

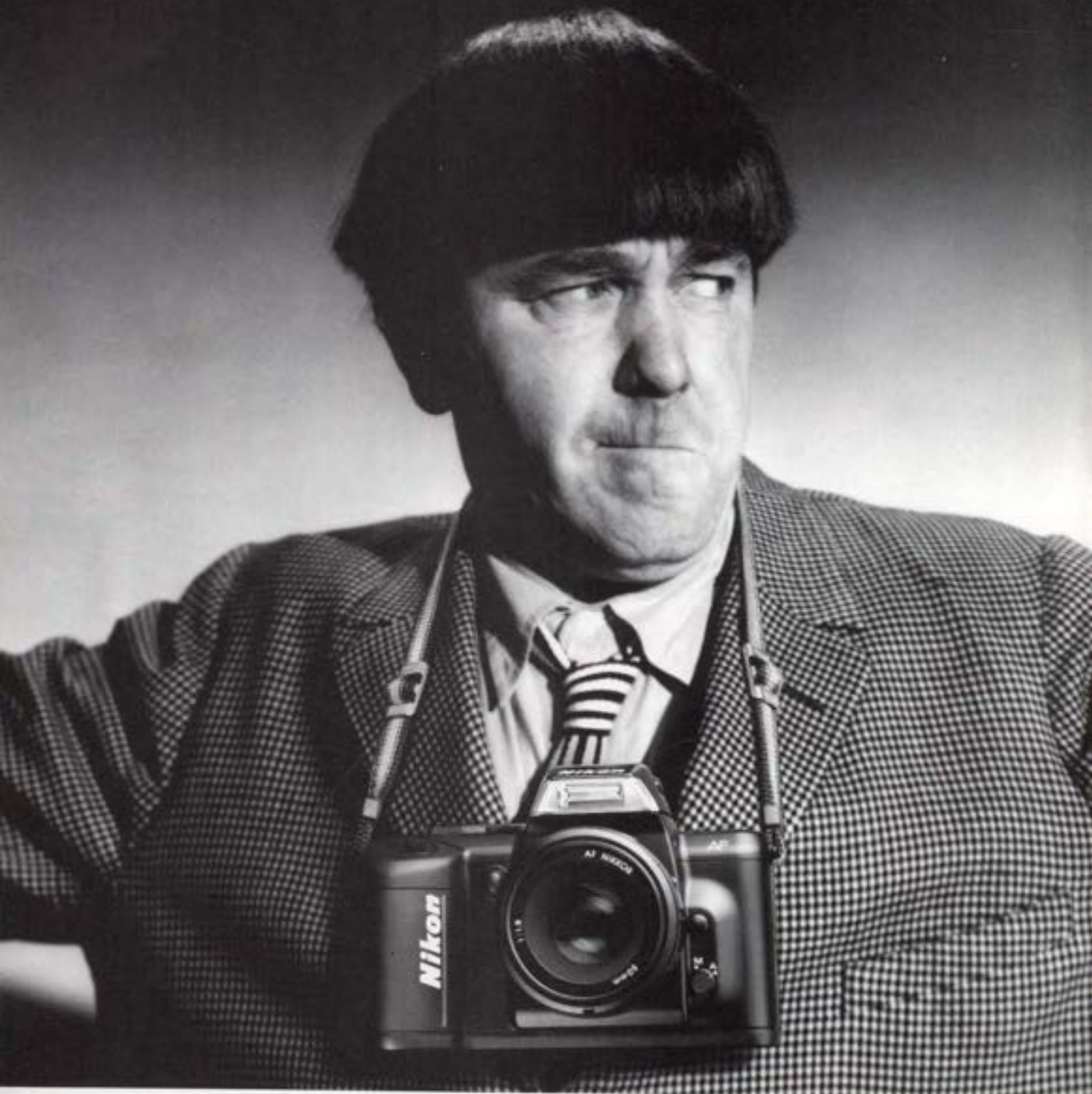
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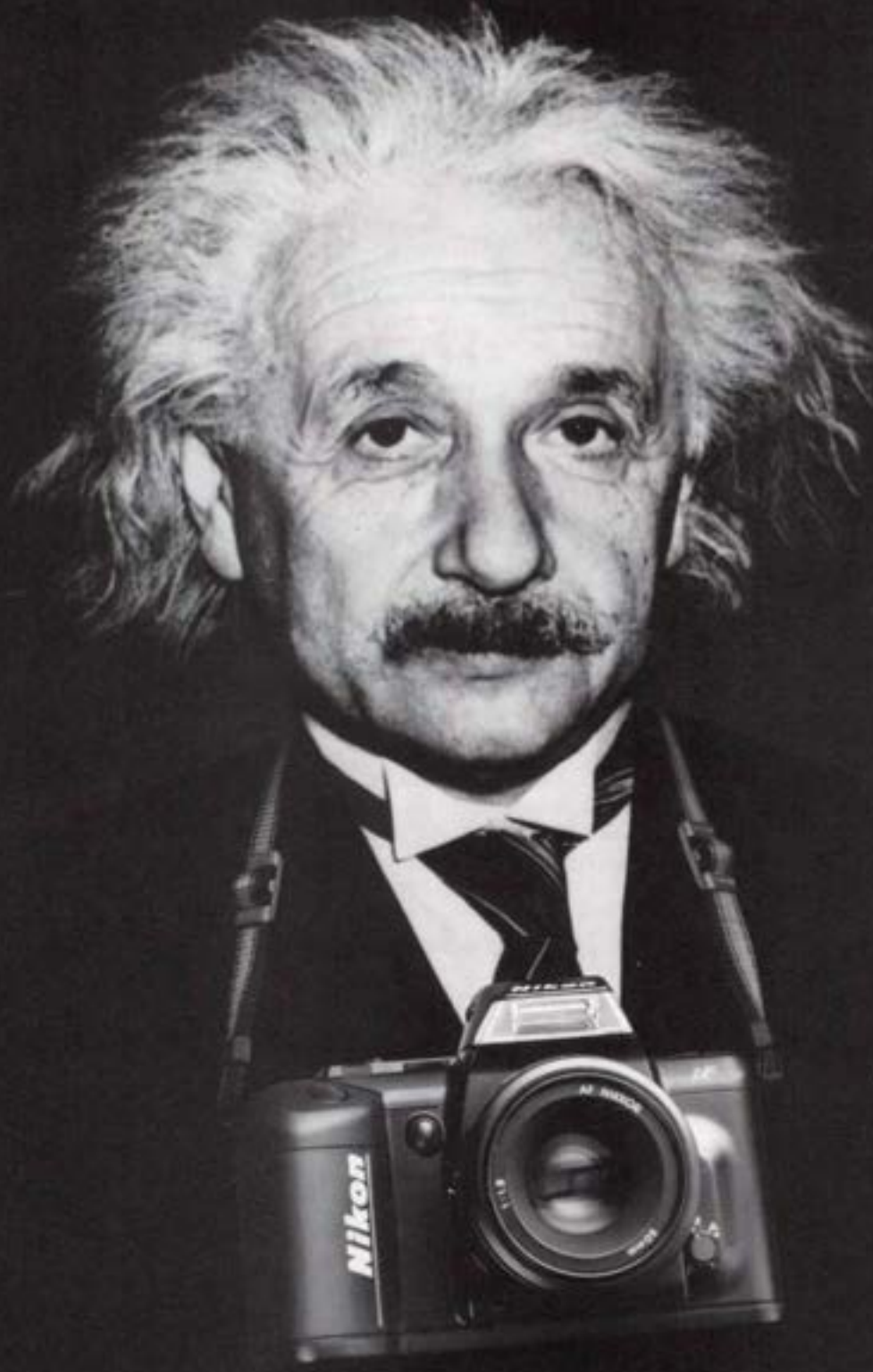
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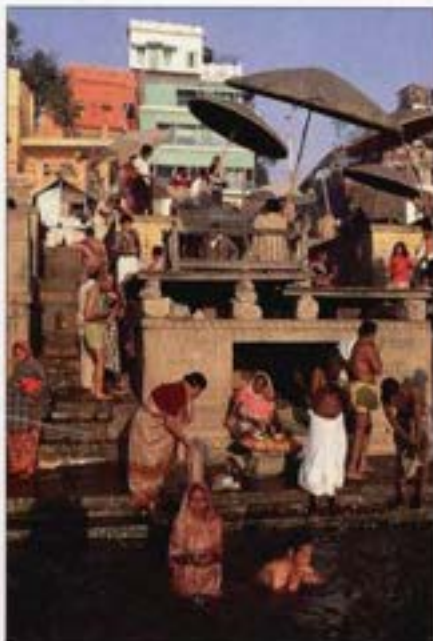
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COVER: A springtime scene in the Tehachapi Mountains, at the southern end of California's Great Central Valley. For more on the state's heartland, see page 58.

Photo by Carr Clifton.

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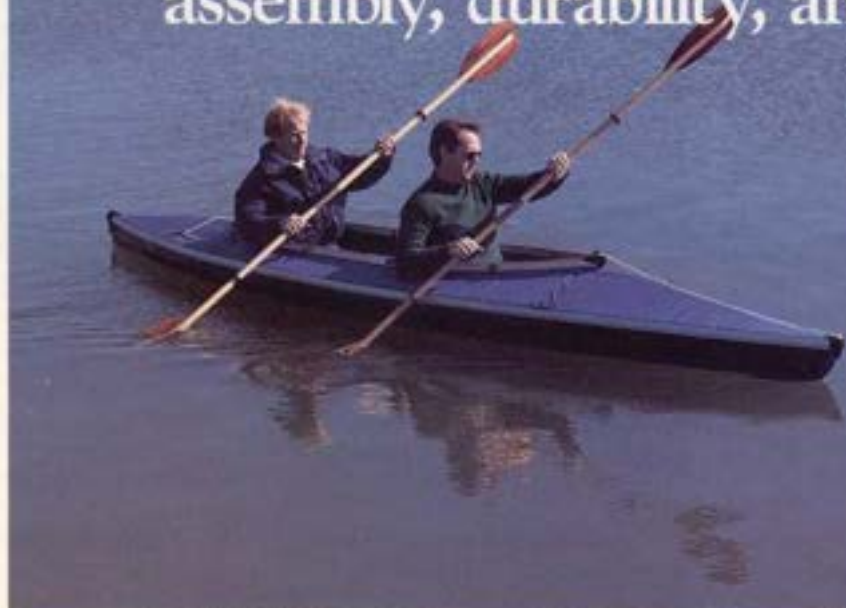


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LETTERS

SHADES OF SLICKROCK

I read James R. Udall's article about Utah's unprotected wilderness lands ("The Slickrock Crusade," March/April) with great interest. Utah is incomparable, a treasure of a state, and must stay that way for future generations to enjoy. There are cities of rock formations shaped like pagan temples or cathedrals, and beautiful colors in different hues and shades. Environmental groups are doing a great job by not allowing the Bureau of Land Management and big business to decimate all of this. Keep up the good work!

Josephine Briggs
Arlington, Texas

HETCH HETCHY, CONTINUED

Joyce Thompson's letter in your March/April issue, largely opposing the Hetch Hetchy Valley restoration project proposed by Interior Secretary Donald Hodel, suggests some well-intentioned but misguided priorities.

First, the expense of the feasibility study for valley restoration shouldn't be a consideration; compared with overpriced or foolish federal expenditures like stealth bombers or tobacco subsidies, the study's cost is less than a drop in the bucket.

Second, some elements of the current valley ecosystem (like fish) will surely suffer if the reservoir is drained, but it's very doubtful that endangered species will be affected thereby.

Third, the diversion of funds (for the restoration itself) from "more immediate concerns" is a common theme used against any relatively expensive project. The question shouldn't be "Can the money be better spent?" (Of course it can.) Rather, "Will the money be better spent?" (Probably not.)

Fourth, toxic waste, water quality, and the like are important—urgently so—but we needn't give them our complete attention. Most environmentalists can walk and chew gum at the same time. Even if they can't, some can walk and others can chew gum.

John B. Fieser
Burke, Virginia

A PATRIARCHAL CRISIS?

In response to Judith Kunofsky's extremely polite review of Ben Wattenberg's book *The Birth Dearth* (January/February), I can do no better than to quote from Scott Malcomson's *Village Voice* review of the same book:

"Wattenberg's book has been reviewed by virtually every print medium in the U.S. instead of dying quietly like most crackpot tomes. Why does this man get so much attention? He resides in that strange, quasi-intellectual world of conservative think tanks; he likes to quote Herman Kahn, the corpulent lunatic who, from his bunker at the Hudson Institute, used to issue papers on plausible scenarios for nuclear war. Indeed, the crux of Ben's economic analysis is Kahn's insight that 'the best thing for poor people is rich people, since the rich can afford to buy what the poor produce': especially babies. This book is a sloppy polemic based on an elite fear of a crisis to patriarchy."

In my personal words, as director of the Los Angeles chapter of Zero Population Growth, your review was much too kind!

Elaine Stansfield
Los Angeles, California

CHLORDANE CONTRETEMPS

"EPA Wavers Again on Chlordane" (January/February) by Josh Getlin, a reporter for the *Los Angeles Times*, presents a terrifying account of carcinogenic and other effects of chlordane as used in household termite control. Getlin states that chlordane "may be responsible for birth defects, leukemia, brain cancer, and lung disorders in humans."

I know of no evidence for these serious charges. Would it not have been good journalism (as well as fair play) to have presented both sides of the question? My information is that no health abnormalities or lowered life expectancy were found in Velsicol employees who have manufactured and packaged chlordane for years. A University of Wisconsin epidemiologist collaborated in this study. Presumably, the employees were potentially exposed to chlordane at far

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higher levels than would be encountered in homes where chlordane is used for termite control. The OSHA maximum level for industrial exposure is 500 micrograms per cubic meter of air as compared with 1 microgram for homes.

Getlin says "the chemical causes cancer in laboratory animals." As far as I am aware, this refers to mice. Professor Bruce Ames has noted that mouse tests are discordant even for rats, and "quantitative extrapolation from rodents to humans, particularly at low doses, is guesswork that we have no way of validating." The EPA "test results" quoted by Getlin are based on extrapolations from mouse tests. The tests were reviewed by a committee of the National Academy of Sciences, which concluded that there was marginal evidence of adenoma, and that chlordane was not tumorigenic in rats. The EPA did not refer to these reviews, nor to similar evaluation by the International Agency for Research in Cancer.

Rachel Carson's prediction, made 25 years ago and quoted by Getlin, was that a gardener who used chlordane might

develop health problems "months or years later." The prediction has had ample time, but there is no evidence that it has been fulfilled.

Thomas H. Jukes
Department of Biophysics
and Medical Physics
University of California
Berkeley, California

Josh Getlin responds: I'm puzzled by Jukes' ardent defense of chlordane, because the scientific evidence about this pesticide is so clear. Let me respond to his points in order.

First, Jukes says he knows of "no evidence" proving chlordane's potential links to birth defects, leukemia, brain cancer, and lung disorders in humans. He might be interested in the following research:

- A 1985 case report by the National Institute of Occupational Safety and Health on spontaneous abortions potentially linked to chlordane.

- A 1983 study of Florida pest-control workers published in the *Journal of the National Cancer Institute*, relative to

stomach, brain, and lung cancer.

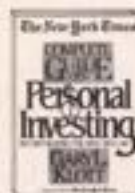
- A 1982 American Medical Association report on potential linkage between leukemia and exposure to the basic chemical component of chlordane.

- A 1978 report in the *Scandinavian Journal of Work Environment and Health* on blood disorders and childhood tumors potentially linked to chlordane.

Second, Jukes touts Velsicol reports in which researchers found a nonsignificant increase in lung cancer among company workers exposed to chlordane. There are major limitations in those studies, according to EPA officials and other scientists. The population studied was too small and, more important, the follow-up period too short to determine the carcinogenic risk from exposure, according to the EPA. Since cancer is an insidious disease that often takes years to develop, it would be nonsense to suggest that this study has somehow exonerated chlordane.

Third, it would be poor science (as well as dreadful public policy) to minimize the fact that chlordane causes cancer in mice. Since our society does not

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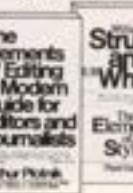
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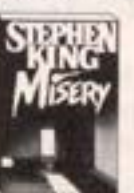
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perform cancer experiments on humans, such data—however open to interpretation—are invaluable in predicting the potential dangers of various substances. I would refer Jukes to a 1986 study by the International Agency for Research on Cancer that measured the impact of several known human carcinogens on lab animals. Researchers found an 85-percent concordance, and concluded that the figure would have been even higher if the quality of the tests on animals had been better.

In February, Washington, D.C., District Judge Louis Oberdorfer ruled that the EPA had until the end of April to ban all sales of chlordane. The judge, in an action brought by environmentalists, held that the agency had not provided him with full information about the number of people licensed to sell the pesticide, and said officials had not taken into account the health risks posed by its use. Even before that ruling the EPA had listed chlordane as a probable human carcinogen and had taken action, however sluggishly, against the product's use in the home.

