahala and Chattahoochee Forests, North Carolina and Georgia—May 25–June 1.** *Leader, Chuck Cotter, 1803 Townsend Forest Ln., Brown Summit, NC 27214. Cost: \$200.* Tucked away in the southern Appalachians lie the Nantahala Mountains, which the Cherokee called the "Land of the Noonday Sun." Our hike follows the Appalachian Trail, which snakes its way through two exquisite roadless areas: the Southern Nantahala and Tray Mountain, currently under review as future wilderness areas. The rock ledges at Albert Mountain, Standing Indian, and Tray Mountain will provide breathtaking views of the surrounding countryside. (Rated M)

**[47] Mt. Rogers Scenic Backpack, Jefferson Forest, Virginia—June 1–8.** *Leader, Cliff Ham, 3729 Parkview Ave., Pittsburgh, PA 15213. Cost: \$205.* Mt. Rogers, Whitetop, and Pine Mountain, the three highest peaks in Virginia, are along the Appalachian Trail. Our section offers hikers the opportunity to climb mountain ridges, to wander along streams and gorges, and to roam through a variety of forest habitats. Wildflowers, redbud, and sourwood will bloom during our trek. Views from the high mountain meadows, many above 5,000 feet, can be spectacular. This trip will total 30 miles with two layover days, and several climbs or descents over 1,000 feet. (Rated L-M)

**[48] Skyline Trail, Pecos Wilderness, New Mexico—June 2–8.** *Leader, Joanne Sprenger, 2805 Eighth St., Las Vegas, NM 87701. Cost: \$160.* The first five miles along Beaver Creek in Porvenir Canyon (8,000) will include numerous stream crossings with spectacular views of towering cliffs. The third day we will reach Skyline Trail and turn north (11,000). From here the trail is fairly level, with views of the plains to the east and several 12,000- to 13,000-foot peaks to the west. The area is near the south end of the Sangre de Cristo Mountains. There may be snow. (Rated L-M)

## SERVICE TRIPS

**[49] Mazatzal Wilderness, Tonto Forest, Arizona—March 17–24.** *Leader, Linda Dutcher, 606 Alto St., Santa Fe, NM 87501. Cost: \$70.* We will be clearing the lower portion of Alder Creek Trail, which runs from within a mile of Apache Lake (1,891)

to near Browns Peak (7,657). This is a seldom-visited area, with abundant wildlife. We will work every other day, leaving time for exploration of this rugged country, where the vegetation ranges from saguaro cactus to pine and fir forests.

**[50] Coyote Gulch, Glen Canyon Recreation Area, Utah, April 13-21.** *Leader, Jim Bock, 1859 23rd St., Boulder, CO 80302. Cost: \$70.* A large, recent increase in foot traffic has scarred this area with litter, fire rings, and overused trails. There are no more than two salaried backcountry rangers to handle these problems for this 250,000-acre district. We will work with them, but also have time to explore the 13 miles of Coyote Gulch and part of the Escalante River. These sandstone canyons, up to 1,000 feet deep, are characterized by arches, alcoves, oases, and even some Indian ruins.

**[51] Red Rock Trail Maintenance, Coconino Forest, Arizona—April 21-27.** *Leader, Jim Ricker, 525 S. Elden, Flagstaff, AZ 86001. Cost: \$70.* Red Rock-Secret Mountain is one of the newest and most spectacular wilderness areas in Arizona. The trails in this beautiful country of sandstone canyons and pine-covered mountains are in much need of repair. This year's trip will be in Dry Creek Basin, at elevations of 4,800 to 6,600 feet. We will work every other day and there will be ample time to explore, photograph, or just loaf. Expect warm days in the lower elevations and a chance of snow in the higher elevations.

**[52] Owyhee River Cleanup, Oregon—June 2-6.** *Leader, Jim Gifford, 7434 SE 36th, Portland, OR 97202. Cost: \$200.* We will help maintain the pristine beauty of this remote area as we follow the Owyhee through a series of dramatic canyons. The river offers superb whitewater and geography that will remind you of the Grand

Canyon. Our work will consist primarily of removing trash, debris, and excess fire circles. No prior rafting experience is necessary, only a willingness to work and a love of the wilderness. Our guides will provide all river gear and instruction in rowing.

## SKI TRIPS

**[375] Adirondack Ski Tour—January 13-18.** *Leader, Walter Blank, RD #1, Box 85, West Ghent, NY 12075. Cost: \$335.* While staying in an AMC lodge we will take numerous day tours in the High Peaks region of the Adirondacks. There will be one overnight trip to a wilderness cabin high in the Johns Brook Valley. One day will be devoted to intensive instruction in telemark skiing techniques by a certified Nordic instructor.

**[376] Long Pond, Moosehead Lake Region, Maine—February 3-9.** *Leader, Fred Anders, 117 Leverett Rd., Shutesbury, MA 01072. Cost: \$235.* East of Greenville is a large wilderness tract containing numerous mountains in the 2,000- to 3,000-foot range. Our log cabins are nestled along the shore of Long Pond, six miles from the nearest paved road. All personal equipment must be skied in via old logging roads. Once the wood stoves are blazing, the trip will assume a relaxed posture. Optional day trips include: The Hermitage, Trout Pond, Slugundy Gorge, and Monument Ledges. Cold days, lots of snow, and good skiing are planned. *Note: dates and price have been changed.*

**[377] Zealand Valley Cross-Country Ski, White Mountains, New Hampshire—March 3-8.** *Leader, Maggie Seeger, 54 Waldo Rd., Arlington, MA 02174. Cost: \$230.* North of Franconia and Crawford notches, the Zealand Valley provides outstanding cross-country touring. We can visit iced-over Thoreau Falls, climb Mt. Hale

or Zeacliffs for the long winter views, and ski across the beaver ponds and through groves of white birches. We'll choose our plans each day when we leave our lodging at AMC's Zealand Hut. Day one is tough: seven miles with full packs. Thereafter the trip is moderate with strenuous options. Skiers should be of intermediate level with experience off groomed tracks. Leader approval required.

**[53] Crater Lake Cross-Country Ski Tour, Oregon—April 14-20.** *Leader, Tim Odell, 750 W. Broadway, Eugene, OR 97402. Cost: \$200.* Crater Lake National Park has an average yearly snowfall of 50 feet and offers outstanding spring ski touring with views of the lake, cornice-topped cliffs on the crater's rim, and the mountains of southern Oregon. The first three days will be spent touring from a base camp. We will come out for a night in a lodge, and then spend four days on the 38-mile tour around the lake. The trip will be moderate to strenuous. Skiers should have intermediate skills, and backpacking or snowcamping experience.

## WATER TRIPS

**[378] Boating on Mexico's West Coast, and Humpback Whalewatching—December 15-22, 1984.** *Trip Coordinator, Lynn Dyche, 2747 Kring Dr., San Jose, CA 95125. Cost: \$995.* This boat trip aboard our comfortable vessel starts in Puerto Vallarta and explores the coastal tropics and offshore islands of western Mexico. A visit to the sleepy town of San Blas allows us time to explore the inland water channels where exotic birds can be seen. Hikes to the rainforest take us to see wild orchids, tropical parrots, and becards. We will hike through Isabel Island to observe and photograph the colorful courtship behavior of the blue-footed booby and the magnificent frigate bird. The tropical waters are excel-

## FOR MORE DETAILS ON OUTINGS

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

Clip coupon and mail to:  
**Sierra Club Outing Department**  
530 Bush Street, San Francisco, California 94108

Sierra Club Member  Yes  No

Send Supplements:

# \_\_\_\_\_ # \_\_\_\_\_ # \_\_\_\_\_  
(BY TRIP NUMBER)

NAME \_\_\_\_\_

ADDRESS \_\_\_\_\_

CITY \_\_\_\_\_ STATE \_\_\_\_\_ ZIP \_\_\_\_\_

Enclosed is \$\_\_\_\_\_ for supplements requested over three at 50 cents each. Please allow 2-4 weeks for delivery.

After the rain, Hamilton Lake, Sequoia Park, Sierra



lent for fishing and other water activities. Humpback whalewatching is spectacular as this active whale breaks the surface with its distinctive nose or flipper.