As for Rachel Carson's prediction, Jukes overlooks the growing number of people who have complained about health problems linked to chlordane, ranging from nausea, dizziness, and headaches to cancer and blood disorders. A list of these cases is available from the Chlordane Clearinghouse (530 7th St., S.E., Washington, DC 20003), a group that monitors the problem nationwide. Several victims have sued Velsicol and pest-control firms, some settling their cases for considerable sums. Others are simply trying to overcome the long-term health effects of chlordane poisoning.

During a press conference last year, John Moore, the EPA's pesticide administrator, said that he "would probably be reluctant" to use chlordane in his own home, given the weight of the evidence against the pesticide. His comment speaks for itself, but it also raises a disturbing question, given the EPA's refusal to ban the pesticide outright: If Moore wouldn't want this product used in his home, why should less-sophisticated consumers remain at risk?

VIETNAMESE CONTACT

Your January/February "Afield" section stated that a 1986 meeting in the Catskills, "The International Conference on Ecology in Vietnam," was the first meeting on U.S. soil of Vietnamese and American scientists since the war between the two countries ended in 1975. While this meeting may have been the first major conference involving scientists from the two countries, it was not the first important scientific contact on American soil. In the summer of 1981, Vietnamese scientists came to our institute for a six-week workshop on multidisciplinary research in human ecology. Here they interacted not only with American scientists, but with scientists from other Southeast Asian countries. An important spinoff of this meeting was the subsequent establishment of a Southeast Asian Universities Agroecosystems Network, which continues to be very active.

Lawrence S. Hamilton
*Environment and Policy Institute
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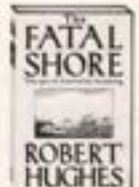
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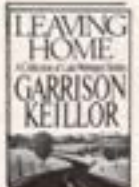
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WILSON SITTING ON THE DESERT FENCE

As spring life bloomed in the California desert this year, the desert's political life quickened in Washington, D.C.

The focus of the debate is the California Desert Protection Act, which would protect more than 3 million acres of federal lands as new national parks, and designate

another 4.5 million acres as wilderness. The Senate and House bills, S. 7 and H.R. 371, are being sponsored by California Democrats Sen. Alan Cranston and Rep. Mel Levine.

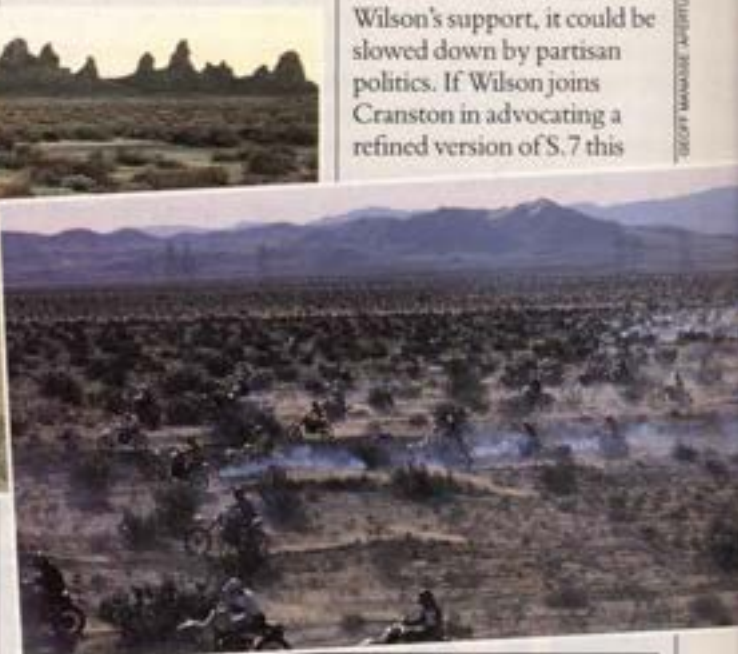
The Senate Committee on Energy and Natural Resources may vote on Cranston's bill in May or

June. Complicating the picture, however, is the position—or lack thereof—taken by California's junior senator, Pete Wilson (R).

Since the legislation's introduction in early 1986, Wilson has refrained from taking a stand, saying he needs more information. At a meeting in early March he told California Sierra Club

leaders that he was still undecided, and that he wants to help negotiate a compromise between conservationists and the bill's primary opponents, off-road-vehicle and mining groups.

Wilson's endorsement is considered critical to passage of the bill in Congress this year. If Cranston must carry the bill in the Senate without Wilson's support, it could be slowed down by partisan politics. If Wilson joins Cranston in advocating a refined version of S. 7 this



CREAM BEFORE SWINE

Two hundred fifty pigs in Stowe, Vermont, are in hog heaven: They have ice cream every day.

Ben & Jerry's Homemade, a manufacturer of chemical-free ice cream, became the pigs' benefactor after the aging sewage-treatment plant in nearby Waterbury showed signs of overload. "We decided to reduce the amount of milky wastes we put into the sewage system and invest in a hog farm," explains plant manager David Barash. The company put a

farmer in business by buying him 250 piglets and supplying him with enough milk solids to fatten the pigs for market. There was just one condition: The farmer had to name three of his pigs Ben, Jerry, and Ed Stanek. The latter is the head of Vermont's Environmental Commission and an enthusiastic supporter of the hog-farm method of waste disposal.

In honor of the pigs, Ben & Jerry's put out a special-edition T-shirt, changing its usual holstein cow and "Vermont's Finest" logo to a picture of a "holstein" pig and the words "Vermont's Swinest."

Despite their reputed appetite, pigs consume only 5 to 20 percent of the company's solid wastes. Farmers in Waterbury and Stowe are using another 10 to 15 percent as fertilizer, and the ice-cream makers are considering two other solutions: building a waste pretreatment plant on the premises, and financing the upgrade of Waterbury's sewage facility. In any case, Barash notes, the swinest will continue eating the finest.

—Marisa Gaines

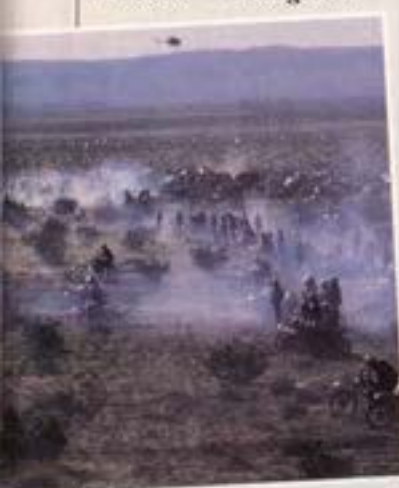


CHRISTINE ALONZO

DEEPTI MANOJAL/AP/WIDE WORLD PHOTOS

spring, however, the bill could move through the Senate quickly, leaving time for action in the House before Congress adjourns.

"We welcome improvements and adjustments in the bill where merited, as long as they do not lead to the elimination of worthy wilderness areas," says Sierra Club Vice-President Sally Reid. "But the desert wilds don't need Pete Wilson as a mediator. They need him as an advocate." —*Doug Scott*



CLUB DIPLOMACY AT WORK IN ASIA

Cheering and firecrackers heralded the first summit meeting of 1988, which took place not in Moscow or Washington, D.C., but on top of Mt. Wutong in the People's Republic of China. At 2 p.m. on January 1, 19 members of the Sierra Club, some 50 hikers from China's Shenzhen City, and more than 300 hikers from the Hong Kong Federation of Hiking Groups gathered on the mountain's peak for the first annual Mt. Wutong Friendship Summit Meeting. "Suspicion and fear would have made this im-

A RACE TO FILL THE OZONE HOLE

Even days after scientists reported in March that Earth's ozone layer is disappearing faster than they had expected, Du Pont Company announced its intention to phase out production of ozone-eating chlorofluorocarbons (CFCs). Shortly thereafter, Allied-Signal Inc., second only to Du Pont in U.S. CFC production, said it would accelerate the search for CFC substitutes.

Meanwhile, two CFC users have initiated research into alternatives on their own. In January, American Telephone & Telegraph Company announced a replacement for CFC-113, a solvent used to clean electronic components. Made from citrus-fruit rinds and other materials generally recognized as safe, BIOACT® EC-7 will not harm the ozone layer, say officials of Petroferm, Inc., the chemical company that helped develop the product. The substance could reduce AT&T's CFC-113 use by up to 30 percent within two years.

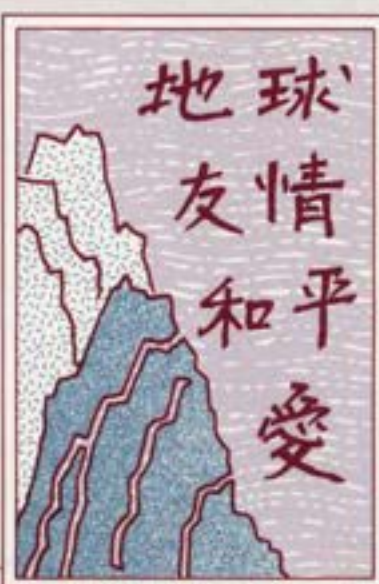
Last fall, Dolco Packaging Company began substituting a new product, Olefane, for the CFC-112 used in foam food-packaging. Developed in conjunction with Du Pont at Dolco's initiative, Olefane should completely replace CFC-112 at Dolco by late spring. —*Barbara Fuller*

possible 10 years ago," said an organizer of the Hong Kong group.

For the Sierra Club members the New Year's Day celebration was the culmination of the South China Hike, a Club outing that included treks in rural Hong Kong.

The Sierra Club hopes to make the tri-national summit meeting an annual event.

—*Phil Gowing and Therese Berreyesa*



IMMIGRANTS ON THE WING

California skies have been bereft of condors for more than a year, but if a U.S. Fish and Wildlife Service plan comes to fruition, that won't be the case much longer. The agency hopes to release 10 to 20 female Andean condors into the wilds of Southern California in late 1988 or early 1989.

The FWS considers the Andean condor an ideal surrogate to help its biologists refine the skills they will need to eventually return some of the 28 zoo-bound California condors to their native habitat.

Some environmentalists are not enthusiastic about the plan. "Andean condors in South America attack the rookeries of marine birds—something California condors do not do," says Mark

Palmer, chair of the Sierra Club's condor task force. Palmer fears that the imported condors, to be released in the Sespe Condor Sanctuary near the California coast, will prey on the eggs of two species of endangered birds that nest on Anacapa Island. But Oliver Pattee, project leader for the condor-release program says that any condors that stray that far would be removed from the study population.

Pattee also

dismisses the task force's concern that the time required to recapture the Andean condors would extend their two-year stay, lengthening the time the California condors would have to remain in zoos.

Pattee explains that the limitations enforced during capture of the California condors would not apply for the Andean birds.

—Mark Mardon



SCORECARD

- On March 14 the Senate unanimously ratified an international treaty to freeze and then reduce the consumption of chlorofluorocarbons (CFCs). The treaty is generally regarded as a mere first step toward protecting Earth's stratospheric ozone layer.
- A federal judge has ruled that Occidental Chemical is responsible for the \$250-million cleanup of toxic wastes at Love Canal.



LIVING AND DYING WITH GANGA MA

In Paris it's the Eiffel Tower; in London, Big Ben. But in Varanasi, the Hindu heartland of northeastern India, the top tourist draw has always been cremation.

To be cremated at one of Varanasi's two "burning ghats" on the banks of the Ganges ensures salvation: More than 30,000 people come here to die and then be

says, endangering the very life of the river.

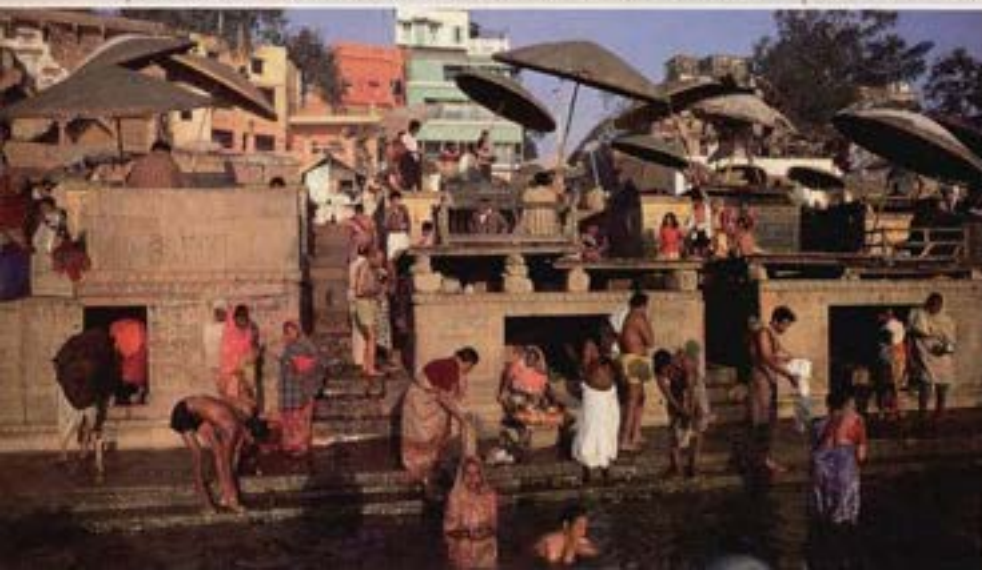
Under a government plan, therefore, approximately 50 million rupees (about \$3.8 million) are being spent to build electric crematoria at several locations, including Varanasi, along the 2,525-kilometer river. Officials say the alternative devices are more hygienic and less expensive than wood-burning pyres.

Hindu purists, however, argue that putting an end to traditional cremations could violate the religious rights of the country's Hindu community. Others insist that the Ganges, known as Ganga Ma (Mother Ganges), is holy and does not need to be cleaned.

But the strongest opposition to the government's electrification scheme has come from the low-caste "doms" who have supervised cremations in India for centuries. Their current boss, or "dom raja," Kailash Chaudhary, who lives in a lavish multistory mansion overlooking the river, is said to have made millions from Varanasi's burning business.

The government, meanwhile, has decided to press ahead. Work has begun on one electric crematorium at the Harishchandra Ghat, and four more are planned for other sites along the city's river bank. Officials dismiss religious opposition to the plan as groundless. "We're not changing the river," says Bagchi. "We're only restoring the quality of the water—and making it better for everyone alive."

—Gary Yerkey



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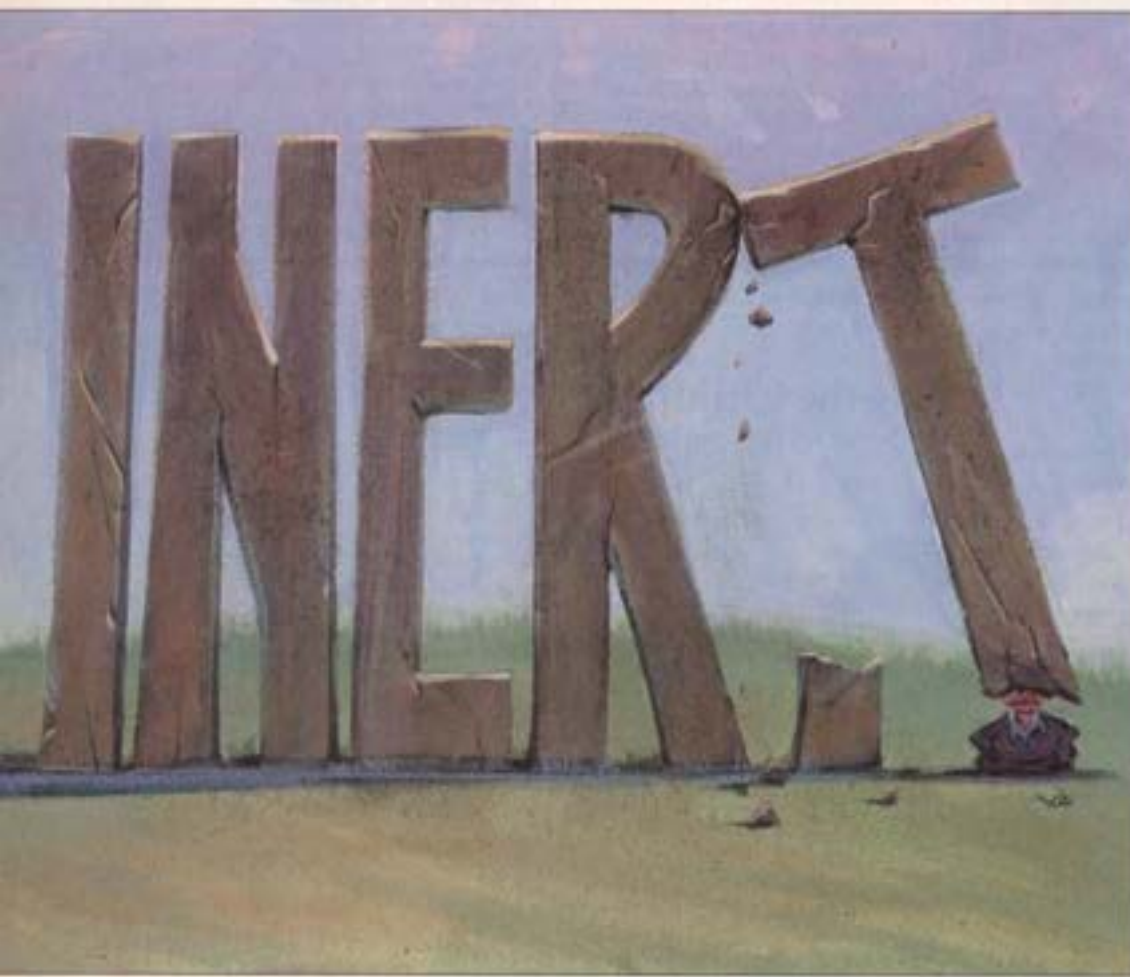
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Pesticides and Secret Agents

You can't always judge a pesticide by its label: "Inert ingredients" in some commonly used compounds are anything but passive.



WILLIAM CONE

painful peeling blisters, when a new inert ingredient—polyvinyl acetate, a glue—was added to the mite killer used on citrus fruit they were picking.

■ A pregnant San Francisco bus driver became acutely ill one morning in 1984 after she entered a bus that had been sprayed the previous night with the insecticide Safrotin. A review by the state health department found that a glycol ether—an "inert" ingredient in Safrotin—caused her illness.

Of the 1,200 substances known by the Environmental Protection Agency to be used as "inerts," many are anything but. The EPA considers only 300 of those inerts safe, while more than 100 others are considered to be of "toxicological concern" or "potentially toxic." The hazards of the vast majority, some 800, are simply unknown.

Methylene chloride, the inert chemical that killed Michael London, is the active ingredient in many paint strippers and is also used in some spray paints and shoe polishes. According to the Consumer Product Safety Commission, it is not particularly potent when used outdoors. But

it can be deadly when used in an unventilated space.

The Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) defines inerts as inactive ingredients used primarily as diluents, dyes, solvents, or preservatives. The EPA, in interpreting FIFRA's provisions, allows pesticide manufacturers to designate which ingredients in their formulas "prevent, destroy, repel, or mitigate any pest." Anything not so designated is "inert." Thus

Jim Stiak

WHILE PARENTS and teachers have said it: You can't believe everything you read. It's certainly true with respect to the labels of bug sprays and weed killers, where bottom lines usually read something like this: "Inert ingredients . . . 99%."

While the bulk of a product's contents may not actively kill pests, inert ingredients can cause trouble for humans.

Consider, for example, the following:

■ Michael London, a 29-year-old pest-control worker in San Bernardino, California, died suddenly while spraying a pesticide in a poorly ventilated residential crawl space in June 1985. According to the coroner's report, methylene chloride—an "inert" ingredient in the pesticide London was using—caused his death.

■ In the spring of 1986, more than 100 farmworkers in California's Tulare County suffered burns, many with

an inert ingredient in one pesticide may be an active ingredient in another, depending on the manufacturer's claim for its pesticidal properties. So-called "inerts," such as pentachlorophenol and pyrethrins, can be as toxic as the active pest-killing agents themselves.

"It's not that inerts are biologically inactive," says EPA toxicologist Tina Levine. "It's that they are not the active ingredient in the formulation. Some people," she admits, "say we should change the name."

The Sierra Club, the National Coalition Against the Misuse of Pesticides (NCAMP), and other groups would like to see the regulatory definition of "inert" changed to "biologically inert." They are pressing for national legislation to prevent ingredients that are active in one formulation from being called "inert" in another.

As it stands now, a more accurate appellation for inerts, according to NCAMP, would be "secret" ingredients. Their makeup in a pesticide is a trade secret—proprietary information protected by law. The manufacturers themselves may not even know what inerts were used, since they often purchase them from other companies that also conceal the substances' chemistries. Such secrecy can cause problems for medical personnel treating poisoning victims. "Most of the time we can get such information," says Tom Kearney, director of Philadelphia's Delaware Valley Poison Control Center, "but it's not universal."

"Trying to pry trade secrets out of these companies is harder than pulling teeth on a water buffalo," says Gordon Edwards, a toxicologist in Natick, Massachusetts, who has explored this area for years. "Any pesticide formulation may contain dozens of inert substances. Sometimes the same ingredient may have three or four brand names, each designed for a different market."

"All of our inerts are safe," says Fred Obenchain, director of research at Reuter Labs, which manufactures several biological pesticide products. "But when you come to the point of formulating a product, you've got to pay an expert to give you advice on what to put in it, and you tend not to want to give that information to any of your competitors."

Inerts are used in pesticides for a variety of purposes. Some are added to prevent leaf burn, as in the Tulare County citrus grove. Others are "stickers" that enable a spray to cling to vegetation—and to human skin, which is one reason dermatitis ranks as the top health hazard in agriculture. "Petroleum distillates, things that are hydrocarbon-based, stay on the skin longer," says Dr. Marion Moses, a medical consultant to the United Farm Workers, "just like they stay on the plant longer."

Petroleum distillates, says the EPA,

are used as solvents in 10 to 20 percent of all pesticides. Although chemical compositions vary, these substances have one thing in common: their potential toxicity. Kearney believes they cause many of the poisonings reported to his center. When inhaled they can create respiratory ailments. Combining them with active ingredients can multiply their toxicity. For example, says Moses, the active ingredient in the insecticide malathion penetrates skin faster if mixed with xylene, a petroleum distillate.

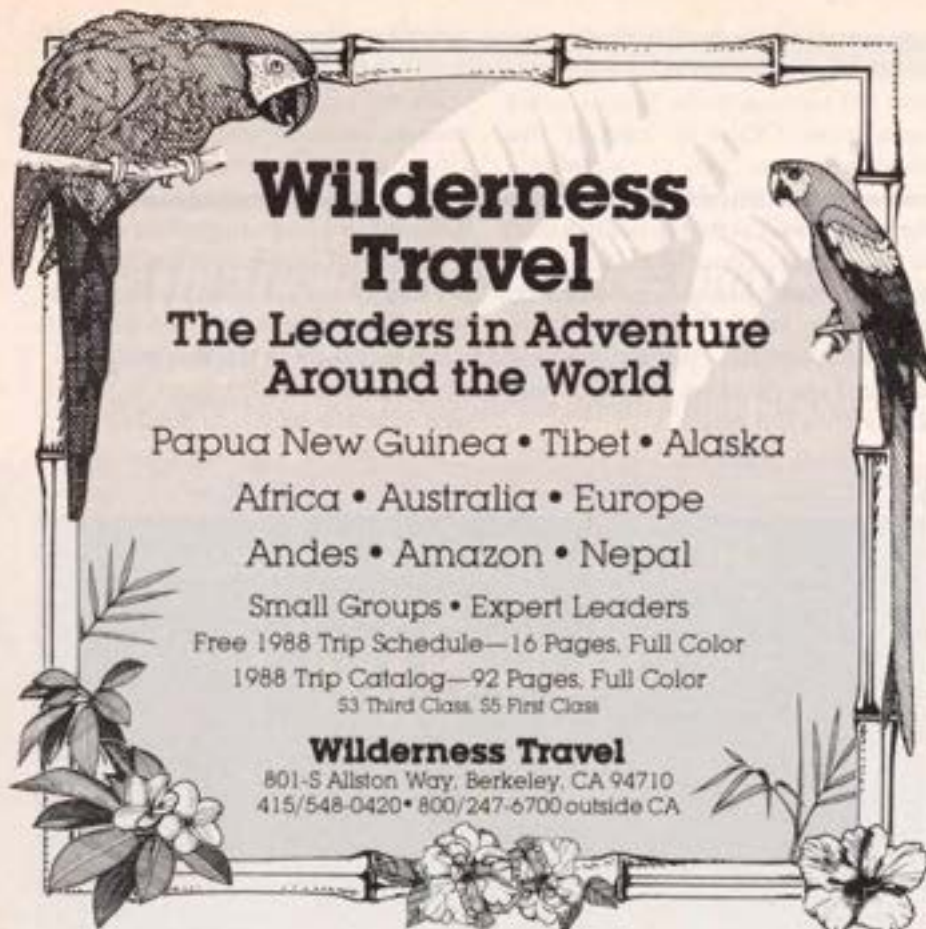
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the EPA last year by the Center for Science in the Public Interest and ten other parties, the neurotoxic effects of some solvents in pesticides are even more insidious: Carbon disulfide can induce psychosis; n-hexane can impair coordination; perchloroethylene, which is also used in dry cleaning, can cause short-term memory loss. The EPA now recognizes the hazards of these three and has set an October deadline for either removing them from product formulas or identifying them on labels.

Also sometimes mistakenly identified as inerts are contaminants resulting from imperfections in the manufacturing process or from the breakdown of active ingredients. The dioxin TCDD, found in hexachlorophene, is one. Another is DDT, a contaminant of dicofol, a pesticide ingredient used on citrus, tomatoes, and pears. High levels of DDT, which was banned in 1972, are appearing again in the Southwest, and the EPA suspects dicofol as the source.

Before 1961, inerts were unregulated. That year the Food and Drug Administration began requiring acute (short-term) toxicity tests on new inerts. The EPA assumed responsibility in 1970 and soon initiated longer-term, chronic testing, but it exempted 200 of the most common inerts. Even so, most new inerts were not tested, because the EPA considered them "generally recognized as safe" and therefore approved them simply upon written request.

Last year the EPA required that pesticide labels indicate the use of any inert on the agency's list of approximately 60 of "toxicological concern." Partly because of this, "a lot of chemical companies have switched to less toxic chemicals," says Kerry Leifer, a chemist in the EPA's registration division. "Obviously, we encourage them."

The EPA also tightened its testing requirements for inerts last year, although chemicals that are "closely similar to existing products" can still slip through the cracks. Critics charge that the tests will be invalid as long as they are performed only on selective inert ingredients. It would be simpler and more effective, they say, to test the entire product. Mary O'Brien, information director for the Northwest Coalition for Alternatives to Pesticides in Eugene, Oregon, says,

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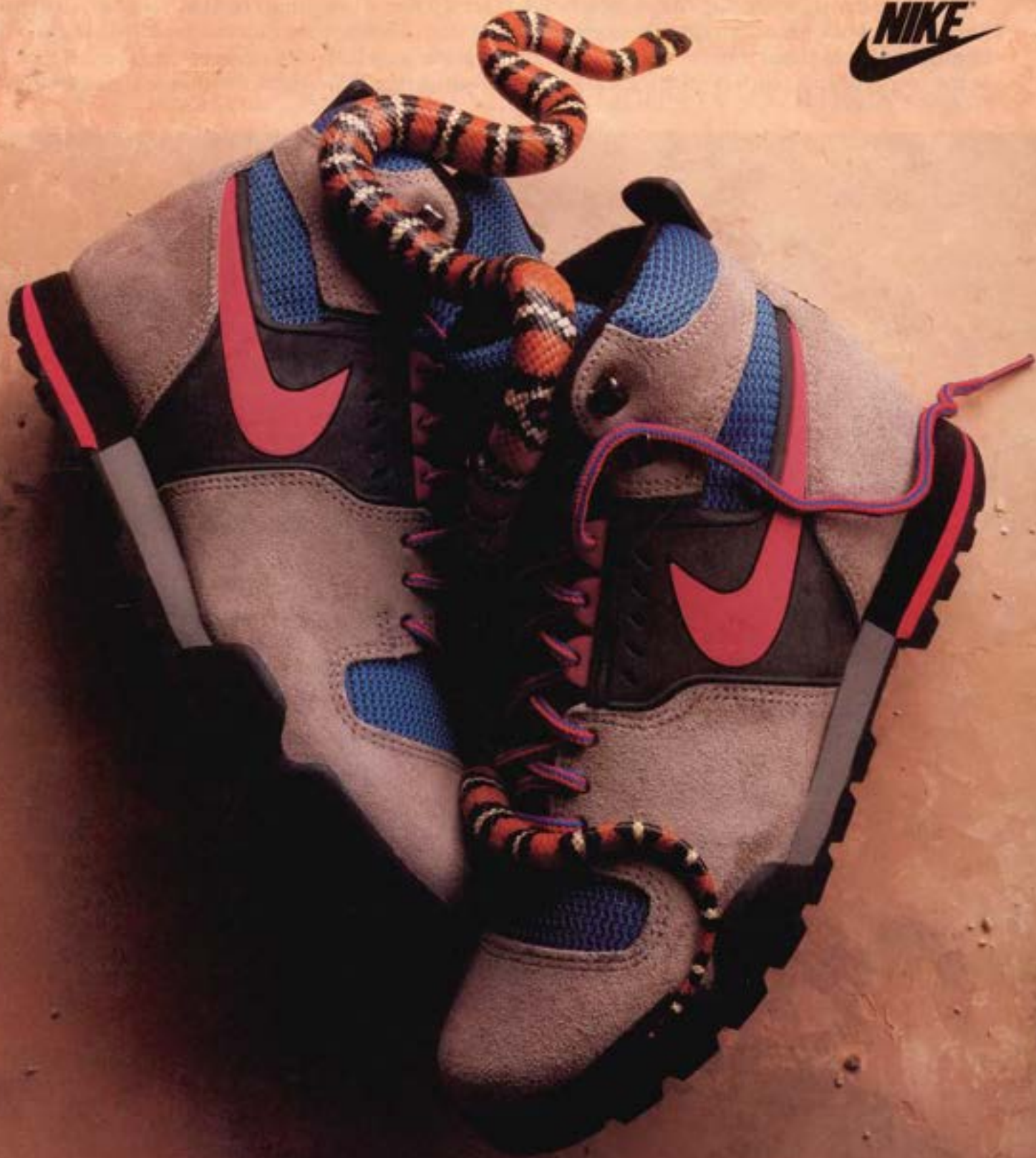


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"People cannot talk about the effects of a pesticide unless they're basing their conclusions on the testing of the full formulation, including active ingredients, intentionally added inert, and contaminants."

"It's kind of a two-edged sword," admits the EPA's Leifer. "Maybe by themselves [the inerts] are not toxic, but the mixture could be. But to take into account all the possible permutations is beyond the scope of our program."

"Probably the people most at risk are commercial applicators. Homeowners run a much smaller risk. But," he adds,

not too encouragingly, "these ingredients are usually long-term toxins."

The EPA now requires manufacturers to list petroleum distillates on their labels. Still, most of the secret ingredients, including the 800 with "unknown toxicity," are likely to remain secret. With limited staffing, the agency currently has no plans to test them.

Which brings us to another cliché, revised for modern readers: What you don't know *can* hurt you.

JIM STIAK, a freelancer in Eugene, Oregon, also writes for Environmental Action.

WILDLIFE

Dolphins Hit Rough Seas Again

Regulatory stalls and a growing foreign tuna fleet are making the Pacific unsafe for dolphins. Is U.S. help on the way?

John Godges

BOAT CAPTAINS intent on filling their holds with top-quality yellowfin tuna often depend on another ocean-going animal to lead them to their quarry: dolphins. Yellowfin and dolphins, for mysterious reasons, frequently swim together. Unfortunately, when fishing boats deploy and begin to tighten their mile-long mesh corrals, many of the dolphins are entangled and drowned.

Keeping dolphins out of U.S. tuna nets is something environmentalists and tuna-industry officials have fought about for decades. Now, despite U.S. laws designed to protect marine mammals, dolphins are facing the redoubled threat of a growing foreign tuna fleet that is poorly regulated by U.S. law and a Reagan administration that has failed to fully implement regulations for the domestic industry. As a result, while fewer and fewer dolphins died in tuna nets during the 1970s, the number is once again rising.

The technique of encircling dolphins in purse-seine tuna nets came into widespread use during the 1960s. Since then millions of dolphins have been killed in the eastern tropical Pacific, a 7-million-square-mile area that reaches from Southern California south to Chile and west to Samoa. In 1972 public outcry

brought passage of the Marine Mammal Protection Act, which mandated that commercial operators' marine mammal kills be "reduced to insignificant levels approaching zero."

To implement the law the National Marine Fisheries Service, a branch of the Department of Commerce, set yearly dolphin-mortality quotas that dropped rapidly from 78,000 in 1976 to 20,500 in 1981, when the Reagan administration extended the 20,500 quota indefinitely. The NMFS initially required fishing boats to follow specific procedures to decrease fatalities, but these requirements became mere guidelines in 1984.

Purse seining has devastated at least one species of dolphin, the eastern spinner. William Perrin, an NMFS scientist and chair of the Cetacean Specialist Group for the International Union for the Conservation of Nature and Natural Resources, says the eastern spinner population has declined by as much as 80 percent since purse seining began in the 1960s. The spinner population is now estimated at between 200,000 and 600,000.

During the year the Marine Mammal Protection Act became law, the United States was responsible for more than 85 percent of dolphin kills—or 368,600 of 423,678. Today the U.S. fleet is smaller and the foreign fleet much larger; for-

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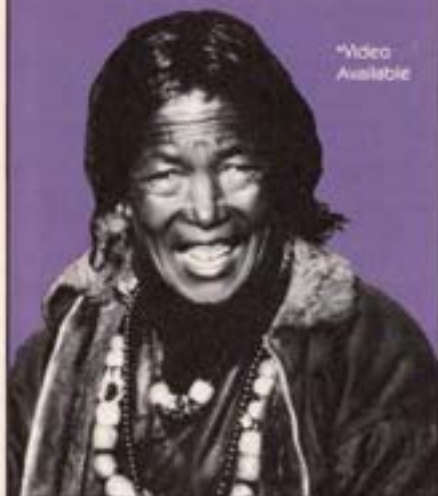
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Spotted dolphins like these often drown in nets intended to catch yellowfin tuna.

eign boats are now responsible for 80 percent of the killings. When the U.S. fleet exceeded its 20,500 quota in October 1986 and had to cease encircling dolphins, Mexico, Venezuela, and Ecuador killed a combined total of more than 100,000 dolphins.