**[379] River of Ruins Raft Trip, Mexico—February 25–March 8.** *Trip Coordinator, John Garcia, 124 Romero Circle, Alamo, CA 94507. Cost: \$1,145.* This trip offers rafting and ancient Mayan ruins in a tropical jungle setting. Our trip begins in Villahermosa, where we will see the ancient Olmec heads. We then travel to Palenque and Bonampak, where we can explore the Mayan ruins. We will board our rafts on the Usamacinta River, which forms the boundary between northern Guatemala and Mexico, and which will be our road through the lush jungle. Highlights will include visits to the Mayan city-states of Yaxchilan and Piedras Negras, and there will be opportunities to observe a large variety of exotic plants, animals, and birds.

**[44] Blue Whale Expedition, Sea of Cortez, Mexico—March 24–31.** *Trip Coordinator, Grace Hansen, 20990 Valley Green, #717, Cupertino, CA 95014. Cost: \$995.* This is an exciting trip on the Earth's youngest and richest sea. We'll travel aboard a comfortable vessel, the *Don Jose*, and our goal will be to observe the magnificent blue whale, the largest living creature on earth. We will drift with them, listening to their sounds and observing their behavior. We will also see many other species of whale and dolphin, as well as visit a sea lion rookery, local islands, and fishing villages. The birdlife in the area is spectacular, with many tropical seabirds including brown and blue-footed boobies, frigates, and pelicans. There will be time for hiking, beachcombing, birdwatching, and exploring. Trip price is from La Paz, Baja.

**[54] Dismal Swamp Canoe Base Camp, Virginia/North Carolina—March 31–April 6.** *Leader, Connie Thomas, 128*

*Muriel St., Ithaca, NY 14850. Cost: \$185.* Extending south from Norfolk, Virginia, into North Carolina, the Dismal Swamp comprises an area of lowlands, lakes, and the Northwest River, fed by tributaries of swamp origin. The swamp isn't really "dismal," and we should observe spring warblers and other birds, frogs, snakes, and budding flora, while visiting, hopefully, before mosquito season.

**[55] Pine Barrens Canoe and Backpack, Pinelands Reserve, New Jersey—May 5–11.** *Leader, Herb Schwartz, 2203 St. James Pl., Philadelphia, PA 19103. Cost: \$235.* Located surprisingly near New York and Philadelphia, this 2,000-square-mile wilderness remains a sand-bedded forest with cedar swamps and canoeable rivers. Once a colonial industrial area, its bog-iron furnaces supplied Washington with cannonballs. This vanished society is re-created in the restored town of Batsto, where our trip begins. We'll circle the heart of the Pine Barrens, hiking through ghost towns, cedar swamps, and dwarf-pine forests, then canoeing on winding, dark cedar-water rivers.

**[56] Owyhee River "Row-It-Yourself" Raft Trip, Oregon—May 12–16.** *Leader, Doris Allen, 1975 Tigertail Rd., Eugene, OR 97405. Cost: \$385.* Flowing through a series of dramatic high-desert canyons in southeast Oregon, the Owyhee offers superb whitewater and continually changing geography, reminiscent of the Grand Canyon. This is true wilderness; perhaps the most remote river trip in Oregon. The river is on the Pacific flyway and is a bird-watcher's paradise. This trip is ideal for the beginning or intermediate rafter, and no rafting experience is necessary. Instruction in rowing and all river gear are provided. A geologist who has studied the area will accompany us.

**[57] Rogue River Raft and Lodges, Oregon—May 20–24.** *Leader, Mark Minnis, 14900 Galice Rd., Merlin, OR 97532. Cost: \$515.* Raft the wild-and-scenic Rogue River while staying in wilderness lodges with all the comforts of home. We will spend five days on the Rogue in oar boats led by experienced river guides. Each night will be spent in a wilderness lodge with home-cooked, family-style meals, clean beds, and hot showers. We will layover at Half Moon Bar and enjoy the awakening of spring. A naturalist will lead field trips to discuss the flora and fauna of the canyon. We hope to have a chance to hear the drumming of the ruffed grouse in the splendor of the Wild Rogue Wilderness.

**[58] Grand Canyon Oar, Arizona—May 26–June 6.** *Trip Coordinator, Ruth Dyche, 2747 Kring Dr., San Jose, CA 95125. Cost: \$1,240.* The Colorado River, one of the greatest whitewater rivers in the world, provides an unforgettable experience for those who travel its 225 miles by oar-powered raft. Each of our rafts will carry three or four passengers and a professional oarsman. The quiet and natural flow of the rafts will allow us to fully appreciate the character and solitude of the canyon. We will stop frequently to study and explore features and creatures often missed on commercial trips. Minimum age 15 (18 solo). Cost includes round-trip transportation from Flagstaff, Arizona.

## FOREIGN TRIPS

*For a complete listing of 1985 Foreign Trips please see your July/August issue of Sierra.*

**[500] Cross-Country Skiing in the Austrian Tyrol—January 13–27.** *Leader, Anneliese Lass-Roth, 712 Taylor Ave., Alameda, CA 94501. Cost: \$910.* We will spend 15 days cross-country skiing in the heart of Europe—Tyrol, Austria. This trip is especially designed for beginners; previous ski experience is not necessary. Our trip will be spent in the picturesque Tyrolean villages of St. Johann in Tyrol, Kitzbühl, Pertisau am Achensee, Seefeld, and Innsbruck. Accommodations will be in comfortable hotels. Trip price also includes equipment rental and cross-country ski instruction by a certified Nordic skiing instructor.

**[505] Cradle Mountain and Frenchman's Cap, Tasmania—January 30–February 14.** *Leader, Jerry Clegg, 9910 Mills College, Oakland, CA 94613. Cost: \$1,390.* This trip is for the seasoned walker. Our route lies within two of Australia's most remote national parks. The terrain does not require mountaineering skills, but cirques, chalk ledges, scarps, peat beds, and airy crests must be negotiated. A highlight format will be used; only daypacks need be carried. The rewards offered include some of the Southern Hemisphere's finest alpine scenery, exotic wildlife, unfamiliar stars, and floral displays of continental scope.

**[510] In Quest of the Quetzal: Mexican Birds—February 15–28.** *Leader, Richard Taylor, Box 122, Portal, AZ 85632. Cost: \$1,425.* The search for a Resplendent Quetzal, three feet of shimmering iridescence and the sacred bird of the Mayan and Aztec empires, will climax this natural-history excursion to Chiapas. While the

accent will be on birds—more than 400 species are found here—we will also visit a deep barranca, hike through cloud forest, look for monkeys and iguanas, and explore the spectacular classic-period ruins at Palenque. Accommodations will be in picturesque hotels.

**[515] Serengeti Wildlife Walking Safari, Tanzania—February 16–March 2.** *Leader, Pete Nelson, 5906 Dirac St., San Diego, CA 92122. Cost: \$1,920.* Vast herds of wildebeeste, zebra, and gazelle, followed by predators, migrate in February to the Serengeti Plains to bear their young. With a naturalist we will visit, by vehicle and on foot, the plains, the volcanic highlands, the Rift Valley, and the archaeological sites at Olduvai Gorge. We will hike alpine moorland into Embakai Crater and drive to Ngorongoro Crater, two rich concentrations of wildlife. The people, terrain, and wildlife all will capture the attention of trip members.

**[520] Egypt: Sailing the Nile, Trekking the High Sinai—February 23–March 15.**

*Leader, Ray Des Camp, 510 Tyndall St., Los Altos, CA 94022. Cost: TBA.* After Cairo and Giza we'll board a first-class train to Aswan. From there a four-day cruise down the Nile in a traditional felucca will take us to Luxor. After Luxor we'll return to Cairo to prepare for our seven-day trek in the Sinai. On the trek we'll be supported by Bedouin guides, and our dunnage will be carried by camels. We'll see the pyramids, the Sphinx, the High Dam, Luxor, Thebes, Karnak, the Valley of the Kings, and other famous sites. In the Sinai we'll see mountains, streams, oases, and visit the Monastery of Santa Katarina. *Note: Dates have been changed.*

**[525] Kali Gandaki Trek, Nepal—March 23–April 13.** *Leader, Mike Brandt, 10229 Variel, Unit 22, Chatsworth, CA 91311. Cost: \$805.* Starting in Pokhara, this 19-day moderate trek follows the mighty Kali Gandaki River through the deepest canyon in the world, with Annapurna (26,500) and Dhaulagiri (26,800) rising sharply on either side. Highest elevation reached will be at the sacred shrine of Muktinath (12,500). The return route, via the Gorapani Ridge, is noted for its rhododendron forests. Leader approval required.