In 1984, a provision added to the act required foreign companies exporting tuna to the United States to have kill quotas "comparable" to those in this country. Since the United States buys about half of all tuna caught by foreign boats, this provision could have had a major impact. But in March, when the NMFS finally released regulations, the agency defined "comparable" in a way that will minimize the provision's benefits: Foreign kills can be no more than either 25 or 75 percent higher than the U.S. fleet's, depending on fleet size and other factors. These quotas take effect in 1991. Until then exporting countries need only show decreasing fatalities.

Todd Steiner, research biologist for San Francisco-based Earth Island Institute's Dolphin Project, argues that "comparable" means the same, not higher or lower. But Dave Burney of the U.S. Tuna Foundation, an industry group, says foreign countries must be brought along slowly, "so we don't lose them. If they choose not to export their tuna to the United States, we lose a golden opportunity."

In January environmentalists took their message directly to the companies that import tuna. Earth Island Institute

staged a rally in St. Louis outside Ralston Purina's annual stockholders meeting. Ralston Purina, the parent company of Van Camp Seafood, is one of the two largest U.S. tuna companies. (The other is H. J. Heinz, parent company of Star-Kist and Bumblebee.)

All of Ralston Purina's tuna vessels operate in the western Pacific, where dolphins are not used to locate tuna, but in 1987 the company purchased about 27,000 tons—or 9 percent—of the 300,000 tons of yellowfin tuna caught in the eastern Pacific. Pat Farrell, Ralston Purina's manager of corporate information, would not reveal the company's total tuna take, but said "the overwhelming portion of our product is not from the eastern Pacific."

If true, argues David Phillips, Earth Island co-director, the company doesn't need to purchase any dolphin-tainted tuna. Farrell disagrees: "When we go to the eastern Pacific, it's because we can't meet our needs adequately elsewhere." The amount purchased from the eastern Pacific is "not small enough that we can drop it altogether."

Despite incomplete implementation of the Marine Mammal Protection Act, the U.S. fleet is killing fewer dolphins. In 1987, the first year in which NMFS observers were aboard nearly all boats in the U.S. fleet, the total U.S. kill dropped from 20,500 to 13,994. Industry officials point to this number as evidence of their good-faith efforts to save dolphins.

But environmentalists say the U.S. fleet may still significantly affect the dolphin population. Studies performed by the NMFS suggest that 99.5 percent of all dolphins encircled in U.S. nets are released. Earth Island points out that if 99.5 percent of the dolphins are released in a year when 20,500 are killed, then the U.S. fleet alone is capturing about 4 million dolphins that year. Scientists have not documented the effects of continual chase and capture, during which nursing young are separated from mothers, females often prematurely abort their pregnancies, and sharks attack exhausted dolphins.

This year the Marine Mammal Protection Act has come up for reauthorization in Congress. While environmentalists at the hearings are demanding a further reduction in the U.S. quota, leading to a total moratorium, the U.S. Tuna Foundation's Burney says, "We do not want to penalize the people who are making the effort out there. If we stay under 20,500, then everyone should be very happy."

The Cetacean Society, Earth Island Institute, Greenpeace, the Sierra Club,

the Whale Center, and other groups have pooled their resources as the Marine Mammal Protection Act Reauthorization Coalition to push for needed improvements in the law.

At the same time Earth Island is asking consumers to boycott tuna. If per-capita consumption declines one can per person, it will cost the companies \$90

million, says Phillips—a high price to pay for a fraction of their tuna supply.

"You talk to people, and they just love dolphins," says Steiner. "Once they find out dolphins are still dying, they'll demand action."

JOHN GODGES is a San Francisco-based editor and freelance writer.

RENEWABLE ENERGY

Solar Cells: Still a Tough Sell

Orphaned by the Reagan administration, the photovoltaics industry is struggling to move forward in an era of cheap oil.

Don Best

FLASH BACK FOR A MOMENT TO 1973. The Organization of Petroleum Exporting Countries, intent on boosting prices and winning political concessions, is choking off oil supplies to the West. Frustrated Americans queue up at gas pumps and worry about having enough fuel oil for the winter ahead.

While the nation scrambles for solu-

tions, photovoltaics emerges as one of the most promising developments on the grim energy scene. Almost overnight, photovoltaics is embraced by politicians and corporate planners, ballyhooed by the media, and burdened with impossible expectations.

Photovoltaic systems, which use semiconductor materials to convert sunlight directly to electrical current, were originally developed in the 1950s to

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provide power for spacecraft. By the year 2000, the pundits proclaimed, America would have 30,000 megawatts of clean, reliable, and inexpensive photovoltaic power in place, the equivalent of 27 Seabrook nuclear power plants.

With perfect hindsight, the industry's pioneers recognize that the technology was oversold. They still envision a day when panels of photovoltaic cells will be installed by the square mile, and they still believe that a \$100-billion industry is in the making. But now they know it won't happen overnight.

"The past two or three years have been tough," says James Caldwell, president of ARCO Solar, Inc., "but now the photovoltaics industry has learned how to keep its expectations in line—neither underselling nor overselling its potential. That's important because people get mad when expectations don't come true, and they begin to question the intrinsic worth of the technology."

It would be hard to imagine a business and political climate more hostile than the one the photovoltaics industry has endured in recent years. President Reagan, convinced that conservation and renewable energy were political concepts left over from the Carter years, refused even to consider them. His administration abandoned Carter's long-range, bipartisan energy plan, killed tax credits for renewable energy and conservation, and slashed solar research-and-development funding.

Ironically, conservation and renewable energy enabled the U.S. economy to grow by 35 percent from 1973 to 1986, while energy consumption remained constant. But now there is concern—even among staunch free-market advocates—that government funding levels for photovoltaic research are too low to keep the industry competitive. Meanwhile, Japan and West Germany, both with long-range energy policies, consistently fund basic research.

A hostile administration has not been solar power's only problem, however. The collapse in oil prices also stung the photovoltaics industry—not because of direct competition (only about 5 percent of America's electricity comes from oil-fired generators) but because of altered perceptions. As oil prices tumbled, the public's interest in renewables

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waned, political support wavered, and investment slowed. Furthermore, photovoltaics developers include large oil companies whose research funds rise and fall with oil revenues.

In 1985 and 1986 solar-cell production in the United States fell for the first time ever. It was a demoralizing setback for the nascent industry, which had grown accustomed to the idea of exponential growth. From 1980 through 1983, production had swelled by 224 percent—to 8.1 megawatts—but then, as though someone had suddenly turned off the spigot, the industry quit growing. Over the next three years U.S. sales slipped 6 percent, while Japan quietly took over as the world's largest solar-cell producer.

Bad as it was, however, the photovoltaics industry's fall pales compared with that of solar-thermal, wind, and other renewable-energy businesses that were more dependent on federal tax credits and less financially able to weather much of a storm. (See "Dark Days for Solar," July/August 1987.)

It is noteworthy that almost all of the important photovoltaic-cell producers are moving ahead. Andrew Krantz, the Department of Energy's photovoltaics branch chief, says technological advances have enabled the industry to keep its footing despite the slump. "We made as much progress in 1987 as we did any year in the last ten," he says. "Decision-makers sense there's an enormous payoff down the road."

Advances have been especially pronounced in thin-film technology, which may one day make mass-producing

sheets of photovoltaic material as common as spitting out newspapers on big-city presses. Concentrators, which focus an intense stream of sunlight on a relatively small area of photovoltaic material, have also improved dramatically.

Furthermore, prices have dropped. In the four years from 1984 to 1987 wholesale prices fell 29 percent—from an average of \$7 to \$5 per watt. Bulk purchasers—customers who buy 100 kilowatts or more—can get "modules" for \$4 or less per watt. (The components needed to build a complete system can double these prices.) While the industry's goal of 50 cents per watt—which would make photovoltaics competitive head-to-head with conventional power sources—is still a dream, new markets emerge with each price drop.

Ray Watts, a research engineer at Battelle Pacific Northwest Laboratory, says photovoltaics has become the system of choice where hookup to a utility grid is

impossible or prohibitively expensive. These uses include water pumping, microwave transmission, navigational aid, and village electrification.

"Two other factors are helping the photovoltaics industry," says Watts. "The first is the weaker dollar, which makes American-made photovoltaic systems more competitive in foreign markets. The second is that the industry doesn't have to spend so much time and money finding and educating its buyers—in other words, the good news about photovoltaics is finally getting around."

Other signs are increased interest from utilities and increased sales of photovoltaic-powered consumer items, such as yard lights and battery chargers. While consumer items do not contribute significantly to energy conservation, they do provide much-needed cash for research and development.

Despite the industry's political, economic, and technical challenges, photovoltaic optimists envision a bright future. "By the year 2000 we're going to see 100-megawatt or larger photovoltaic systems being used for utility peak power," says Steve Gifis, vice-president of Chronar Corporation. "We'd get there sooner if we had subsidies, but right now costs are dropping because of technological advances alone." Such optimism flows from the character of photovoltaics technology, which offers a set of virtues—cleanliness, simplicity, reliability, and renewability—that no other energy source can match.

DON BEST is a business, energy, and environmental writer based in Keene, New Hampshire.

TOXICS

Dangerous Dregs in the Deep

Insidious chemicals known as PAHs are gradually working their way out of aquatic sediments and into the food chain.

Michael Kantor

MORE THAN 20 YEARS AGO, the Surgeon General alerted Americans to the perils of cigarette smoking. One of the culprits in cigarettes is a class of potent carcinogens known as poly-

aromatic hydrocarbons (PAHs), by-products of burning organic material such as tobacco, oil, coal, and coke.

These chemicals enter waterways in municipal and industrial sewage and urban runoff, and as fallout from air pollution. The result: Alarming quantities of

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PAHs collect in sediments and in aquatic creatures. Yet no equivalent of the Surgeon General's warning alerts fish—or those who eat contaminated fish—to the danger.

"We're spewing hundreds of tons of PAHs into aquatic ecosystems every year," says biochemist Donald Malins of the Pacific Northwest Research Foundation in Seattle. Because the chemicals tend to bind to suspended particles that eventually sink to the bottom, PAHs concentrate in aquatic sediments. Tidal action and the location of drain pipes and other discharge points cause the contaminated particles to collect in "hot spots" near shore.

Creosote plants, coke ovens, coal gasification facilities, and some aluminum plants are heavy PAH producers. Sewage containing petroleum products, oil and gas leaked from boats, and fallout from automobile exhaust are also significant sources, particularly in urban areas.

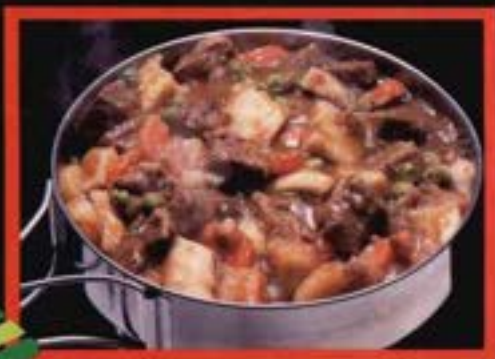
Scientists have long suspected the dangers of PAHs but have developed methods of analyzing them only in the last few years. The complex mixtures in PAHs make testing for them more difficult than testing for PCBs or metals. Some organisms metabolize PAHs rapidly, but the products of disintegration (metabolites) are also toxic.

Although contamination is most prevalent along the shorelines of urban and industrial areas, PAHs carried in the air have floated down almost everywhere. Diseased fish have turned up in Puget Sound, the Great Lakes, the Hudson River, Boston Harbor, and coastal areas of Los Angeles (where bottom sediments may be the most severely polluted in North America). Polyaromatic hydrocarbons have also been found in sediments in a Swedish fjord, in the brains of beluga whales from the St. Lawrence River, and in lobsters from Sydney, Nova Scotia.

In Puget Sound, sediments from some bays near industrial areas contain PAH concentrations at least 150 times higher than those of more pristine sites. In highly contaminated areas scientists are finding many diseased bottom-dwelling fish. In Eagle Harbor, west of Seattle, for example, one fourth of the English sole sampled were riddled with



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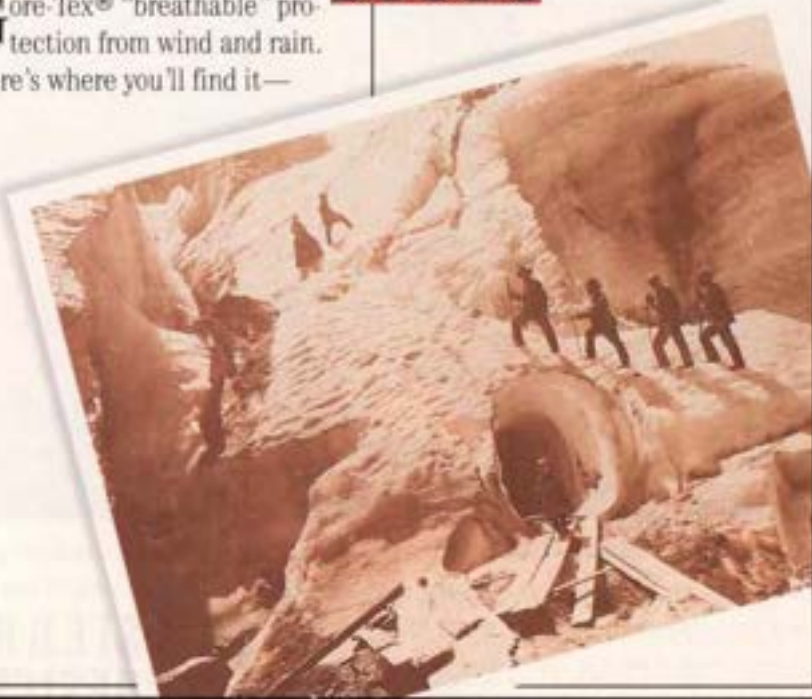
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liver tumors. In 1987 the harbor's creosote plant, a prime contributor to the problem, was designated an Environmental Protection Agency Superfund site.

Meanwhile, conservation groups in the Puget Sound area are challenging a U.S. Navy proposal to build a "home port" in Everett, north of Seattle, for the USS Nimitz and 14 other ships. To deepen the harbor, the Navy wants to dredge an estimated 3.5 million cubic yards of PAH-contaminated sediments and dump them farther out in the Sound. The most heavily contaminated third of the sediments would be deposited first and then covered by the remainder—a process the Navy claims will control pollution.

Environmentalists say a sediment-covering scheme has never been tried on this scale and charge that the plan poses an unacceptable risk to marine life. In March the Sierra Club and five other conservation groups were granted an injunction blocking construction of the base until all environmental permit procedures are completed.

"Stirring up these contaminated sediments and dumping them into deep and clean water is a recipe for ecological disaster," says the coalition's attorney, Todd True of the Sierra Club Legal Defense Fund. "The sediments should be cleaned up carefully, not dumped somewhere else using untried technology."

Recent studies suggesting that PAHs can climb the food chain have fueled concern about sediment contamination in Puget Sound. Lee Shugart, a scientist at Oak Ridge National Laboratory in Tennessee, discovered high levels of PAHs attached to DNA in the brains of beluga whales in Canada's heavily polluted St. Lawrence River. The belugas'

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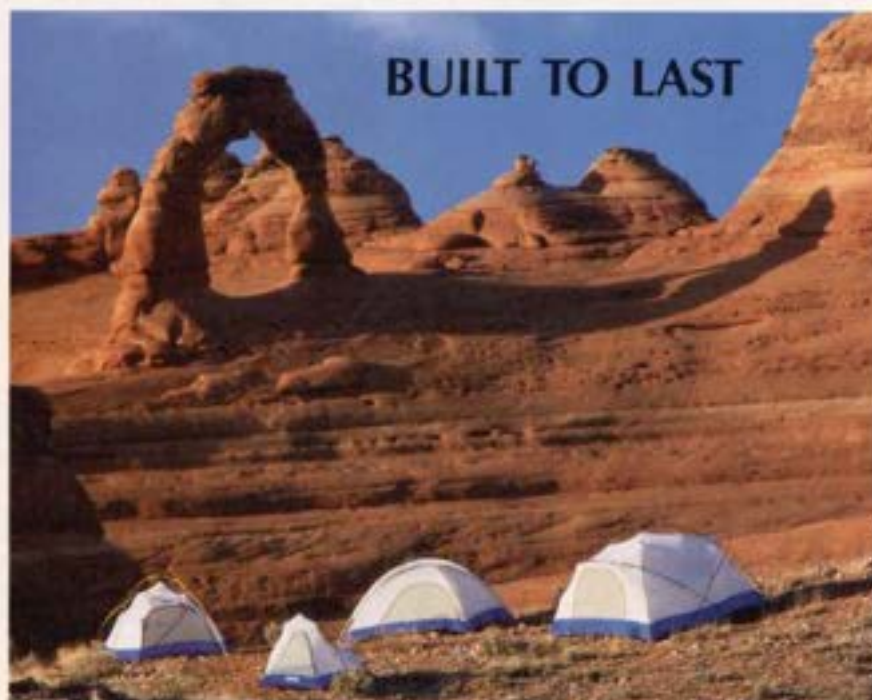
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Many of the 72 dead belugas that have washed up on the St. Lawrence's shores in the past five years have extensive tumors; one had the first recorded case of bladder cancer in a whale. In 1984 researchers at McGill University linked bladder cancers in workers at a steel plant on a St. Lawrence tributary to the facility's PAH emissions. Canada's Department of Fisheries and Oceans does not think there is enough evidence to prove that PAHs are also responsible for the belugas' decline, however.