**[530] Ganesh Himal Trek, Nepal—April 20–May 11.** *Leader, Kern Hildebrand, 550 Coventry Rd., Berkeley, CA 94707. Cost: \$800.* See the rhododendrons at their best on this 19-day moderate trek into an area rarely visited by other trekkers. Ascending the Mailung Khola from Trisuli Bazaar, we

Betty J. Pollock



will traverse many ridges jutting out from the peaks of the Ganesh Himal, the highest of which is 24,100 feet. This circle trip will descend via the Buri Gaundaki River, and our highest camp will be at about 13,000 feet. Leader approval required.

**[535] Italia Centrale by Bike—May 8–23.**

*Leader, Ed McManus, 912 Cerrito St., Albany, CA 94706. Cost: \$995.* Enjoy the spring flowers and medieval hilltowns of the rolling Tuscan and Umbrian countryside. Our figure-eight tour will take us south and east from Florence. Riding days will take us through farm and wine regions meticulously nurtured for more than 20 centuries. Nights and layover days will be spent in towns famous for art, history, and architecture. Accommodations will range from *pensionones* to a monastery. Continental breakfasts, picnic lunches, and dinners in local *trattorias* will be our daily fare. We will carry our own gear. Leader approval required.

**[540] Hiking in the Lake District and Cotswold Hills, England—May 11–25.**

*Leader, Richard Terwilliger, 7339 Pinecastle Rd, Falls Church, VA 22043. Cost: \$1,000.* Staying in a different guest-house for each of the two weeks, we shall be dayhiking in two of England's most interesting walking/hiking regions in advance of the busy tourist season. The first week's hiking will be in the Cotswold Hills, 70 miles northwest of London. The Cotswolds provide a rich variety of walking over gently rolling hills, the highest of which rises to 1,085 feet. For the second

week we move to the Lake District, an area of moors, fells (mountains), lakes, and waterfalls in northwestern England. This area abounds with interesting and challenging hiking routes. Our routes lie in the Lake District National Park—ideal countryside for hikers of all calibers.

**[562] Karakoram and Hindu Kush Trek, Pakistan—June 30–July 26.**

*Leader, Peter Owens, 117 E. Santa Inez, San Mateo, CA 94401. Cost: \$1,450.* After an eight-year absence, the Sierra Club returns to Pakistan with an exciting trip that starts with a visit to fabled Hunza and a five-day moderate trek up the mighty Batura Glacier, in the Karakoram. This is followed by a 13-day trek traversing the Hindu Kush from Gilgit to Chitral. The trip concludes with a visit to Peshawar, the "Paris of the Pathans" at the gateway to the Khyber Pass. Leader approval required.

**[642] Trek in Tibet, China—October,**

**1985.** *Leader, Mike Brandt, 10229 Variel Ave., Unit 22, Chatsworth, CA 91311. Cost: TBA.* The Sierra Club has been invited by the Chinese Mountaineering Association to trek in Tibet. The hike will begin in the Tibetan highlands and eventually reach Camp 3 (21,500) on Mt. Everest. The walk offers unequalled views of the north slopes of the Himalaya and the magnificent Rongbuk glacier. There will be time to visit places of interest in Beijing (where the trip begins), Cheng Du, Lhasa, and Xigase enroute. Mountaineering experience is not required, but the trip will be strenuous for all but those in superb condition.

Policy

## RESERVATION & CANCELLATION

**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. When a trip is

full, later applicants are put on a wait list.

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 Outings)	\$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. Full payment of trip fee is due 90 days prior to trip departure. Trips listed under "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 nor specialized transportation on some trips. 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 car pools 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.

**Confirmation:** A reservation is held for a trip applicant if there is space available, when the appropriate deposit has been received at the Outing Department. A written confirmation is sent to the applicant. Where leader approval is not required, there is an unconditional confirmation. 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 application is placed on the waitlist, the applicant should seek immediate leader approval, so that in the event of a vacancy we can confirm reservations of applicants who have leader approval. 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) of cancellation from either the trip or the waitlist. The amount of the refund is determined as of the date that the notice of cancellation by a trip applicant is received at the Outing Department.

A cancellation from a leader-approval trip, when the Outing Department has confirmed the reservation subject to leader approval, is treated exactly as a cancellation from any other type of trip, whether the leader has notified the applicant of approval or not.

**Note:** For foreign trips, the days before departure are counted in the time zone of the trip departure point.

The Cancellation Policy for River-Raft-Sailing Trips is separately stated.

**The Outing Committee regrets that it cannot make exceptions to the Cancellation**

### 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 .....	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 policy shall amount to the nonrefundable deposit or 10% of the total trip cost, whichever is greater.



YOUR NAME		HAVE YOU RECEIVED TRIP SUPPLEMENT? <input type="checkbox"/> YES <input type="checkbox"/> NO		TRIP NO.:	TRIP LEADER:
STREET ADDRESS				TRIP NAME:	
				DEPARTURE DATE:	
CITY	STATE	ZIP		YOUR HOME PHONE:	
				YOUR WORK PHONE:	
PLEASE PRINT YOUR NAME AND THE NAMES OF OTHER FAMILY MEMBERS GOING ON THE TRIP		AGE	RELATIONSHIP	MEMBERSHIP NO.	HOW MANY OUTINGS HAVE YOU BEEN ON? Chapter    National
			SELF		
PER PERSON COST OF OUTING:	TOTAL COST THIS APPLICATION:	DEPOSIT ENCLOSED:		FOR OFFICE USE ONLY:	

MAIL TO: SIERRA CLUB OUTING DEPT., DEPT. #05618, SAN FRANCISCO, CA 94139

YOUR NAME		HAVE YOU RECEIVED TRIP SUPPLEMENT? <input type="checkbox"/> YES <input type="checkbox"/> NO		TRIP NO.:	TRIP LEADER:
STREET ADDRESS				TRIP NAME:	
				DEPARTURE DATE:	
CITY	STATE	ZIP		YOUR HOME PHONE:	
				YOUR WORK PHONE:	
PLEASE PRINT YOUR NAME AND THE NAMES OF OTHER FAMILY MEMBERS GOING ON THE TRIP		AGE	RELATIONSHIP	MEMBERSHIP NO.	HOW MANY OUTINGS HAVE YOU BEEN ON? Chapter    National
			SELF		
PER PERSON COST OF OUTING:	TOTAL COST THIS APPLICATION:	DEPOSIT ENCLOSED:		FOR OFFICE USE ONLY:	

MAIL TO: SIERRA CLUB OUTING DEPT., DEPT. #05618, SAN FRANCISCO, CA 94139

#### IMPORTANT INFORMATION

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.
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

*Please note that this is a new address.*

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## A TRANSFORMING VISION

### *Words and Pictures From the Incredible Valley*

TONY HOFFMAN

*West of Eden: A History of the Art and Literature of Yosemite*, by David Robertson. Co-published by the Yosemite Natural History Association and Wilderness Press, 1984. \$29.95, cloth; \$14.95, paper.

FOR THE FIRST TIME, the major benchmarks in the history of the painting, photography, and literature of Yosemite have been drawn together under one cover. David Robertson, a professor of English at the University

of California at Davis, gives us a richly illustrated review that searches for commonality, development, and strength in Yosemite's art. It is a welcome gathering.

Robertson gives timely credit to the over-criticized, unacknowledged, and over-

shadowed. Thomas Ayres, Gilbert Munger, George Fiske, Eadweard Muybridge, and Christian Jorgensen (to name but a few) are reinstated in the company of William Keith, Thomas Hill, Carleton Watkins, and Ansel Adams. Old feuds are forgotten; no mention is made, for example, of Muybridge's exploitation of Watkins. A new breed of artist, unmaliciously stifled by the old masters, is greeted and encouraged.



Carleton Watkins. Yosemite Falls (front view) 2630 ft. 1861. Mammoth-plate. Henry E. Huntington Library and Art Gallery, San Marino, Calif.

In Robertson's view, Yosemite offers the artist the challenge (and the opportunity) to embellish nature's extremes. The "incredible valley" demands an understanding of nature deeper than most newcomers anticipate. Composition and theme are constrained by the artist's ability to plausibly render the interaction of dramatic natural events. The illustrations in *West of Eden* were picked to exemplify the styles artists develop to meet this challenge. In his text, Robertson emphasizes two trends that have characterized most efforts to depict Yosemite: realism and supernaturalism.

Yosemite's artists have been drawn more

toward realism than sensationalism, devoting themselves to the reproduction of detail. Early critics saw this as a conservative movement that limited expression. But such realism, it turned out, was a necessary precursor to an appreciative naturalism. (Painters such as Hill and Keith developed impressionistic and expressionistic styles only after passing through a realistic stage.)

As the title of this volume suggests, Robertson also describes some artists' spiritual or pantheistic approach to Yosemite. The valley in particular conveys the impression of fundamental forces having been at work, forces that underlie surface reality.

Great falls originate beyond view; giant cliffs intrude and recede into vastness; heaps of boulders dwarf tall trees; waters meander through delicate meadows—all suggesting the temporary and timeless, the delicate and powerful. Yosemite's most successful artists draw attention to "a transforming vision of a cosmic order that contains and maintains us and our world."

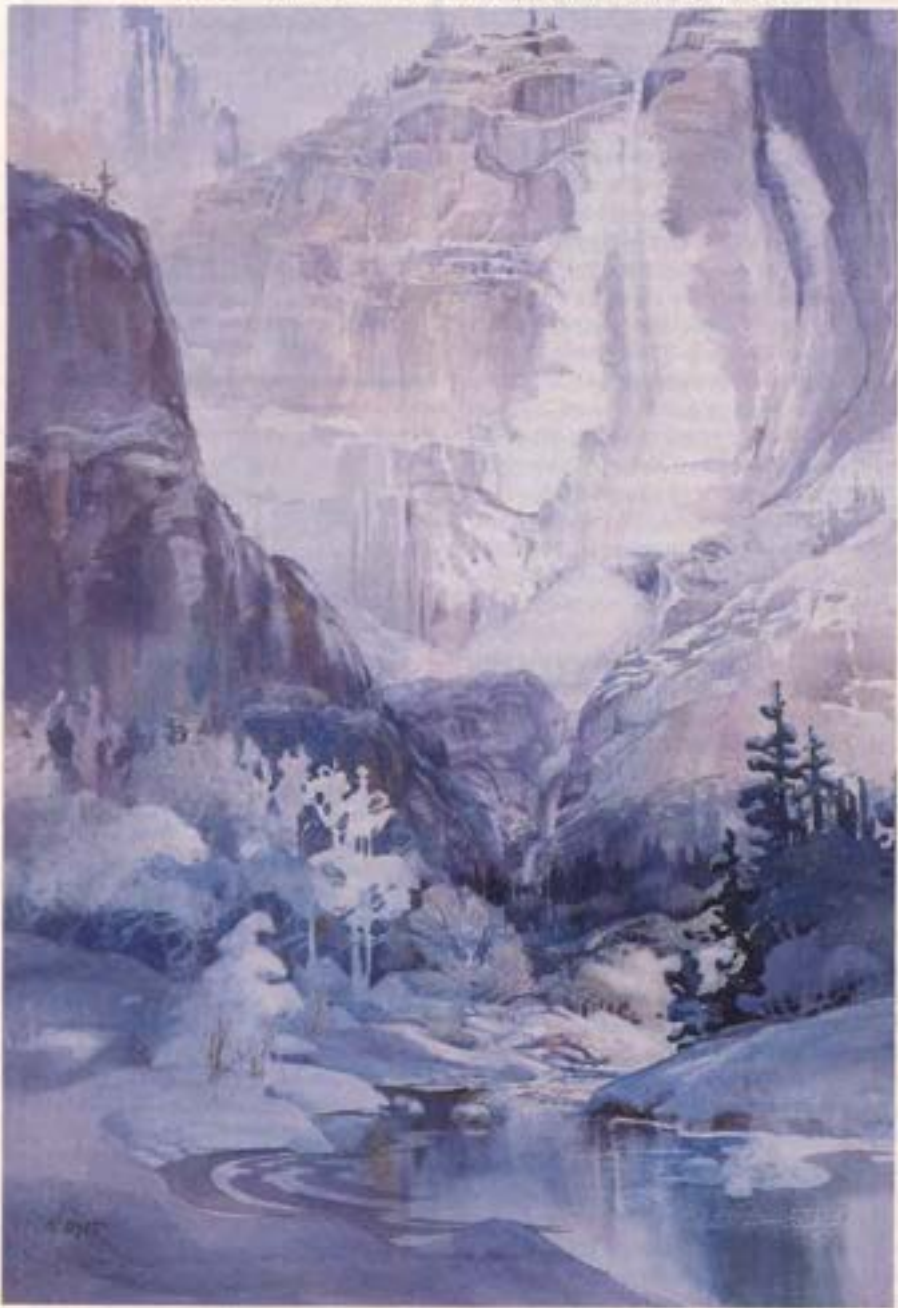
This is neither overinterpretation nor contradiction. The notion that the real reveals the supernatural was a hallmark of transcendentalist and pantheistic philosophies throughout the last century, and naturalists still embrace these philosophies and their modern variations. Early artists had a dualistic vision, depicting Yosemite as a realm close to the heavens. (Albert Bierstadt painted Yosemite to suggest the work of higher hands, drawing the eye beyond a majestic landscape to billowing clouds and distant hidden light.) More-modern artists have been concerned with the "suchness" of nature as it is. They draw attention to an inherent, essential order and its manifestations.

A new generation of painters (especially watercolorists) and photographers is today in the making. Names to look for include Ted Orland, Jeff Nixon, Jane Gyer, Howard Weamer, Harry Fonseca, Brian Grogan, Ray McSavaney, John Sexton, and William Neill. Modern artists have found plenty of room in Yosemite for stylistic exploration and intimacy. We can now see the realists' mirror portraying more than what is visualized. A radical naturalism is coming of age, wherein the ego retreats and the interaction of natural phenomena reflects the working of the psyche; the external world clearly mirrors inner experience.

Despite the influence of John Muir, Yosemite's literature has not flourished as well as its visual arts have. But Robertson reminds us that it can. Gary Snyder's poetry takes us along on a trailbuilding project for an unobscured meditation on work, rock, mind, and the riptap of things. *West of Eden* leaves us with unintended literature: a passage of trail signs warning of natural power and human experience.

Robertson's interest is in the effects of place on art, so he has restricted his subject matter to unify the more explicit translations of landscape. Hence, Miwok crafts are not mentioned; Ahwahneechee legends are included only as a postscript to the first chapter. Climbing photography and literature, most notably the work of Galen Rowell, are omitted. *West of Eden* gives the impression that the art of Yosemite, with the exception of its internationally famous photographic tradition, is a hodge of valiant starts and, often, a podge of stops. This is a credit to Robertson's narrative and analytic

Jane Gyer. Yosemite Falls—Winter. 1982. Watercolor. 22 x 30 inches. Courtesy Jane Gyer.



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style, which leaves the reader with enough freedom to appreciate myriad artistic contradictions. *West of Eden* does much to encourage artistic endeavor, not only because Yosemite is such a unique subject, but because the art it inspires promotes an appreciation of natural wonder.

*Tony Hoffman lives in a canvas tent cabin in Yosemite Valley.*

## HARSH AND ANGRY WORDS

MICHAEL R. SHERWOOD

*Indian Country*, by Peter Matthiessen. Viking, 1984. \$17.95, cloth.

**M**OST WHITE AMERICANS probably have a vague notion that the indigenous peoples who lived gently on this land for thousands of years before the first European settlers arrived were ill-treated by those settlers and succeeding generations of white men. If they think about it at all now, however, they find comfort in the belief that the conflicts of the last 300 years are a thing of the past, and that an "Indian problem" no longer exists in this country.

In *Indian Country*, Peter Matthiessen brings this history into sharp, painful focus—and demonstrates, in ten case histories, that white America's cruel injustices to the Indians continue to this very day. The Indian Wars of the last century are not over. They continue to be fought—not by soldiers but by federal bureaucrats, often from the Bureau of Indian Affairs, an agency within the Department of the Interior. Although the BIA is supposed to act as the Indians' protector, the bureau—as Matthiessen documents time and again—is only too eager to betray that trust when it conflicts with what they perceive to be a need for economic development or commercial enterprise.