Meanwhile, the Canadian government has initiated the largest-ever PAH-pollution cleanup—of 3,400 metric tons of PAH from the harbor at Sydney, Nova Scotia. The ten-year project will shut a local steel plant's ovens by July and incinerate the sediments it contaminated. The project will create about 200 jobs per year for the first five years and generate electricity for the region.

Neither Environment Canada (the agency responsible for safeguarding Canada's environmental quality) nor the EPA has tackled PAH pollution on a large scale. In the United States, few state or federal laws directly address marine-sediment pollution. As a result, only generally worded clean-water laws can be used in the attack against PAHs. The EPA is preparing sediment quality standards, but it won't complete them for at least two years. Even then the standards will not address all PAHs, and procedures for implementation will remain unresolved.

Chemist Sheri Tonn, a member of the Puget Sound Water Quality Authority and chair of the Sierra Club's water resources committee, is not impressed with the EPA's response. She says that sediment pollution is not difficult for scientists to analyze: "You can churn out data by the ton. The EPA just isn't keeping up with it."

In the meantime, scientists and environmentalists continue pressuring regulators and legislators to curb PAHs and other marine pollutants. "If we want healthy fish," Tonn says, "we need clean sediment." ■

MICHAEL KANTOR is a freelance writer in Missoula, Montana.

The Department of Energy's weapons facilities aren't aging gracefully, nor have they had a blemish-free youth. It's time, critics say, for the makers of bombs to stop fighting the law.

The Bomb-Business Blues

Cass Peterson

ON THE sagebrush-studded desert in the eastern part of Washington state stands a massive concrete-and-steel factory that is in some ways the very antithesis of productivity. Known as PUREX, the plutonium-uranium extraction plant at the Department of Energy's Hanford nuclear reservation produces plutonium at the rate of about a kilogram (2.2 pounds) per eight-hour shift. Every couple of days, the facility extracts enough plutonium from irradiated uranium fuel rods to provide the fissile material for a nuclear warhead the size of the one that the United States dropped on Nagasaki almost 43 years ago.

The production of plutonium is enough to make the plant controversial, but PUREX also renders something else: hazardous radioactive waste—and a lot of it. For every kilogram of plutonium, PUREX churns out about 340 gallons of highly radioactive liquid waste mixed with chemicals and toxic metals, more than 55,000 gallons of low-level radioactive wastes, and about 2.5 million gallons of contaminated cooling water.

The Hanford reservation is home to more factories than just PUREX. The plutonium-producing N reactor there was closed more than a year ago, but contaminated effluent from a plutonium-finishing plant, assorted labs, a fast-flux test reactor, and PUREX totals several billion gallons a year. The high-level waste is stored in steel tanks beneath the desert; other waste goes into assorted trenches, cribs, ponds, and ditches.

For decades the debate over nuclear weapons has centered on the massive

destruction that nuclear war would bring. But a series of federal disclosures in recent years has injected a potent new element into the discussion, forging an unusual alliance among traditional conservationists, antinuclear activists, and some of the military's strongest supporters in Congress.

At issue is the immediate environmental impact of the nation's nuclear-weapons program—not a holocaust but a growing contamination that is spreading throughout the weapons-production complexes, which sprawl over 3,900 square miles in 13 states.

"These processing centers could make sections of the continent uninhabitable," says Tim Connor, director of the Spokane-based Hanford Education Action League, which has spent four years pressing the government for information about Hanford operations.

David Taubman, a Seattle internist active in Physicians for Social Responsibility, puts it even more succinctly: "This is a slow nuclear war we're perpetrating on our own population."

From its genesis during the Manhattan Project, the nuclear-weapons program has operated outside the environmental laws that govern the rest of the nation's businesses. For more than four decades, what critics term "the most dangerous industry in the world" has gone about its work unregulated and largely unnoticed.

That work, carried out by contractors for the Department of Energy, is still heavily shielded from public scrutiny, but in recent years the veil has parted enough to offer a few glimpses inside.

According to DOE documents declassified in 1983, 2.4 million pounds of mercury were dumped or spilled into



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the streams that drain the Oak Ridge nuclear reservation in Tennessee. The releases of the toxic metal, a by-product of lithium enrichment, took place between 1950 and 1963 but were not made public until after mercury-contaminated soil had been used as construction fill in various projects in and around Oak Ridge. At the same time, state officials learned that waste-disposal pits at Oak Ridge were leaking more than 4 million gallons of metal-plating wastes and solvents into the groundwater each year.

Also in 1983 the DOE disclosed groundwater problems at the Savannah River plant in South Carolina, where three reactors produce about half the plutonium and all the tritium for U.S. nuclear weapons. Industrial solvents have seeped into the Tuscaloosa aquifer, a major source of drinking water for several southern states. The DOE is now trying to pump the solvents, which so far have not migrated off the 300-square-mile reservation, from the

groundwater. The job will take years to complete and will cost the agency some \$50 million.

A National Academy of Sciences analysis last year found that production reactors at Savannah River and Hanford are deteriorating badly, do not meet current safety requirements, and might not be able to contain radioactive debris in the event of a major accident. Months before the NAS announced its full report, the panel had issued an unusual warning that the plants were operating beyond the capacity of their emergency cooling systems, leading the DOE to order its three Savannah River reactors cut to half power.

The NAS report underscored a major problem of national concern: The government's weapons facilities are becoming obsolete, cannot hope to meet modern environmental standards, and are operating on an increasingly thin margin of safety. The DOE said it flatly in its 1986 budget request: "The majority of

nuclear material production plants are over 25 years old and have considerable deterioration. Some equipment is obsolete and/or replacement parts are unavailable."

Alarmed by the potential threat to rivers and aquifers, officials in several weapons-production states have stepped up pressure to bring federal nuclear facilities into compliance with environmental laws. The DOE has historically resisted such regulation, contending that its operations are exempt under the Atomic Energy Act for reasons of national security.

In recent years, however, the DOE has adopted a more conciliatory tone. In 1985, Energy Secretary John S. Herrington gave the department's environmental and safety division a more visible spot in the hierarchy and launched environmental surveys of DOE facilities. "We know we have a legacy of problems," says one top DOE official. "They won't get cleaned up tomorrow, but

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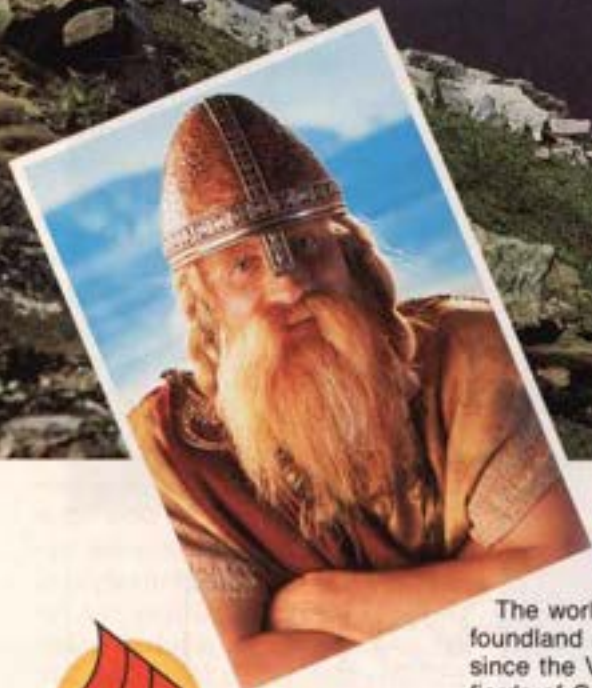
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we're working on them." Agency employees say increased attention from the upper levels has had some impact. "At least we don't get sneered out of the meeting room," says an official involved in environmental monitoring.

The department still opposes outside regulation, saying it can handle problems internally without jeopardizing national-defense goals. But "national security" arguments are playing to an increasingly skeptical audience.

Last year the Senate Armed Services Committee, traditionally sympathetic to the DOE's weapons work, approved legislation that would give an independent advisory board the responsibility of overseeing the DOE's environmental and safety practices. The bill was introduced by Sen. John Glenn (D-Ohio), who entered the fray after learning of extensive pollution originating at a DOE uranium-enrichment plant in Fernald, Ohio, where radioactivity has been released into the air for more than three decades and private drinking-water wells have been contaminated.

Five members of the House of Representatives have offered similar proposals, aimed not just at the DOE but at all federal facilities. "Passage of this legislation would make the DOE subject to the same environmental laws and enforcement penalties as is private industry," says Shira Flax, a Sierra Club lobbyist in Washington, D.C.

These proposals face a busy congressional agenda in an election year as well as formidable opposition from the administration. The Justice Department has argued that allowing the Environmental Protection Agency to issue orders or levy penalties against other federal agencies would be a "conflict." But Flax notes that the legislation has one significant advantage: All the primary sponsors are subcommittee chairs in the House Energy and Commerce Committee, a powerful legislative force whose chair, John Dingell (D-Mich.), has taken a dim view of DOE efforts to avoid compliance with environmental laws. "One key participant described the Department of Justice's initiative as



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AIR-INDIA

"a big game of chicken between the executive and the legislative branches," Dingell said at a 1987 congressional hearing. "Now is not the time for games to be played."

The avoidance game has been played for two generations, however, and the bills are coming due. According to DOE estimates, it could cost as much as \$100 billion to rid Hanford of contamination—if it can be done at all. The deep, gravelly soil that originally made Hanford an attractive site for an industrial complex is now permeated with wastes. The reservation is dotted with the hulks of obsolete reactors and processing plants, representing thousands of tons of radioactively contaminated graphite, steel, and concrete.

Simply arresting the spread of contamination will cost from \$25 billion to \$32 billion—again, assuming it can be done. Hanford managers have already transferred millions of gallons of highly radioactive waste from their original steel tanks, many of which are leaking, into double-sided tanks, but a layer of sludge remains.

These enormous expenditures are looming over the federal government even as it has been forced to concede that it cannot continue to run its antiquated weapons-production reactors forever. The DOE has already started to lay the groundwork for building one or more new reactors; not surprisingly, one possible site is Hanford, where the DOE is eyeing conversion of an uncompleted Washington Public Power Supply System commercial reactor.

Wherever it locates a new weapons facility, the DOE may find itself under more scrutiny than it has in the past. The DOE has resisted regulation for decades, but a growing number of people, both in and out of officialdom, feel that it's time the department be held accountable. In sacrificing safety for defense goals, they feel, the DOE has lost a crucial element of national security: the confidence of the public. ■

CASS PETERSON is a staff writer for The Washington Post.

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VIEW from a KAYAK

TEN PADDLERS, WILD-EYED WITH NERVOUS EXCITEMENT, YELL AT EACH other over the racket in a Seattle pizza parlor. Most of us are friends, but no one knows everyone, and we try to get acquainted amid the uproar. Members of the North Sound Sea Kayaking Association and the Washington Kayak Club of Seattle, we are gathered in this incongruous spot to complete plans for a sea-kayaking trip to the Broken Group islands of Barkley Sound, a deep indentation on the rugged west coast of British Columbia's Vancouver Island.

As I talk eagerly with my buddies, I do not really see the loud, smoky room. During the two years I have paddled the Pacific Northwest, I've longed to visit Barkley Sound, a wildly beautiful island-studded part of the sea. Already I see mist in the distance, smell the tang of the sea, and feel the pull of my paddle through dark water as my kayak rocks gently in the swells.

Although Barkley Sound is well known to centuries of Indians, European explorers, and settlers, and to modern sailors, anglers, biologists, and powerboaters, we must plan our trip as if we are entering uncharted waters. An expedition to the Broken Group is a serious endeavor, even for seasoned paddlers. Pacific Northwest weather is unpredictable in late March and early April, and we'll be making channel crossings while exposed to the full reach of the Pacific Ocean. We must carry food, water, and gear for a full week—and extra quantities in case we become stormbound.

So we quiet down and listen as Lowell, one of our trip leaders, explains that the Broken Group is in Canada's Pacific Rim National Park and that we can expect to be alone in semiwilderness at this time of year. Lowell outlines safety measures and lists the gear we should take. Two members of our group will paddle out one day early to stake our claim to a primitive Park Service cabin on Clarke Island. Veterans of many kayak-camping trips, the rest of us look at each other a bit puzzled. Aren't we camping out? But the discussion shifts to the warm clothing and rain gear each of us should bring, replacing our insouciant memories of cooking and frolicking around a beach fire, frequent activities on short summer trips, with visions of cooking for ten cold paddlers in pouring rain. Staying in a cabin begins to make sense.

*Perched on
a floating
platform,
one paddler
finds a new
perspective
on the ocean's
mysteries.*





Kinetic memories of my kayak dancing in light-spangled water vanish. What am I doing here? I almost ask out loud. I have paddled canoes and kayaks for 20 years. My first sea-kayaking tour spanned a month in southeast Alaska, and with my fellow trip-planners I have paddled and camped in wind, rain, and sun, learned to brace in choppy seas, and practiced self-rescue techniques in swimming-pool training sessions. But I still can't roll a kayak, and I wonder if this expedition, with its frequent open-ocean paddling, will be literally over my head.

I paddle to feel part of the sea, not to battle it. When I must brace myself to stay upright, I hardly have time to explore the natural world around me. Many of my kayaking friends love to run rivers and surf waves. While I agree that wild waves and big water are thrilling, a three-foot chop is challenging enough for me.

I voice my concern to Lowell and co-leader Loren, both experienced guides. They reassure me, and suddenly I am again able to tune in to the talk of whales and expanses of

open, empty water, mountains all around, and unspoiled rocky islands. Excitement takes over once again.

THE NEXT WEEKEND, HEAVILY LOADED, KAYAK-TOPPED CARS hurry north to Vancouver and the ferry across Georgia Strait. We drive west across Vancouver Island through wet, rough country and deep forests, wincing as we pass the scars of clearcut logging and piles of tailings from mines. When we twist down the dirt road to our put-in at Toquart Bay, turquoise water dotted with islands and rimmed by white-ridged mountains spreads out before us. Quickly, however, trampled ground, reeking chemical toilets, and trash at the public campground obliterate the beauty. Already withdrawing from our urban lives, we are not in sync with this tainted transition point at the edge of the wilderness.

In a rosy, clear dawn the next morning, I dress for cool-weather paddling. That means a nylon tank suit, polywool underwear, pile pants, thin neoprene jacket under thick poly

turtleneck, wool socks inside rubber knee-boots, and knit hat. As final protection against the cold and damp, I pack a pile jacket and wool sweater in the kayak's cockpit and a rainjacket on the deck.

We eat hastily as the clouds build, then move the kayaks to the water and start stuffing them with gear. Although I've packed a kayak many times, it always seems impossible to fit everything in on the first try. The repair kit, a diving weight to hold the bow down in wind, an inflated plastic flotation bag shaped to the boat's narrow nose, and a spare paddle go in the bow. My tent and sleeping bag, stuffed in waterproof bags, go between the foot braces.

A kayak can carry more weight than a backpack, but everything must be watertight and packed to fit the nooks and crannies inside the hull. The bilge pump, emergency supplies, water bottles, field guides, and camera bags fit around the contoured seat. A coated nylon "sea sock" lines the cockpit to limit the amount of water and dirt that can enter the boat. The kayak's rear compartment holds heavy bags of food, skin-diving gear, warm clothes, and the trip's little luxuries: wine, milk, and fresh fruit. The chart and rescue gear go on the deck. Only half in jest, I wonder if the kayak will float.

By the time I look up to see if the others are ready, boiling gray clouds have replaced dawn's clear sky. Winds scud down the channel toward us, raising whitecaps and hitting us with the first rain of the day.