As it did in earlier years, the point of conflict between whites and Indians today almost always involves their radically differing views of the appropriate use of land. Those whom Matthiessen calls today's "traditional" Indians—Native Americans who seek to retain their cultural identity and traditional ways of living—believe as their ancestors did that the land and all living things are sacred, a manifestation of the Great Spirit. The land nurtures and provides for all creatures who live on it; it deserves, in return, reverence and respect. It belongs to all creatures and is the exclusive preserve of no one. Land is not owned by anyone and



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cannot be bought or sold. The white man's concept of land ownership is literally incomprehensible to these traditional Indians, as was the early white man's horror and fear of the wilderness and his consequent impulse to "tame" that wilderness by changing the harmony and balance of nature.

Yesterday, the wrongs inflicted upon the Indians involved forcing them from vast amounts of land—over which they had lived and roamed freely from time immemorial—and relocating them onto "reservations" that grew smaller and smaller as the white population expanded. Today, as coal, oil, uranium, and other "necessities" of the white economy are discovered on the ever-diminishing remnants of Indian country, the land is being leased to private industry either by the federal government directly or by tribal councils set up by the BIA. And as Matthiessen shows all too clearly, white society's assaults on Indian lands are almost always environmental assaults as well.

*Indian Country* is at once a profoundly moving story of ongoing human tragedy and a shocking documentation of environmental ruination being inflicted on the land, air, and water of this country by an insensitive and insatiable white society. Matthiessen wonders more than once whether we might not solve many of our worst environmental problems, and redress a terrible inequity to the Indians at the same time, simply by giving some of the public lands back to the Indians to control in their own fashion.

In each of the book's ten case studies—wherein Matthiessen acquaints the reader with the Shoshone and Sioux, the Cherokee and Cheyenne, the Hopi, the Navajo, and other remnant tribes of today—the author's technique is to begin by giving a historical sketch sufficient to explain the Indians' present plight. The history is, without exception, painful to read for anyone with a conscience: It is, in each case, a history of betrayal, fraud, and deceit; of disgraceful and inhumane military campaigns; of treaties forced upon the Indians that were absurdly advantageous to the whites and often not understood by the Indians, and that in any event were broken at will by the whites; and of forced removal of the Indians from their ancestral homelands to make way for white settlers. That the land was sacred and central to the cultural and spiritual lives of the Indians was something the whites, most of whom saw the land only as a commodity, could never understand—and that only compounds the tragedy.

As poignant as Matthiessen's historical sketches are, the most memorable and touching portions of the book are his descriptions of his personal contacts and relationships with the Indians themselves. We learn firsthand of the growing unity within

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Indian country of the "traditionals," with whom Matthiessen's sympathies clearly lie, and of their struggle to maintain or regain their cultural and spiritual independence from white America. Sometimes this struggle has expressed itself through armed confrontation, as when a group of traditional Mohawks in upper New York State were besieged for more than a year (1980-81) by police intent on enforcing warrants from a state court that the traditionals believed was foreign and held no authority over them. Sometimes the Indians directed themselves to the nonviolent reoccupation of land that had been taken from them, as when a coalition of Chumash and other Indians "invaded" the proposed site for a liquid natural gas terminal at Point Conception, Calif., in 1978. And sometimes the Indians' strategy has involved declaring themselves sovereign nations not subject to the jurisdiction of the United States government.

Through Matthiessen, we meet the traditional Indians who are leading this movement. We travel with Howard Osceola into remote back stretches of the Florida Everglades, where a handful of traditional Miccosukee Seminole continue to hold on to their traditions by refusing offers of federal aid and education. These are the people who turned down an Indian Claims Commission award of \$16 million in compensation for lands taken by white settlers, "not because the payment was so small but on the principle that the Earth is sacred and could not be sold."

We share meals with Mina and John Lansa, Hopi traditionals who resist the continual attempts of the BIA to convert all Indians into "Christians and consumers." From them we learn of the Hopi rebirth movement, which has spread throughout North America, giving encouragement to younger Indians who wish to reclaim their heritage. This phenomenon has spawned the Indian Unity Movement, a spiritual focus for traditionals all over America.

We walk with Dick Myers and John Trull up the "Golden Stairs," a trail forever taken by Yurok, Karuk, and Tolowa Indians of Northern California to reach the sacred high country in the Blue Creek watershed of the Siskiyou Mountains. Along the way we learn of the U.S. Forest Service plan to clearcut 929 million board feet of old-growth Douglas fir from this area over the next 80 years, and to build 200 miles of logging roads in the process—actions that the agency's own experts acknowledged would destroy the sacred characteristics of the High Country, thereby striking at the very core of these Northwest Indian peoples' religious and cultural lives.

We share the anguish of Neil Brafford, a young Lakota Indian living in the Black Hills

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of South Dakota (a spiritual center for many Indians), who discovered in 1980 that he, his wife, and their three small children had been living for three years in a house built from highly radioactive mill tailings from uranium mined on Indian land by the Kerr-McGee Corporation. Though the Environmental Protection Agency had known that radiation levels throughout the house were four times the highest exposure permitted to uranium miners (who are exposed for only eight hours a day), no one had warned Brafford. "In the sickening knowledge that he and [his family] are condemned to live for the rest of their lives with the dread of cancer," Brafford vacated the house and joined forces with other Indians and environmentalists in a "remarkable new environmental group composed of Indians as well as whites," called the Black Hills Alliance. The alliance is publicizing the deadly effects of uranium mill tailings and taking the huge mining companies to court in an attempt to force safer conditions and a cleanup of the tailings.

In more and more cases, traditional Indians are joining forces with environmentalists in common cause against thoughtless and short-sighted exploitation of resources and the despoliation of land, water, and air; and increasingly the battleground is shifting to the courts. Many of the early legal fights were unsuccessful, such as the litigation to halt the Tellico Dam in Tennessee, which resulted in the flooding of sacred ancestral Cherokee homelands and burial sites. One of the few notes of optimism in this book, however—beyond the spirit of unity among traditional Indians that Matthiessen sees spreading across North America—is sounded by a handful of recent courtroom victories in which the Indian point of view has prevailed. One such was the 1983 ruling by a federal judge that forbade the Forest Service to violate the sacred Siskiyou high country visited by Matthiessen.

But while *Indian Country* contains some small rays of hope and optimism, it is essentially a sobering book that tells a shameful story in language that is often angry. In concluding his chapter on the plight of the Navajo, for example, Matthiessen says:

*On paper, at least, the Navajo should be one of the wealthiest people on earth [because of the great wealth of uranium and coal underlying Navajo lands]; in fact (according to the U.S. Civil Rights Commission), they are the poorest ethnic group in the United States . . . largely because of the ludicrous terms in the leases signed by the Tribal Council, with the encouragement and approval of the BIA; here again one must conclude that the BIA and the Department of the Interior have made rich white men that much richer at*

*the expense of a helpless and destitute people they were sworn to protect.*

These are indeed harsh and angry words; after finishing this book, however, one is left with the sad belief that they are accurate. And it is not only the Indian people who will suffer in the long run—for, as Matthiessen says in his opening chapter: "It isn't enough to admire Indian teachings; we need them. We belong to this Earth, it does not belong to us; it cares for us, and we must care for it. If our time on Earth is to endure, we must love the Earth in the strong, unsentimental way of traditional peoples, not seeking to exploit but to live in balance with the natural world."

*Michael R. Sherwood, a staff attorney for the Sierra Club Legal Defense Fund, represented the environmental plaintiffs in the successful litigation to protect the sacred Siskiyou high country.*

## THE CITY AS ECOSYSTEM

REBECCA FALKENBERRY

*The Granite Garden: Urban Nature and Human Design*, by Anne Whiston Spirn. Basic Books, 1983; \$25.95, cloth.

THE CONCEPT of ecological interconnectedness is a common one. Most Sierra Club members are familiar with the words of John Muir: "When we try to pick out anything by itself, we find it hitched to everything else in the universe."

In this, her first book, Anne Whiston Spirn creates the image of an interconnected urban ecosystem, then brings it into clear focus. The city—that wonderful invention of our species which allows us to live, work, and play together—is also hitched to and dependent upon its surrounding environment. From the earth upon which it is built to the water that flows under and through it, from the air that surrounds it to the flora and fauna that live in it, the city is as much a part of the terrestrial environment as anything else on the planet.

For those of us who live in cities and enjoy the constant variety of lifestyles found there, but who may feel that cities are apart from "nature," *The Granite Garden* offers a refreshing perspective. Even the title creates a new image of the city and its ties to nature. The book addresses the many problems that have arisen because we commonly ignore the fact that cities are an integral part of nature. Four major topics—air, earth, water, and life—are discussed in terms of the

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part each plays within the urban ecosystem.

City air, whether polluted, stagnant, or prone to temperature inversions, can cause problems. The poor air quality of Stuttgart, West Germany, was markedly improved by a large-scale project that involved many aspects of an environment-oriented approach. Development on surrounding hillsides was restricted after the hills were identified as major sources of cool, clean air for the city. Open spaces were set aside and preserved in an effort to lower urban temperatures, and the height of smokestacks was increased to allow pollutants to flow out of the city. Traffic was prohibited on poorly ventilated streets, and many thoroughfares were widened to improve air circulation. The burning of oil and coal was prohibited in certain areas of the city, and public water was warmed by municipal incinerators. Throughout the city, roof gardens and wet roofs were encouraged. Asphalt on parking lots was replaced by turf blocks (precast blocks that allow grass to grow in holes), which reflect less heat. New buildings were situated to take full advantage of winter sun and summer shade, in an attempt to reduce heating and cooling costs. By harnessing natural patterns of airflow to ventilate the city, and by regulating polluting activities, Stuttgart has improved its air quality to such an extent that it has become a model for other cities.

The earth upon which cities are constructed may appear solid, but it can be subject to earthquakes, landslides, subsidence, sinkholes, and other unstable conditions. Cities have to adjust to the needs and special problems of their specific sites, whether this involves building earthquake-resistant structures, establishing grading ordinances to prevent landslides, or restricting the withdrawal of groundwater to prevent subsidence. Kansas City, Mo., has taken advantage of abandoned limestone caverns beneath the city, and they are now even more profitable than the original quarrying operations. Approximately 44 million square feet of space have been converted there to accommodate warehouses, factories, and offices. The rents and overheads are low, and heating and cooling costs run nearly 80 percent less than on the surface because the temperature below remains a constant 56 degrees Fahrenheit. The caverns are not only convenient to major transportation routes but are also fireproof and noise- and vibration-free, and entrances are easily made secure.

Problems related to flooding, poisoned water, drought, and dwindling drinking-water supplies plague many cities; but water supplies can be managed so they become assets rather than liabilities. As a result of a disastrous flood in 1965, Denver imple-

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mented a comprehensive strategy for managing its water. The city has transformed a ten-mile stretch of the South Platte River flowing through the downtown area from an open sewage ditch to a landscaped park used for water sports, public gatherings, and nature study. In addition to serving as a flood-control device, the 450-acre Greenway Project now links 18 parks with 15 miles of trails.

Although urban plants and wildlife are natural resources for cities, they are dwindling in number—the victims of skimpy park budgets, negligence, hostile habitats, disease, and pollution. If we fail to perceive city forests as part of the metropolitan ecosystem, we may eventually be faced with barren cities. Some flourishing habitats still exist within cities: Rock Creek Park in Washington, D.C., and Mount Auburn Cemetery in Boston are two large urban parks that owe their diversity and abundance of life to the fact that they are located along river corridors.

An urban ecosystem is more than just the sum of its parts. It is the interrelationship of the energy and materials that flow through the city, linking its air, land, water, and living organisms. The urban-ecosystem concept can provide a powerful tool for understanding these relationships, for it provides a framework that enables us to examine all levels of activity within the city and to perceive our impacts on its environment. In addition it allows designers of buildings, parks, and streets to determine the role their creations need to play within the whole city. Each element of the city should be designed both as a system within itself and as a tiny piece of the overall metropolitan ecosystem.

Though Spirn's book is generally praiseworthy, I have some misgivings about her apparent expectation that comprehensive and detailed information about the environmental problems of our cities can be acquired quickly and inexpensively. Likewise, I question whether the processes required to alleviate these problems can be implemented in a similar fashion. Creating a data bank that contains all the details needed for comprehensive planning would be both time-consuming and expensive. In times of budgetary restraint, city administrators would have to be convinced of the overriding need for such information. Changes in cities come rather slowly at times, and often do not happen on a grand scale. Until crises occur, many cities will not change their policies or priorities. Comprehensive, integrated city planning is possible, but it will perhaps take decades for such a concept to become reality.

*The Granite Garden* is must reading for all city planners, urban designers, landscape architects, and city managers because it presents a comprehensive, integrated view

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of the city within its environment. But the book is also a delight for those environmentalists who themselves live in cities and wonder how the urban environment can be made more livable.

*Rebecca Falkenberry, a professor of urban planning at the University of Alabama at Birmingham, chairs the Sierra Club's Alabama Chapter.*

## KIDS' BOOKS FOR THE HOLIDAYS

LINDA SPARROWE

In the days of Peter Rabbit, Winnie the Pooh, and Br'er Fox, animals were really no different than people. Indeed, with their human voices, human feelings, and often human clothing, these animals treated us to many a human adventure.

While our love for these creatures was steadfast, we rarely learned how they lived as real animals. Today's wildlife and environmental books for children focus on different species in their native habitats—what they eat, who their predators are, how they survive. Sure, some still have names, speak our language, and get hurt feelings, but they are, at the same time, showing us what they are about.

The following is a sampling of some recently published wildlife books for all ages, loosely catalogued in terms of subject matter and the age groups each is likely to appeal to. Although several publishers are represented here, we found that G.P. Putnam's Sons seemed to offer the highest-quality and most diverse catalog of environmental books for children.

For the very young (the pre-preschooler), Jill Bailey's "Animals Of Course" series (Putnam's) is a delight. Made of indestructible cardboard, each of the four books focuses on one part of an animal's body—Mouths, Feet, Noses and Eyes—asking the young reader to identify the animal associated with the particular foot, nose, mouth, or eyes. Sounds easy, to be sure, but do you have any idea what a crab's eyes or a turtle's nose look like close-up? Luckily, a mere turn of the page reveals a handsome color photograph of the owner of each body part.

Eric Carle's *The Very Hungry Caterpillar* (Philomel) serves a dual purpose for the very youngest child. Using die-cut pages to show what the caterpillar ate on successive days, it not only reinforces counting skills (to ten) and the names of the days of the week, but unfolds the transformation of a caterpillar into a beautiful butterfly. The language is



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simple without being condescending; the illustrations are bold and unusual. To achieve the desired visual effect, Carle, a graphic designer, cut and layered collages and then overprinted them with ink, crayon, and tempera. Beginning readers will also appreciate the book.

The books in the "See & Read" series (Putnam's) are written simply enough for preschoolers to enjoy, contain enough information to stimulate the curiosity of the young schoolchild, and will supply many an adult with newfound knowledge. Although there are several titles in this series, my favorite by far is *The Spit Bug Who Couldn't Spit*, written by Penny Pollack and illustrated by Lorinda Bryan Cauley. Not only did I find myself rooting for Ezra as he desperately tried to make proper bubbles to protect himself from the hot summer sun and from enemies lurking, but I gained a new appreciation of spit bugs in general.

Although not as cleverly written nor as brightly illustrated, *Raccoon Baby* and *Wood Duck Baby*, both "See & Read" books by Berniece Freschet and Jim Arnosky, deserve mention. Designed for the young reader, each book follows the life of an animal from the time its mother begins the nest-building process to the time it strikes out on its own. While the illustrations are often fuzzy and gray, both books are good examples of literature that can be educational as well as simple to read.

*Grey Squirrel*, by Oxford Scientific Films (Putnam's), is a handsome, straightforward account of the life and habits of one of the most familiar mammals in North America. This book, which should attract the older elementary-school child (fourth or fifth grade), is just one in a series by Oxford Scientific Films that includes such topics as *The Stickleback Cycle*, *Harvest Mouse*, and *Jellyfish and Other Sea Creatures*.

Using rhymes coupled with large, colorful illustrations, Ruth Heller introduces kindergartners to the world of mammals in *Animals Born Alive and Well* (Grosset & Dunlap). Five-year-olds love to rhyme and are more apt to remember short, sing-song poems than a long treatise on the difference between a whale and a trout. Heller, in fact, uses very few words. The simple statement, "Mammals are animals with fur or hair who nurse their young and breathe fresh air," says it all. The drawings are the best part, however. They are brightly colored, true-to-life pictures of several different types of mammals, each clearly identified.