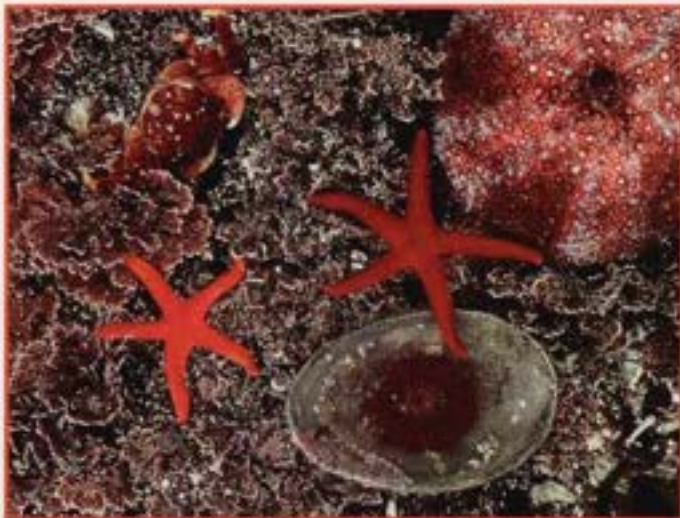
But the winds drop. I inch my cumbersome boat into the water, crawl in, snap down the sprayskirt, and carefully push off from the gravel beach. At once the inert fiberglass shell quivers as it is lifted on the water. Floating in just a few inches of water, inches from shore, the boat is already in its element. The air around me seems to shimmer and change, and I look back toward land, which already seems infinitely remote. With a few quiet, tentative strokes, I join the paddlers swirling around each other and chattering happily, and then head west down the channel.

I spend the first hour getting acquainted with my boat, feeling its balance, adjusting to its new knee braces, and settling into a rhythmic pace. Once we're clear of bleak Toquart Bay, jagged blue mountains rim the day and distances unfold in the blue mist like scenes on a Chinese scroll. This is a world of gentle swells rippling under the kayak and whispering along the hull, of water dimming the air and trickling down steep forested slopes to stony beaches. Water pushes back against my paddle as I stroke, spattering rhythmically on the rear deck as the blade swings up and back.

From our waterline vantage points we look for the sea lions we heard during the night. Instead we see the smooth round heads of harbor seals, who study us carefully with dark eyes, curious about the intruders in their domain. They turn away when we look at them, reappearing just behind us when they think we're no longer watching.

Unsure if the weather will worsen, we paddle steadily. A tiny whirlpool curls around the end of each paddle stroke, and a tiny wave arcs back from the straight, long thrust of the bow. I tuck the paddle under my elbows, pull my camera out from under the sprayskirt, and zoom in on brush-stroked hemlocks and seaweed-covered rocks polished black by surf and rain and banded by barnacles and mussels.

Paddling is easy in the shelter of islands; we head into the wind, but the rain has subsided and it's neither stormy nor cold. We stop for an early lunch at Hand Island, a campsite accessible only by boat. Camping is restricted to designated sites to minimize human impact on the park; indeed, the trees and underbrush are so thick and the shore so rocky that it is difficult to imagine carving out a new camp.



Above and at right: A kayak becomes an unobtrusive and highly mobile marine observatory. Bottom right: With planning, you can squeeze enough gear for a multiple-day trek into a kayak.





JOEL W. ROGERS

As we set out again, light rain makes the vistas monochromatic: silver water, black shorelines, and gray mountains merge into gray sky. Now I paddle easily, my swing and rotation of the blade becoming subconscious. Slight course corrections become automatic as my knees brace snugly under the deck, and I feel as if I, rather than the boat, am moving through the water.

Our final channel crossing is rough enough to be challenging, and the day begins to feel long. I welcome the sight of our scouters' kayaks pulled high on Clarke Island and the smoke rising from the cabin behind the beach.

Finally reaching land after a long day—we've paddled nearly ten miles in four hours—always seems to promise a respite that soon proves illusory. Struggling upright on stiff legs, we unload our wet gear and carry the kayaks above the distant high-tide line, stumbling through the sand and

over huge drift logs. Because the rain falls more heavily now, six of us hurriedly set up tents and then join the others in the cabin, where our boisterous voices almost drown out the roaring woodstove.

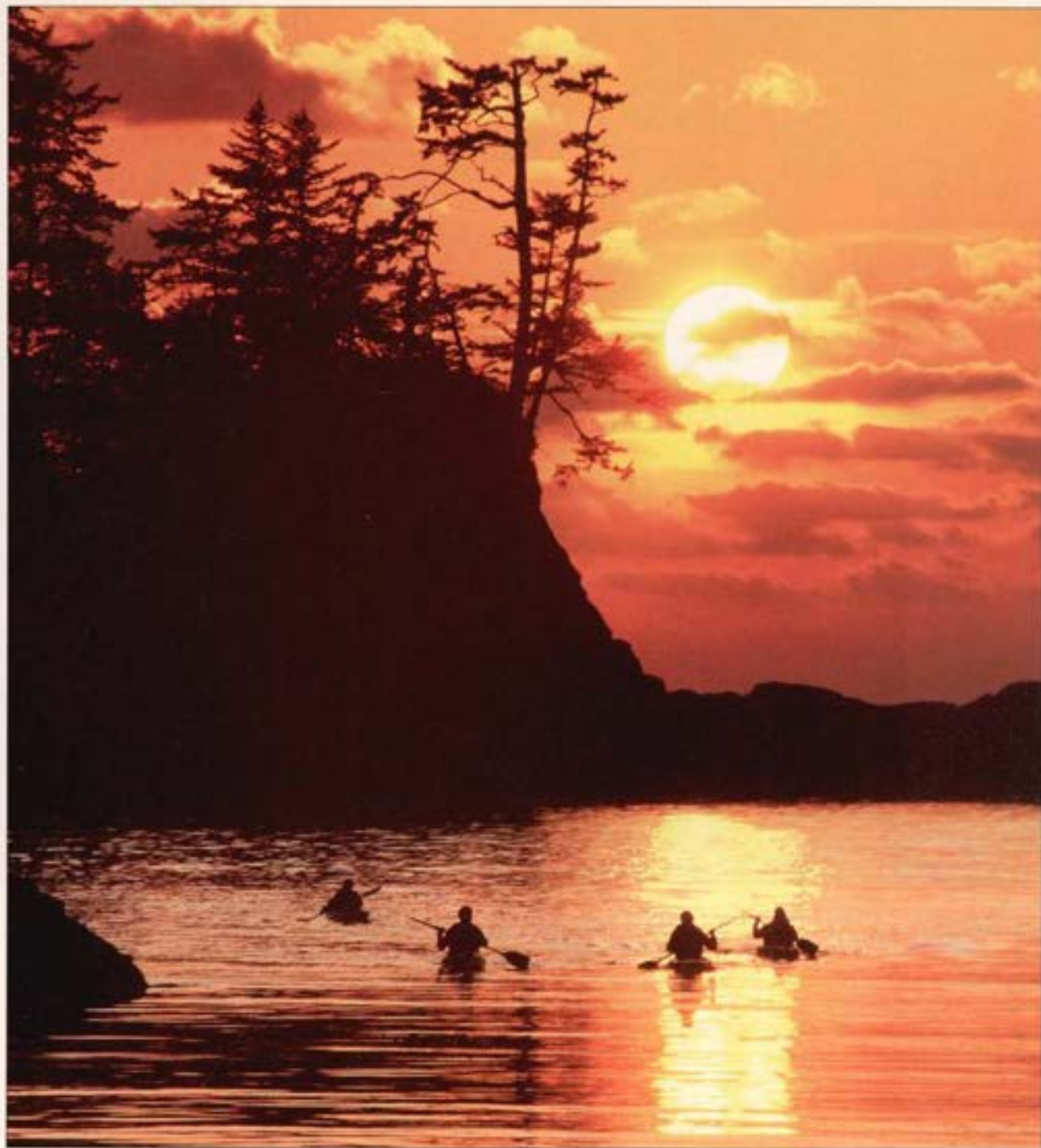
My cooking partner has volunteered us for the first supper, so I offer him a touch of "cooking brandy" and begin setting up stoves and unpacking food. A glance out the steamed-up window shows the silver storm clouds overlaid with sunset peach and lavender. I abandon my boiling potatoes, grab my camera, and head outside.

When dinner is ready, it is accompanied by shouting and shoving and several crush-proof boxes of wine. Soon after we stack the dishes on the porch to rinse in the rain, I seek solitude. While Gayle, Lowell, Tom, and Jeff opt to sleep in the cabin, the rest of us prefer the fresh, clean air and the privacy of our tents, however damp.

Insulated by brandy, I creep



MARCY SIMONIAN/ALASKAPHOTO



out to a moonlit beach and bathe hastily and exultantly at the edge of the silver ocean. Hearing the party in the cabin a few hundred feet away, I am pleased that friends are near, but also that I can be alone splashing in the sea. Refreshed by cold seawater, I retreat quickly to my sleeping bag before the chill catches up with me.

I awake knowing that this will be the last trip for my ten-year-old nylon tent; despite recoating, rain is coming through the door. As long as I insist on sleeping outside, that translates to five nights in a sodden tent and days of drying out gear between rains. Fortunately, my new zero-degree-rated syn-

thetic sleeping bag is seven layers thick and keeps me dry.

In spite of squalls, our group's more ambitious paddlers head out past Benson Island to surf six-foot-high ocean swells. I admire their élan, but when they return, chattering loudly, I'm still not tempted. Frank, one of the hardest among them, admits laconically, "It was a bit much."

I wander the beach, wanting to paddle in the clear green lagoon behind Clarke Island where I can see small fish and crabs against the white, sandy bottom. But the tide is too low for me to get my kayak there, so I settle for a walk on the rocks; ravens and seabirds scream overhead as I watch the surf

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spume against the horizon and dream of seeing gray whales. Later some of our group paddle in the protected waters around Turret Island. I stay out on the water while my friends hike and play seesaw with huge drift logs on the beach. I lie back on the kayak's deck and photograph bald eagles swooping overhead.



JOEL W. HODGINS

My first close encounter with a bald eagle was from a kayak. I was alone, poking around tiny islands in Sitka Sound, when I slipped around a corner about two feet from shore and surprised an eagle perched on a rock. By the time we saw each other, I was close enough to touch the bird with my eight-foot paddle. I'm not sure which of us was more surprised.

A sea kayak, moving silently inches from shore, is a marvelous vehicle for reaching areas inaccessible on foot or by powerboat. A paddler can sit quietly and watch deer on the shore, or peer into the water at colorful starfish piled on rocky ledges or at jellyfish drifting by. The water itself is fascinating as it moves up and down the beach, rattling the pebbles, rocking the kayak, and shimmering in unimaginable colors. Despite the irony of high-tech clothes and a fiberglass vessel, I am acutely aware of the natural environment, an awareness as mystical as it is scientific.

After the rest of the group return to their boats we move to even calmer water, a spooky labyrinth of passages behind the island where the other boats seem to disappear in intricate turns and muffling silence. I point out deserted headlands that once supported Indian encampments and then a white settlement with homes, a hotel, schools, a post office, and ferry service. Now the ferry runs only in summer, carrying tourists, and the last Indian is long gone.

The others land and squish about in tidal mud flats looking for oysters and mussels on exposed rocks. I'm left alone with uncomfortable thoughts of the thousands of invertebrates that live buried in each cubic meter of the intertidal zone. Even our casual invasion can mangle these organisms and their pristine habitat.

We have not gathered many shellfish during this trip, because the provincial government has posted warnings about toxins from "red tides." These natural and cyclical dinoflagellate blooms sometimes concentrate toxins in near-lethal amounts in shellfish. Recent evidence suggests that pollution has upset natural balances even in remote places like Barkley Sound, causing the blooms to occur more frequently than ever before.

The third day is so stormy that we drop our plans to tour outlying Effingham Island in search of sea caves, sea lions, and whales. Instead we hike, cook, read, cut wood, hang wet clothes to dry in the cabin, and grow increasingly restless. We are eager to move on the following day, but the marine weather forecast again predicts heavy rain and winds. By noon a lull frees us to paddle just off the beach, where we discover that our loaded boats are remarkably seaworthy.

I launch my boat reluctantly; everything is cold, wet, and gritty, and I'm in no mood to practice open-water rescues. Jean, Gayle, and I team up with the strongest and most experienced paddlers. Loren patiently talks me through the tumbling water; I find it requires more judgment than I have acquired to sense the best angle for paddling against wind and waves, to know when to brace and when to keep paddling.

After a few breathless minutes, I realize my boat handles well as it rides up and down the six-foot swells rolling in from Coaster Channel. Loren offers to "catamaran" our kayaks together if I get tired, but I am exhilarated and say no. We tackle a five-mile traverse in a series of charges, pausing to rest in the lee of islands. At times my bow is buried under foaming whitewater or seems to rise above my head. The rain and spray frequently blind me, and I can barely move my paddle against the wind, which is gusting to 40 knots. Toward the end, my euphoria gives way to exhaustion that almost—but not quite—blunts my fear.

When a final push brings us to calm water and the relative comfort of our next cabin on Jacques Island, we step silently out of our boats onto the beach. Having survived such rough water, we now feel that we belong here in the wilderness. We look at each wet rock and tree with almost a proprietary gaze, and at each other with a new sense of kinship. Lowell, never satisfied, soon goes off to find more wild paddling; two other kayakers fish just offshore, black silhouettes against the serenity of a sudden copper sunset.

The next day some of the group set out on another rough-water paddle, but I decide to find more peaceful paddling and solitude. Jeff, Frank, and Eric also want some quieter moments. Together we discover a lagoon between Jarvis and Jacques islands, a place mysterious, haunted, and utterly still.

I can scarcely tell where water and shore meet. The trees and rocks are so perfectly reflected by the water that later, in my photographs, I find it hard to distinguish between water and sky. The dense forest comes nearly to water's edge, reflecting green in green. Gaps at the lagoon's entrances give narrow views of choppy water and distant mountains that seem to be in another existence, outside this void in time. We drift along the passages, separate, and then rejoin and sit still in our kayaks, unaware of any separation between ourselves and the universe. A loon slides by and calls softly. Just above a whisper, one of the men says, "This is like being in church."

Our return to Toquart Bay the following day is almost anticlimactic. But it is on this final leg, as we move gracefully over calm water and among small islands, that I am most aware of Barkley Sound as an entity, a living creature, breathing softly as the water barely swells beneath its unbroken, silken skin. ■

SUSAN KREML is a writer, editor, and kayaker landlocked in Richland, Washington.

Illustrations by Pamela Prichett

WILD WORDS

Selected by Steve Silberman

Language, as Gary Snyder has pointed out, is a wild system, more resembling a virus or an old-growth forest than anything of our devising. The word *poetry*, however, in its most ancient and profound sense, means "making." Poets work as wise stewards of the wilderness of language, and a good poem mediates between the garden-world of culture and that world's fertile source outside of culture. Skilled poet-stewards do not deform their wild words to fit the king's fancy, but take counsel from the innate tendencies of their own minds and daily speech as

manifestations of deep-rooted wisdom.

Poetry can act as a storehouse of essential knowledge forgotten by the culture at large. A warning in Ecclesiastes, "that which befalleth the sons of men befalleth beasts . . . yea, they have all one breath," stems from an understanding of the interconnectedness of all things—an understanding that has escaped Forest Service agents and presidents in our time.

All of the poets included here are living, taking up an old discipline with contemporary spirits. As Shelley's "unacknowledged legislators of the world," their constituencies are infinite.—S.S.

F A L L S

from "Mountains and Rivers Without End"

by Gary Snyder

Over stone lip
the creek leaps out as one
divides in spray and streamers,
lets it all go.

Above, back there, the snowfields,
rocked between granite ribs
turn spongy in the summer sun
water slips out under
mucky shallow flows
enmeshed with roots of flower and moss and heather
seeps through swampy meadows
gathers to shimmer sandy shiny flats
then soars off ledges—

Crash and thunder on the boulders at the base.
painless, playing,
droplets regather
seek the lowest,
and keep going down
in gravelly beds.

There is no use, the water cycle tumbles round—

Sierra Nevada
could lift the heart so high
fault block uplift
thrust of westward slipping crust—one way
to raise and swing the clouds around—
thus pine trees leapfrog up on sunlight
trapped in cells of leaf—nutrient minerals called together
like a magic song
to lead a cedar log along, that hopes
to get to sea at last and be
a great canoe.

A soft breath, world-wide, of night and day,
rising, falling,

The Great Mind passes by its own
fine-honed thoughts,
going each way

Rainbow hanging steady
only slightly wavering with the
swing of the whole spill,
between the rising and the falling,
stands still.

I stand drenched in crashing spray and mist,
and pray.

—Yosemite

M E A T

by Thom Gunn

My brother saw a pig root in a field,
And saw too its whole lovely body yield
To this desire which deepened out of need
So that in wriggling through the mud and weed
To eat and dig were one athletic joy.
When we who are the overlords destroy
Our ranging vassals, we can therefore taste
The muscle of delighted interest
We make into ourselves, as formerly
Hurons digested human bravery.

Not much like this degraded meat—this meal
Of something, was it chicken, pork, or veal?
It tasted of the half-life that we raise
In high bright tombs which, days, and nights like days,
Murmur with nervous sound from cubicles
Where fed on treated slop the living cells
Expand within each creature forced to sit
Cramped with its boredom and its pile of shit
Till it is standard weight for roast or bacon
And terminated, and its place is taken.

To make this worth a meal you have to add
The succulent liberties it never had
Of leek, or pepper fruiting in its climb,
The redolent adventures dried in thyme
Whose branches creep and stiffen where they please,
Or rosemary that shakes in the world's breeze.