The familiar pop-up book is a delight for children of all ages. They enjoy pulling a tab to reveal a hidden animal, opening a page to have a butterfly pop out at them, or turning a wheel to make the entire picture change. My favorite ones for preschoolers

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and kindergartners are the "Natural Pop-ups" published by Putnam's. Written by Graham Tarrant, illustrated by Douglas Maxwell, and designed by Tony King, each book is an intimate look at the life of a creature—*Frogs*, *Rabbits*, *Honeybees*, and *Butterflies*. It's often not enough for a child to be told about the behavior patterns of a rabbit. To be able to visualize what a rabbit does is an important step, but to participate in the activity is even better. The text accompanying the illustrations is simple yet informative. After the child has had a chance to try out each page, s/he is treated to a short, more scientific account of each creature's life story. These are all good introductions to the world of animals and insects, giving young children sophisticated knowledge about these creatures in a creative and playful way.

To prove that pop-up books are not only for small children, I'll mention *Dinosaurs*, *A Lost World*, devised and designed by Keith Moseley, and illustrated by Robert Cremins (Putnam's). Obviously designed with the older elementary-school child in mind, *Dinosaurs* is full of interesting information and very nice color illustrations. Unfortunately, many of the "pop-up" skeletons seem to get in the way of the text rather than enhance it. The exceptions to this are the "pop-out" skeletons used to illustrate the descriptions of four types of reptiles, and the archaeopteryx that leaps off the page to greet the reader.

A most enchanting pop-up book is *Our Changing World*, written by Ingrid Selberg and illustrated by Andrew Miller (Philomel). It's better described not as a pop-up book but as a "revolving picture book" that dramatically demonstrates how changes in season and time of day can affect the environment. Selberg highlights six different ecosystems: the woodlands, mountains, seashore, lakes and marshes, desert, and arctic tundra. With a tug of the ribbon tab, each circular picture is transformed—some from winter to summer, others from day to night, low tide to high tide. We see, for example, the difference between the daytime desert and the nighttime desert; we learn which animals can endure the heat of the day and which prefer the cool of the evening to hunt for food. Andrew Miller has done an excellent job illustrating this unique book—his pictures of animals in their natural habitats are sharp and very pleasant to look at. To help children identify the more obscure animals, Miller provides a key to each picture on the opposite page for easy reference. This book is definitely a must for every elementary-school child's library. □

*Linda Sparrowe teaches jazz dance and ballet to preschool and elementary-school children in the San Francisco Bay Area.*

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## SEASONS &amp; THE SUN

L. A. P. MOORE

WE ALL KNOW that spring weather is different from winter weather, and that some days and nights are longer than others. This is because the Sun is closer to the Earth at certain times of the year. Here are some facts about the way the Sun affects the seasons of the Earth's year.

## THE SUN IS A STAR.

Our sun *is* a star, and a fairly average one at that. If you made a list of all the stars according to their size, color, and stage of life, our sun would be near the middle. Although our sun is very important to us, it is only one of some 400 billion or so stars that make up our Milky Way galaxy. In the observable universe, there are billions of stars for every human who has ever lived.

If Earth were much closer to the Sun, our oceans would boil; if it were much farther away, they would freeze. Earth is the third of **nine known planets** orbiting the Sun: They are (in order) **Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune, and Pluto**. Everything that orbits our sun, including the Earth, is part of the *solar* system; the energy we receive from our star is *solar* energy. (The first part of the word *solar*—the short word *sol*—is Latin for sun.) With a few rare exceptions deep beneath the ocean, all life on Earth gets its energy from star power.

## LIGHT FROM THE SUN TAKES MORE THAN EIGHT MINUTES TO REACH EARTH.

Because the Earth's distance from the Sun varies during the year (from 91,445,000 to 94,555,000 miles), we say that its "mean" or average distance is 92,870,000 miles. (The "mean" is always the middle point between two extremes.) Because we know the speed of light to be 186,282 miles per second, we can figure out that light from the Sun takes slightly more than eight minutes to reach us on the Earth.

## EARTH IS NEAREST THE SUN IN JANUARY, AND FARTHEST FROM IT IN JULY.

It would seem to make sense that it would be hottest when the Earth is nearest to the Sun—until you think about the distances involved. One and a half million miles either way makes very little difference when the mean distance is 93 million miles. The Earth is closest to the Sun during the northern hemisphere's winter, in January, and farthest from it in July.

## IT IS LONGER FROM SPRING TO AUTUMN THAN IT IS FROM AUTUMN TO SPRING.

The seasons are not of equal length, because the Earth's orbit is not circular, but elliptical (the form of a slightly squashed circle). When the Earth is closest to the Sun it moves faster than its average speed, and when it is farthest from the Sun it moves slower than its average speed. In one recent year, winter lasted 89 days, 0 hours, 7 minutes; spring lasted 92 days, 18 hours, 42 minutes; summer lasted 93 days, 15 hours, 20 minutes; and autumn lasted 89 days, 19 hours, 46 minutes.



JANUARY 91,445,000 MILES

The Earth's elliptical orbit takes it closest to the Sun in January during the Northern Hemisphere's winter, and farthest from it in July.

MIDWINTER IN THE NORTHERN HEMISPHERE IS  
MIDSUMMER IN THE SOUTHERN HEMISPHERE.

At the summer solstice, the Northern Hemisphere is tilted 23.5 degrees *toward* the Sun, so we have our longest day and our shortest night at that time. At the winter solstice, the Northern Hemisphere is tilted 23.5 degrees *away* from the Sun, so we have our shortest day and our longest night then. When the Northern Hemisphere is tilted *toward* the Sun, the Southern Hemisphere is tilted *away* from it, so the seasons are exactly the opposite.

At both of the equinoxes (spring and autumn) the Earth's axis is tilted neither toward nor away from the Sun, so day and night are of equal length—in both hemispheres.

ONLY BETWEEN THE TROPIC OF  
CANCER AND THE TROPIC OF  
CAPRICORN CAN THE SUN BE  
DIRECTLY OVERHEAD.

At winter solstice, when the Northern Hemisphere is pointed as far away from the Sun as it ever gets, the Sun's rays cannot reach beyond a line 23.5 degrees south of the North Pole. This line is called the Arctic Circle. (See the drawing directly above.) The circle in the Southern Hemisphere beyond which the Sun's rays cannot reach at summer solstice is called the Antarctic Circle.

At both the spring and autumn equinoxes the Sun is directly over the equator. During the course of the year, the Sun can never be directly overhead any farther north than 23.5 degrees north of the equator. This line is called the Tropic of Cancer. The line at 23.5 degrees south of the equator is called the Tropic of Capricorn. The area between these two lines is called the tropical zone.

North of the tropical zone, between the Tropic of Cancer and the Arctic Circle, is the North Temperate Zone. South of the tropical zone, between the Tropic of Capricorn and the Antarctic Circle, is the South Temperate Zone. In these zones the Sun can never be directly overhead, but it will rise and set every day. North of the Arctic Circle and south of the Antarctic Circle, there will be days when the Sun never rises, and days when the Sun never sets. The closer you get to the poles, the longer these periods will be.

You've always known that there are seasons, and now you know why. When you hear people say, "This is the first day of winter" (or of spring, summer, or autumn), you'll know they mean it's the day of an equinox or a solstice. To find out exactly when these will occur in 1985 (they change from year to year), look in an almanac or ask at your library. □

SUMMER DAYS ARE  
LONGER THAN WINTER DAYS.

While rotating on its axis (a line through the planet from the North Pole to the South Pole), the Earth also revolves around the Sun once a year, chugging along at 18.5 miles per second. Earth is a chubby 24,903 miles around at the equator, and weighs in at a hefty 6,588,000,000,000,000,000 (6.588 sextillion) tons. If the Earth's axis were always straight-up-and-down while it revolved around the Sun, days and nights would be of equal length year-round. The reason that summer days are longer than average, while winter days are shorter, is that the Earth's axis is tilted 23.5 degrees.

If you were to mark where the Sun rose every morning, starting with the winter *solstice* (when winter officially begins, about December 22), you would notice that it was a little farther north each day, and that every day was a little longer. When spring *equinox* arrived (about March 21), the Sun would still be heading north, but night and day would be exactly equal in length.

At summer solstice (about June 21) the Sun would stop moving north and begin its trip back south.



JULY 94,555,000 MILES

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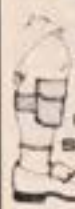
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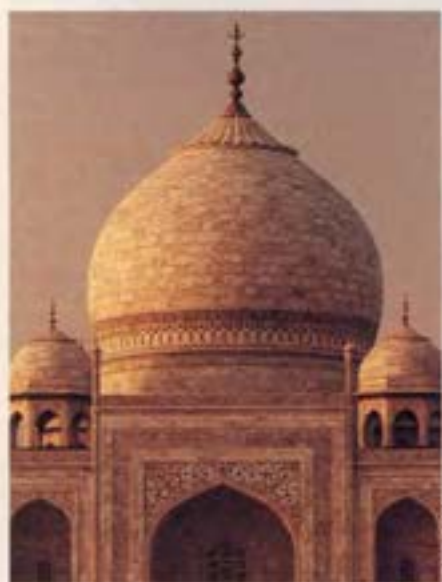
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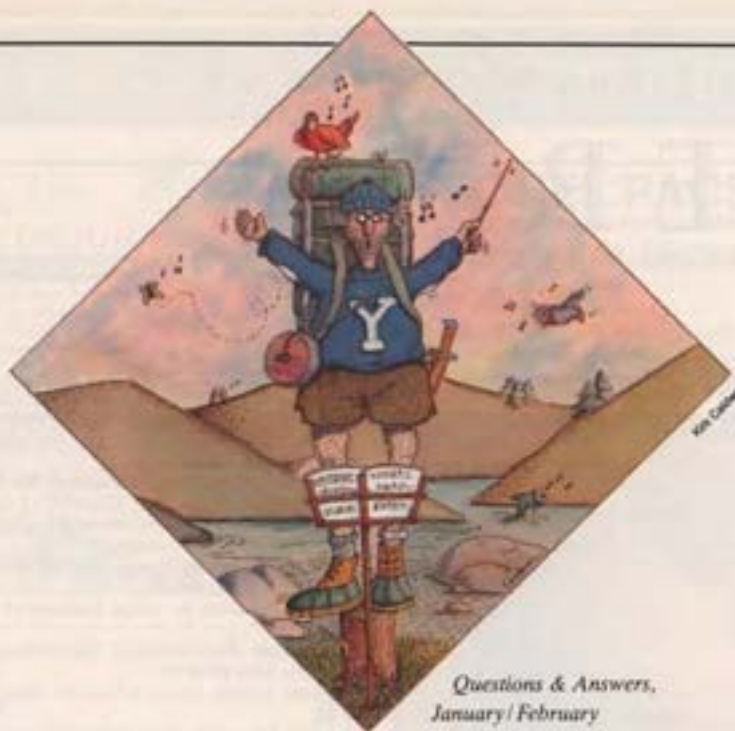
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## QUESTIONS ? ANSWERS

**Q** A dip in a hot spring sounds as if it would be very enjoyable during a cross-country skiing trip—but can my body take the temperature fluctuations? (JOANNE MENDEL, BERKELEY, CALIF.)

**A** According to Dr. Edward Geehr, coeditor of *Management of Wilderness and Environmental Emergencies* (Macmillan), there is nothing harmful about this practice. "The microclimate of the body would already be at higher-than-normal temperature levels due to the strenuous nature of cross-country skiing," says Geehr, "and movement from cold to hot is actually easier on the system than jumping from hot to cold. However, one would be advised to follow the normal safety precautions."

First and foremost among these would be the "look before you leap" rule. Avoid jumping directly into a hot spring, opting instead for the spot where runoff from the spring mixes with cold stream or river water. While some hot springs are within the comfort range of 100 to 110 degrees Fahrenheit, many reach the 200-degree range—and all are subject to periodic temperature fluctuations.

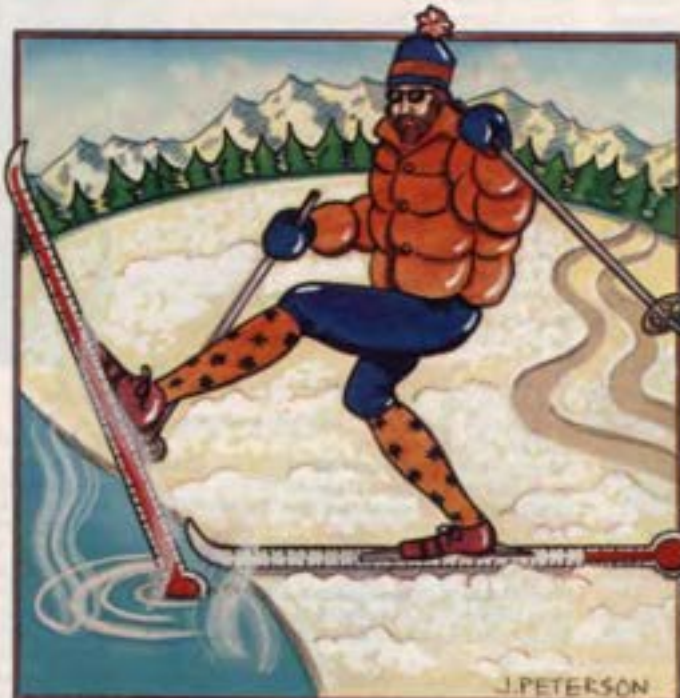
Limit your stay to about 15 minutes, and never indulge for more than 30 minutes per exposure. Avoid drinking alcoholic beverages—the heat and alcohol don't mix. And be sure to dry off completely upon completion of your dip.

If you are able to set a land speed record for dressing in the cold, you will top off a pleasant, relaxing—and safe—respite from the rigors of your trip.

**Q:** We all know about Ronald Reagan's environmental policies, but what about other recent Presidents? Did any of them receive favorable ratings for their environmental policies? (BILL BENNETT, AUSTIN, TEXAS)

**A:** The League of Conservation Voters (LCV), founded in 1969, provides a rating of Presidents and candidates based on their records in a variety of areas—including environmental policies, energy, land use, nuclear arms, toxic substances, clean water, and clean air/acid rain.

Sierra encourages its readers to take this opportunity to learn more about the Sierra Club and its activities. If you have a question you'd like answered, send it along with your chapter affiliation and address to *Sierra Q & A*, 530 Bush St., San Francisco, CA 94108. We will respond to as many questions as space allows.



Richard Nixon, the first President to be rated, was termed "opportunistic." The LCV stated that "as the first President forced to deal with the environment as a potent political issue, he was credited with many major initiatives; but his commitment lessened as of mid-1971, and little of a substantive nature was accomplished thereafter."

Gerald Ford, labeled "hopeless," received a report card of F-minus to D-plus. Jimmy Carter, who earned high marks during his tenure as governor of Georgia, fell to a C average in the Oval Office. According to the LCV, Carter's administration was characterized by "many good appointments and enlightened policies, but spotty implementation."

And just for the record, President Reagan has earned an F-minus to D-plus for his environmental record during his term in office.

**Q:** Is there a publication that lists the quality levels of drinking-water supplies for our metropolitan areas? (BRUCE CONTENT, SEATTLE, WASH.)

**A:** The Safe Drinking Water Act of 1974 directed the Environmental Protection Agency to set minimum national standards

for pollutants in drinking water that may have an adverse effect on health. Some of these contaminants are bacteria, inorganic elements, nitrates, pesticides, and turbidity. While the EPA does not provide a listing of water quality for metropolitan areas, it does maintain records of those systems that are or have been in violation of the national standards. You can contact one of the ten regional EPA centers for this information. For general information on the subject, write to the EPA's Office of Drinking Water, Washington, DC 20460.

Because there is no national water-quality publication, your best bet would be to contact the water-quality divisions of the specific water districts you are interested in. Most of them keep a record of the current quality analysis of the local natural libation.

**Q:** Can I phone the National Park Service for current information on winter park conditions and available services? (LOUISE KAPFHAMMER, LOUISVILLE, KY.)

**A:** You can call one of the six regional offices of the NPS for current road and weather conditions for major parks within the region you've called. If your destination is a remote or obscure locale, your friendly Park Service employee will either provide the appropriate telephone number or search for the information and return your call within 30 minutes.

The regional NPS offices and telephone numbers are: Gateway (Northeast)—(718) 338-3688; Southeast—(404) 221-5187; Rocky Mountain—(303) 234-3095 or 3857; Western—(415) 556-4122 or 6030; Pacific Northwest—(206) 442-0170; and Alaska—(907) 271-4243.

**Q:** Which designation came first: national park or national monument? (DENNIS RENFROE, TAVERNIER, FLA.)

**A:** The national-park designation came first. Yellowstone National Park—the largest in the lower 48 states—was established on March 1, 1872. Devils Tower (Wyoming) was named the first national monument by presidential proclamation on September 24, 1906.

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