R H U B A R B

by David Cope

the front room full of women,
the nurse giving her instructions.
the fan swiveled back & forth,
they wiped their brows continually.
in the back room she lay gasping,

tongue flopping to one side,
coated with glycerine to keep it from drying.
the women were going in & out,
bathing & powdering her,
changing the sheets when she soiled them.
he sat in the front room & watched,
his face red with the strain.
seeing me, he said, come out in the garden,
I've got some rhubarb for you.
we walked among the beets & peppers & tomatoes.
he took out his knife & began pulling & trimming,
now & then silently looking to me.

from On the Bridge, Humana Press



CANYON CAMEO

for Hans and Pam Poeters

by Michael McClure

ON THE BLUE-GRAY, GLINTING CLIFF-FACE WALL

a tiny bag of spider silk is hung,
all velvety to dust with sluff
that's shed from rocks and oaks above.

Resting on the twig beside the web
is an iridescent wing—green, blue, purple,
silver, gold. The air here is light
with sage and tarweed scent.

The nearby pond sends gleams
of summer sun from the surface, dotted up
by noses of the frogs
and turtles' beaks. The ribbon
snake that's resting there

is
pleased
to
be.

The soaring eagle dips
to earth
as free
as thought.

TRANSFORMATION OF BAI'S
"A NIGHT IN XINGYANG"

from "Reading Bai Juyi"

by Allen Ginsberg

I grew up in Paterson New Jersey and was
just a virginal kid when I left
forty years ago. Now I'm around the world,
but I did go back recently to visit my stepmother.
Then I was 16 years old, now I'm fifty eight—
All the fears I had in those days—I can still see myself
daydreaming reading N.Y. Times on the Chinese rug on the living room
floor on Graham avenue. My childhood houses are torn down,
none of my old family lives here any more,
mother under the ground in Long Island, father underground
near the border of Newark where he was born.
A highway cuts thru the Fair Street lot where I remember our earliest
apartment, & a little girl's first kiss. New buildings rise on that street,
all the old stores along Broadway have disappeared.
Only the Great Falls and the Passaic river flow
noisy with mist then quietly along the brick factory sides
as they did before.

—10:15 p.m.

*from White Shroud, Poems 1980-1985, copyright © 1980 by Allen Ginsberg.
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A LOVE LETTER

by Nanao Sakaki

Within a circle of one meter
You sit, pray and sing.

Within a shelter ten meters large
You sleep well, rain sounds a lullaby.

Within a field a hundred meters large
Raise rice and goats.

Within a valley a thousand meters large
Gather firewood, water, wild vegetables and Amanitas.

Within a forest ten kilometers large
Play with raccoons, hawks,
Poison snakes and butterflies.

Mountainous country Shinano
A hundred kilometers large
Where someone lives leisurely, they say.

Within a circle ten thousand kilometers large
Go to see the southern coral reef in summer
Or winter drifting ices in the sea of Okhotsk.

Within a circle ten thousand kilometers large
Walking somewhere on the earth.

Within a circle one hundred thousand kilometers large
Swimming in the sea of shooting stars.

Within a circle a million kilometers large
Upon the spaced-out yellow mustard blossoms
The moon in the east, the sun west.

Within a circle ten billion kilometers large
Pop far out of the solar system mandala.

Within a circle ten thousand light years large
The Galaxy full blooming in spring.

Within a circle one billion light years large
Andromeda is melting away into snowing cherry flowers.

Now within a circle ten billion light years large
All thoughts of time, space are burnt away
There again you sit, pray and sing
You sit, pray and sing.

—Shinano, Japan, May 1976

from Break the Mirror, North Point Press

BROKEN PROMISES

CONGRESS PASSED A LAW TO CLEAN UP HAZARDOUS WASTE SITES AND ENTRUSTED THE E.P.A. WITH ITS ENFORCEMENT. HAS THE AGENCY COME THROUGH? BETTER ASK THE PEOPLE OF PITMAN, NEW JERSEY.

Harry Lindsay filed his first complaint against the Lipari Landfill with the state of New Jersey in 1972. Located a mere thousand feet from his home in Pitman, the landfill was the source of noxious fumes that brought tears to the eyes of visitors unaccustomed to having an eight-acre chemical dump as a neighbor. "It was like living next to an oil refinery," recalls Lindsay.

Even after the landfill was closed and covered in 1971, odors occasionally fouled the air. But Lipari turned out to be the source of far more than olfactory problems. It was then, and is today, leaking dangerous chemicals.

In 13 years of operation, the Lipari Landfill—a former sand and gravel pit—legally accepted 3 million gallons of chemical wastes. Although adjacent property owners regarded Lipari initially as just a malodorous nuisance, they began to worry when Alcyon Lake, just downstream from the landfill, occasionally turned orange or purple. In 1979 trace amounts of the carcinogen bis (2-chloroethyl) ether were detected in water leaking from the landfill into the lake.

The discovery prompted a swift promise of help from Washington, D.C. The federal government agreed to spend \$750,000 over three years to clean up Lipari as part of a demonstration project. Announcing the program was Pitman's Rep. James J. Florio (D), who at the time was leading the fight on Capitol Hill to enact a law mandating cleanup of the nation's 2,000 abandoned hazardous waste sites.

The \$750,000 financed a few studies but little else. Contaminated water continued to leak from the site, and townspeople were barred from swimming or fishing in their well-loved lake. Adding to the residents' frustrations, the state refused to provide cleanup funds for the lake until the pollution from the landfill was halted.

Then, on September 1, 1983, the Lipari Landfill was singled out for a dubious honor: The Environmental Protection Agency announced that the site was the nation's worst hazardous waste dump, topping a

list of 546 priority sites. The ranking was based on Lipari's proximity to residential and recreational areas, the extent of ground and

BY SUSAN Q. STRANAHAN

PHOTOGRAPHS BY MATT MAHURIN





surface water contamination, and state data on the contents of the landfill. The next day at Lipari, in the first of many empty pledges, EPA regional administrator Jacqueline Schafer promised Pitman residents that cleanup activities would be completed by that December.

Harry Lindsay remembers the day well. "We thought: This is it, our problems will be gone in a year or two and we'll be out there fishing and boating. It sounded as if within a week there was going to be a large caravan of trucks with EPA written on the side coming in and they were going to do their jobs."

The people of Pitman also believed the number-one ranking brought with it an ironic form of insurance. Why? "We could always point to our numerical place and say, 'If they don't do it right here, they won't do it right in the rest of the country,'" explains Rick Brett, who lives across town from the site.

Time has convinced the townspeople otherwise. "Lipari is a symbol," New Jersey Sen. Frank Lautenberg (D) once proclaimed. Unfortunately, it has since become a symbol of the broken promises of the Superfund.

In December 11, 1979, President Jimmy Carter signed into law the Comprehensive Environmental Response, Compensation and Liability Act, better known as the Superfund, committing \$1.6 billion over five years to begin cleaning up the nation's abandoned hazardous waste dumps.

Just as the timetable and cost estimate for the cleanup at Lipari proved unrealistic, so did the initial projections for the Superfund. It will be a decade, possibly two, before work around Lipari is completed; no one is certain of the final cost. It may take generations and tens of billions of dollars to complete the nationwide cleanup—if it's done at all.

A recent General Accounting Office survey estimated that there are 400,000 hazardous waste sites in the nation, many posing threats to public health and the environment. "The more information you have, the worse it looks," says Joel S. Hirschhorn, senior associate with the congressional Office of Technology Assessment. "The question in front of us now is: Can our economy handle

such bad news?" Hirschhorn, who has studied waste-disposal issues for ten years at the OTA, argues, "We can't afford to clean up everything." It's a position, he concedes, that puts him at odds with many members of the public.

Kevin Oates, the EPA's project manager for Lipari since July 1986, feels that money is not the only obstacle to an effective Superfund. "I wish there were a simple answer as to why Lipari wasn't made into a showcase and why a lot of other sites aren't cleaned up by now," he says. Oates candidly blames the Superfund's failings on "a hostile administration" and on some "less-than-stellar appointments" made to the agency in its early years. The program was stymied while Congress debated reauthorization legislation in 1985 and 1986—which meant, he says, that the Superfund was "kept alive on a shoestring" with short-term emergency funding.

Oates maintains that most of the EPA's troubles are over; others see it differently. "The lack of leadership and competence [at the EPA] has only gotten much, much worse as time has gone on," says the OTA's Hirschhorn.

Although the EPA has done little to make the Superfund work, Congress must also assume a share of the blame for the problems, according to Sierra Club lobbyist A. Blakeman Early. "The EPA is being asked to do too much with too few resources," he says. "One congressional committee writes the laws and claims credit for ending a crisis, and another committee fails to appropriate enough money to do the job."

The Superfund has since its inception been embroiled in controversy. The Reagan administration's EPA has seemed more intent on impeding the law than on implementing it; only five sites were cleaned up during Reagan's first five years in office. When the time came to reauthorize the program, Congress decided to force the EPA to live up to the terms of the original law. In addition to increasing the program's funding to \$9 billion over five years, the Superfund Amendments and Reauthorization Act (SARA), passed in 1986, spells out a number of new duties for the EPA.

The amendments aren't discretionary; the EPA must comply. Even so,

according to many observers, the agency continues to ignore the fundamental goals of SARA. "What we're finding is really very little change since passage of the amendments," says Early.

Between 1980 and 1985 the agency routinely approved cleanup plans that merely contained wastes on-site or transferred them to other landfills, occasionally ones known to leak. Critics accused the agency of engaging in a "toxic shell game" that would only perpetuate the nation's exposure to dangerous wastes. Recognizing that landfilling hazardous wastes had, after all, created the need for a Superfund in the first place, in SARA Congress ordered the EPA to choose technologies that "permanently and significantly reduce the volume, toxicity or mobility of the hazardous substances, pollutants and contaminants . . . to the maximum extent possible."

However, according to a recent analysis of 74 final cleanup plans approved since the enactment of SARA, the EPA continues to rely heavily on containment or landfilling. In that study, released in late 1987, Clean Water Action, the National Campaign Against Toxic Hazards, and the U.S. Public Interest Group found that the EPA employed permanent-treatment technologies in only 25 of 74 cases. According to the study, many of the final resting places selected for untreated wastes are in floodplains, in wetlands, or close to drinking-water supplies.

J. Winston Porter, who heads the EPA's Superfund program, accuses the study's authors of "greatly oversimplifying the problem." The emphasis on permanent treatment, he says, ignores two factors: community desires and costs.

The Sierra Club's Early acknowledges that a dump's neighbors often object to on-site incineration, one of the few known permanent treatment methods; their immediate concern is to be rid of the wastes. "The sad thing," says Early, "is that we have not even reached this level of the debate often enough to determine which permanent methods really work."

On the issue of costs, environmentalists believe the law is on their side;

SARA mandates that cost considerations take a backseat to protecting the public health and environment. Even if that weren't the case, permanent treatment has one clear economic benefit: If waste is destroyed in the first place, rather than just contained, the EPA will not have to return to the site a second time—as it eventually did at Lipari.

In SARA, Congress also required the EPA to give the public a greater say in cleanup decisions. The agency must devise a technical-assistance-grant program for Superfund communities, enabling citizens to apply for up to \$50,000 to hire independent consultants to evaluate the EPA's cleanup plans. Hirschhorn compares the concept to that of providing a public defender in the criminal justice system.

Although Porter says he's "not unenthusiastic" about the grants, he admits he's concerned that adding a citizen consultant to the process will create "an adversarial relationship, us and them."

Critics charge that the EPA, which spent 16 months writing regulations for the grants, has dragged its feet in implementing this portion of the law. "It just takes time to write a regulation around here," Porter says of the delay. In the meantime, the EPA has approved more than 75 final cleanup plans without affected communities having the benefit of consultants. Porter hopes to award "a couple hundred" grants by the end of the year.

If the recipients are like the Lipari neighbors, they will be elated. Before the grants were written into the 1986 law, Pitman residents applied to the EPA for financial assistance to hire a consultant. After lengthy delays, the request was granted. Doug Stuart, who helped organize community involvement in the landfill cleanup, says the grant has been an "outrageous success" in helping the neighborhood deal with the EPA.

The Superfund amendments also require the EPA to enact cleanup standards to ensure that all Superfund sites are dealt with uniformly. The EPA has yet to issue such standards, and as a result there are wide discrepancies from site to site as to what constitutes "clean." Such deviations not only "fail to protect public health and violate the law," Early says,



but they may soon come back to haunt the EPA—and U.S. taxpayers.

When companies become aware of the different standards, they can argue that "the agency's approach to cleanup is not based on any dependable, logical application of the law," warns Early. They can then claim that they should not be held liable for their share of the cleanup, leaving the federal government responsible for the costs. "In short," he told a Senate subcommittee, "the agency's erratic, inconsistent approach to cleanup standards today could compromise the fiscal integrity of the fund years into the future."

One need look no further than Lipari to understand why Congress passed SARA.

Patrick Fitzgerald, whose backyard abuts Lipari, remembers when EPA officials arrived in Pitman in 1983 to brief interested residents on the plans for the landfill. "The EPA would come horribly prepared. There would be different people each time [and] they couldn't answer questions," he recalls. "The community

felt the [cleanup] plan was being rammed down its throat."

That's exactly what was happening. Residents were given no say in the cleanup. The agency simply announced it would spend \$2.1 million to surround the site with an underground wall to contain the chemicals buried there and to cover the landfill with clay and a plastic cap.

The project was completed that year, but two problems quickly developed. Residents continued to complain to the EPA about a chemical odor "so pervasive you can taste it on your tongue," as one letter-writer described it. And although the EPA had promised residents that the containment would "virtually eliminate any contamination moving off-site," the landfill continued to leak into the lake. An estimated 2,600 gallons of polluted water were found leaching from the Lipari site each day through the walls and fractured clay substrata beneath the landfill.

When containment failed, the EPA announced in September 1985 a second strategy for cleaning up Lipari: It would

THE WORST OF THE WASTE SITES



The EPA's National Priority List represents the agency's agenda for cleanup of abandoned hazardous waste sites. As of July 1987, the list included 802 sites across the nation, distributed among the states as shown above. Three states—Alaska, Hawaii, and Nevada—had no priority sites. New Jersey was hosting the largest number (96), followed by the states of New York (63), Pennsylvania (61), Michigan (58), and California (48). The EPA revises its list at least once a year and was expected to publish an expanded version soon after Sierra's press time in early April.

the EPA, it will be a dream come true for us."

Although it has yet to make its final decision, the EPA appears to be amenable to a plan to dredge the bottom of Alcyon Lake to remove five feet of contaminated sediments, then treat the sludge and pump it to a nearby site for disposal. The lake cleanup, which is estimated to cost between \$10 million and \$15 million, will occur simultaneously with on-site cleanup. A final decision on cleanup of the lake was to be made this spring.

Doug Stuart sums up the difference between the community's initial dealings with the EPA and the current process: "The first time, we weren't part of the decision; the second time, we were."

The people of Pitman are also demanding a yardstick by which they can measure the EPA's performance. "We want a specific [cleanup] goal so when they say it's clean, they can't just walk away," explains Stuart. "We want to be able to compare what they've done with what they promised to do."

Although Stuart and his neighbors are demanding only what the law mandates, the EPA is balking. The Superfund's Porter believes it's unwise to commit to specific numbers because "we don't know enough yet" about the site. Porter's man in the field, Lipari project manager Oates, sees the demands in a different light. "What people are asking us to do is to be accountable, and I completely agree there needs to be a level of accountability."

If the people of Pitman are ever rid of the hazards of Lipari, it won't be the result of an effective Superfund program. Rather, it will be because a handful of citizens forced a recalcitrant federal government to do the job Congress ordered it to do.

Harry Lindsay has no doubts that the Lipari Landfill is an example to be cited when people talk of the Superfund. "But what kind of example, I don't know," he says. "It's a good thing we're not trying to go to the moon here. We would never have made it." ■

SUSAN Q. STRANAHAN is an editor at the Philadelphia Inquirer. She writes frequently about environmental issues.

flush the contaminants out of the landfill and treat them on-site. The plan caused an immediate uproar.

"The EPA wants to pour water into a bathtub it has already said is leaking," said Pitman resident Pat Stuart at the time. Stuart and her husband, Doug, who live near the landfill, had joined with Harry Lindsay, Rick Brett, and a handful of other Pitman residents to form a citizens' group to influence the EPA's actions at Lipari.

It wasn't just Pat Stuart who thought flushing made no sense. An Office of Technology Assessment analysis requested by the New Jersey congressional delegation sharply criticized the plan, accusing the EPA of choosing a less-costly, unproven technology over tested methods of removing pollutants.

In electing to flush out the site, the EPA also ignored its own consultants, who had declared that the technique was "unproven technology." Even Rohm & Haas Company, a chemical-manufacturing firm that had disposed of its wastes at Lipari, condemned the EPA's choice and urged the agency to use a costlier, but proven, cleanup technology

—a significant recommendation because Rohm & Haas ultimately will be charged a share of the final cleanup bill.

Despite the furor, the agency refused to back down. It did agree to alter the plan slightly to complete the flushing in seven rather than fourteen years (driving the cost up from \$8.9 million to \$12.8 million), but it would not consider any other alternative. The EPA reaffirmed its commitment to flushing in December 1985, and the work was scheduled to begin this spring.

But that's not the end of the Lipari controversy. A debate over the cleanup's final phase has been fueled by an increasingly sophisticated community that has dealt with the EPA for nearly a decade.

Historically, the EPA has confined its Superfund cleanups to designated sites. However, as a result of community pressure, the agency has taken the highly unusual step of considering decontaminating the neighborhood around the landfill, including Alcyon Lake. "The people in town won't be satisfied until they get their lake back," says Bruce Ware, a member of Pitman's town council. "If we can work all of this out with

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ISN'T FROM STUTTGART
TO MUNICH.



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MOISTEN AND SEAL

THE 1988 SIERRA PHOTO CONTEST



■ Last year thousands of entries (from 1,300 photographers) yielded what we and our judges agreed was the best crop of photos to date. That's why we're adding only one new category for 1988—why tamper with success? The winning photos will be published in the September/October issue of *Sierra*.

PRIZES ■ Grand Prize: A Nikon N2020 35mm SLR camera with a 50mm f/1.8 lens and a complete head-to-toe outfit from Timberland valued at more than \$1,000.

■ Eight first prizes (black-and-white and color in each category): a pair of Swift binoculars.

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

■ We urge all contestants to submit only their best work for consideration, to follow the packaging guidelines under "Submissions" to guarantee the safe return of their materials, and to make sure they communicate clearly which pictures are entered in which categories.

CATEGORIES ■ *Abstracts in Nature*: The focus should be on the form, symmetry, or asymmetry of natural objects, not on their function or their place in the biosphere.

■ *People in Nature*: Images in this category should show people enjoying themselves in the out-of-doors anywhere in the world.

■ *The Meeting of Land and Water*: This ever-popular theme offers photographers a surprising degree of flexibility. Surf, sure—but ice, snow, and rain as well.

■ *Environmentalism in Action*: We're trying something new this year—a category for creative photojournalism. Show us people doing the things that best embody the spirit of activism.

■ Grand Prizes: Nikon N2020 35mm SLR and Timberland apparel.

HOW TO ENTER

■ **SUBMISSIONS**: No more than two color slides (or transparencies) and/or two black-and-white prints may be submitted in any one category.

Either original or high-quality duplicate slides and transparencies are eligible as color entries, but prizewinners must provide original(s) for publication. No color prints or color negatives from print film will be considered.

Mark each slide, transparency, or print clearly with your name and address, and state the category being entered. On a separate piece of paper, explain where each photograph was taken, and describe the subject briefly and accurately. Careful packaging is important. Improperly wrapped submissions will be returned unexamined.

■ Color slides (2 x 2) and color transparencies (4 x 5 or 2 1/4 x 2 1/4) should be placed in 8 x 10 plastic sleeves (available at any camera shop).

■ Black-and-white photos should be unmounted prints no larger than 11 x 14, packaged between two pieces of stiff cardboard in a simple manila envelope.

Send your submissions to *Sierra* Photo Contest, 730 Polk St., San Francisco, CA 94109. Include a self-addressed, stamped envelope for returning material and a check or money order for \$2 made out to *Sierra*. (This fee covers all submissions by an individual entrant received in one package.)

■ **ELIGIBILITY**: This contest is open to all amateur and professional photographers. *Sierra* Club staff, their immediate families, and suppliers to *Sierra* are not eligible. Photos must be taken and owned by the entrant. Previously published work, photographs pending publication, or photos that have won other contests are not eligible. Void where prohibited.

■ **DEADLINE**: All submissions must be postmarked by midnight, June 1, 1988. Please include a stamped, self-addressed postcard if you wish receipt of your photo(s) to be acknowledged. The judges' decisions will be made by July 15, 1988, and photos will be returned within six weeks of that date.

■ **PRIZES**: In addition to a grand prize, first and second prizes will be awarded in each category. The judges reserve the right not to award a prize in one or more categories.

■ **LIABILITY**: *Sierra's* responsibility for loss of or damage to any material shall not exceed the amount payable to the magazine under any insurance carried to cover its liability for such loss or damage. We are not responsible for material lost or damaged in the mail.







JEFF GUNAS

BY GERALD HASLAM

THE OTHER CALIFORNIA

From above on a winter day it appears that a massive gray protozoan has established residence in California's core. What those who live in the Central Valley call "tule fog" or "valley fog" rises from the damp, fecund soil, engulfing the entire region. Visibility is sometimes but a few feet; at its worst, the miasma closes highways and schools. William Everson, a poet who was born and raised in the Valley, describes it this way: "... earth and sky one mingle of color,/ See how this moment yields sameness: December evening grayed and oppressive." Relief comes only when rain falls or wind blows.

Winter is by no means the preeminent season here. Between a brief, glorious spring and a short, desiccated fall, the sun dominates. Rain is rare and heat can be brutal, bending light rays above neatly furrowed green fields. Everything gasps under a faded sky that presses soil, presses leaves, presses breath. Native daughter Joan Didion writes that the Central Valley is "so hot that the air shimmers and the grass bleaches white and the blinds stay drawn all day, so hot that August comes on not like a month but like an affliction."

The prevailing sun provides some 300 growing days annually. Consequently the Great Central Valley, a plain some 430 miles long and up to 75 miles wide, has become the most affluent farming region in the world. In 1985, grapes, just one of the more than 200 commercial crops grown in the Valley, brought \$292 million to growers in Fresno County, \$194 million to those in Tulare County, and \$152 million to those in Kern County. The annual value of the

Barn and windmill, Yolo County

Many people know the Great Central Valley only as an open landscape to be endured on the drive between Los Angeles and San Francisco. But those who leave their cars, for a visit or a lifetime, discover the heartland of the Golden State.

area's agricultural production exceeds the total value of all the gold mined in California since 1848.

In the Valley, agriculture can hardly be referred to as farming. A new terminology has evolved: Farms are "ranches," farmers are "growers," farming is "agribusiness." Agribusinesses have created the region's own equipment: the Fresno scraper, the Stockton gangplow, the Caterpillar tractor, the Randall harrow.

Most significantly, agriculture is Big Business. Corporations whose officers are more adept at picking stock options than tomatoes control great tracts and direct ranch managers who in turn direct laborers. Their domains are enormous: In

1981 just eight companies owned two thirds of the state-irrigated acreage in three southern Valley counties. Those "farmers" included Chevron USA (37,793 acres), Getty Oil (35,384 acres), Shell Oil Company (31,995 acres), and the Prudential Insurance Company of America (25,105 acres). Most of these interests also controlled substantial tracts elsewhere in the Valley.

Despite domination by huge agribusinesses, some family farms continue. "I know how that mud feels between my toes and I like it," says rice grower Francis DuBois of Davis. "The small owner's landscape is a scattered, localized one, clustering at the edges of towns, where jobs are available,"

writes David Rains Wallace. "The landscape of big ownership stretches all around the small holdings, a sea in which the waves are arranged in orderly, dirt-brown rows."

Life has always been both tough and promising in this region. During the winter of 1861 and '62 a record rainfall flooded the Central Valley. William Henry Brewer, a member of the state's first geological survey, noted that the entire area had become an enormous lake: "Steamers ran back over the ranches 14 miles from the river . . . to the hills," Brewer wrote. "Thousands of farms are entirely under water—cattle starving and drowning."

The deluge contributed to the Valley's eventual agricultural demography not only because the dominant cattle industry was crippled, but because, under the dictates of the state Swamp-lands Act then in effect, anyone who diked and drained wet areas could gain title to them. Opportunists were able to bend the act's intent and acquire immense tracts of normally arid land by claiming them during the flood. Ironically, the new land barons then had to devise irrigation systems for the erstwhile swamplands to render them productive.

In Brewer's day the northern portion of the Valley, called the Sacramento for the river that bisects it, was more settled and cultivated than the southern. The Sacramento Valley was then characterized by vast riparian forests, junglelike woodlands that lined rivers and extended sometimes hundreds of yards inland. "A wide plain borders the river on each side," Brewer wrote, "but generally we saw only the river and its banks, which were more or less



ROBERT DAWSON



STEPHEN C. JOHNSON

Top: Tomato harvest, Dixon. Bottom: Fruitstand #33, Newcastle.



Pinto bean packing shed, Newman

STEPHEN C. JOHNSON

covered with trees—willows, cottonwoods, oaks and sycamores—with wild grapes trailing from them.” The riparian woodlands, among the richest wildlife habitats, were also important for soil conservation and flood control.

Today the southern Valley, called the San Joaquin for its major river, is more intensely developed. It is composed of what were once two distinct geomorphic and ecological entities, the San Joaquin Plain and the now-forgotten Tulare Basin, where the Valley’s four southernmost rivers once formed extensive, shallow bodies of water in an otherwise arid stretch of land. The largest of them, Tulare Lake, boasted the greatest surface area of any lake west of the Mississippi. Today, its rivers dammed, its lakes drained and their beds tilled, the Tulare Basin is indistinguishable from the large plain that fronts it.

The Sacramento and San Joaquin rivers meet and flow toward San Francisco Bay in the Valley’s other major sub-region, the Delta. Developed for agriculture, the Delta is made up of a thousand miles of braided river channels,

marshes, swamps, and diked “islands” that are frequently lower than surrounding watercourses. Tourists motoring through the Delta are occasionally startled by the sight of large, oceangoing vessels apparently plowing through nearby asparagus fields some 50 miles inland from the sea.

By the time Brewer visited, the Valley had already been considerably altered. It once was home for one of the nation’s largest populations of Native Americans, more than 100,000 Yokuts, Wintun, Maidu, and Miwok, but by the 1860s that population was in dramatic decline. Spaniards had explored the Valley, and although they never settled here their presence had its effects. Early explorers used straw as packing material, and their domestic animals were walking seed bags; the replacement of native perennial grasses by introduced annuals, virtually unnoticed at the time, is perhaps the most pervasive sign of Spanish influence.

Herds of pronghorns, tule elk, and mule deer once grazed the Valley’s prairie. Golden beaver swam in its sloughs. These animals were, in turn, preyed upon by grizzly bears, coyotes,

and gray wolves. Great condors soared through the skies of the southern Valley.

The native animals, like the native grasses, were quickly displaced or eliminated. Hunting, competition from domestic animals, and destruction of habitat caused the demise of pronghorns, grizzlies, wolves, and condors. Nearly 98 percent of the riparian forests are gone now, too. Like so much of the Valley's lost natural environment, they are little remembered, little mourned in the celebration over the area's agricultural accomplishments.

Today most of the Great Central Valley is green with field crops, orchards, and groves. Irrigation (agribusiness uses 85 percent of the state's harvested fresh water annually) and other technologies have led to greater and more efficient uses of the land: A stunning 25 percent of all table foods consumed in the United States are grown in this region.

Such abundance, of course, has its negative side. Valley agriculture has developed a dependence on chemicals as intense and potentially destructive as any junkie's. Studies show that pesticides increasingly pollute drinking-water wells and the streams and reservoirs that drain Valley fields. Insects are developing resistance to toxic chemicals, but that feat has so far eluded humans: Fieldworkers suffer from pesticide-related illnesses, and mysterious cancer clusters have appeared in two Valley towns.

Many farmers feel trapped on the chemical treadmill. "As farmers, we're probably the greatest environmentalists," says Norman Crow of Stanislaus County. "We see every tree, every acre of land. I'd love it if I didn't have to use these chemicals."

Some experts suggest that chemicals wouldn't be needed if growers would settle for lower yields. However, changing minds may be more difficult than altering technology. "They've had decades of experience with chemicals," says Michael Perlman, an agricultural economist at California State University at Chico, "and have forgotten other ways to farm."

Chemicals are not the only source of environmental difficulties in this human-altered garden. Uncontrolled pumping from deep, ancient stores of groundwater has caused the Valley's floor to sink in places; today many residents of the San Joaquin Valley live and work more than 30 feet lower than the Indians who preceded them.

Irrigation keeps crops green where once grasses browned, but where previously arid lands have been saturated, still other problems have developed. Water often brings naturally occurring toxins and salts to the soil's surface, eventually degrading the land's fertility. "More than 400,000 acres of farmland in the rich San Joaquin Valley are now seriously affected by salt," points out Lowell Lewis, director of the University of California's Agricultural Experiment Station in Davis. "It is pro-



ROBERT DAWSON



STEPHEN C. JOHNSON

Top: Hub Barber Shop, Vacaville. Bottom: Orchard near Wheatland.



Irrigation canal near Modesto

ROBERT DAWSON

jected that by the turn of the century another million acres could be lost to salinity."

Although more efficient methods of watering fields are now available, growers continue to employ flood irrigation, which requires moving enormous quantities of wastewater, much of it heavily polluted, out of the region. On the Valley's southwest side, wastewater flows through the partly completed San Luis Drain to Kesterson Reservoir. The water carries toxic concentrations of selenium and other chemicals leached from the soil; in 1983, 246 birds were found dead and 106 maimed in the Kesterson National Wildlife Refuge. Waterfowl deaths and deformities have declined over the past year, a result of the interim solution of flooding the refuge's ponds with saline groundwater in order to lower selenium levels. Eventually, the toxic pond sediments and vegetation will be dredged and stored in an on-site facility. As Lewis says, "California, like many other areas of irrigated agriculture, continues to manage its soil and water systems as if there will be no day of judgment."

As agricultural fecundity increases, so does the human population. The Great Central Valley, filling with people at a rate two and a half times higher than the state's average, is expected to be home to more than 10 million by early in the next century.

In 1863, Brewer stayed in a hotel that "showed a truly Californian mixture of races—the landlord a Scotchman, Chinese cooks, a Negro waiter, and a Digger Indian stable boy." The population in the Valley remains decidedly multi-ethnic, for even today it attracts the determined and the desperate willing to toil in its fields, to start at the bottom in an attempt to reap California's rich promise. With Chinese, Japanese, East Indians, Mexicans, and Filipinos among its more than 100 distinct groups, the Valley is arguably the most ethnically diverse rural society in the world.

Brewer's observations reveal another social dynamic: Already a whites-on-top class system was evolving. While educational opportunities and shared experiences are slowly changing it, the Valley has traditionally sustained a pyra-



Rice fields near Sacramento

midlike society. A tiny elite is at its peak; just below that, a small middle class provides services, while the structure's indispensable foundation consists of the poor. Each group is more sizable and less white than the one above it.

Insularity is a common charge leveled at Valley dwellers. "We're parochial," says lifelong resident Aldo Sansoni. "Everybody else is wrong. No one else's problem is our problem." It is thus ironic that American foreign policy has deposited 25,000 Hmongs, a large fraction of one of Southeast Asia's major ethnic groups, in the area between Fresno and Merced, and refugees from Central America are joining the workforce. Welcome to the 20th century.

Mount Shasta, a towering deity, seals the Valley's northern end. This mystical mountain, revered by native cultures, dominates the flatland for more than 100 miles south. On its shoulder is Shasta Dam, the linchpin of the Valley's federal irrigation project. From high ground near the dam, the Sacramento Valley looks burnished on a summer day. A spiral of smoke rises to the west where rice hulls are burning; a narrow forest winds onto the prairie where the mighty river flows. The Valley's northernmost city, Redding, spreads into the foothills.

More than 120 years ago, Brewer visited the other end of the Valley. He praised the lovely view of the plain, of Buena Vista lake, and of the Coast Ranges. The plain is still there, though it is now an agricultural checkerboard. The Coast

Ranges remain, although their slopes are dotted with oil pumps. Buena Vista Lake, which covered more than 4,000 acres, is gone, its floor now plowed and irrigated. Few open regions have been more physically altered by technology.

Life in this realm nonetheless remains pleasant and hopeful for most. Summer nights are especially memorable. With darkness heightening the senses, a drive through the fields can be an olfactory adventure, redolent of turned earth, of mowed alfalfa, intimate aromas rich and rank as a lover's breath. They may be sliced momentarily by the sharp stench of chemicals, then through the darkness return those comforting, titillating scents dense as gravy.

Dawn reveals a vast agricultural panorama, cooled toward the 70-degree range by gentle darkness. Sleepy irrigators climb from pickups, set water, then rest for a moment against their shovels, drinking coffee from their thermoses or chewing fresh plugs of tobacco. Palpable sweetness lingers in the air as the sun sneaks over the rugged Sierra, bringing a fragrance of life and possibility. It is tempting to pretend that larger problems belong elsewhere. ■

GERALD HASLAM is a professor of English at Sonoma State University and a native of Oildale, a small town at the southern end of the Great Central Valley. Haslam and photographers Stephen Johnson and Robert Dawson are collaborating on *The Great Central Valley: Heart of California*, to be published by the University of California Press later this year.

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A Man, a Ship, and a Dream to Sail By

Henry Fersko-Weiss

ALIFE SPENT on the high seas with Greenpeace is a life of cramped isolation, of long hours spent practicing drills and doing chores, of waiting, and, occasionally, of intense confrontation. It is a life that requires personal sacrifice and that must allow for failure.

While thousands of people have sailed with Greenpeace, few have done so for much more than a year. Peter Willcox is an exception: As captain of the Greenpeace flagship *Rainbow Warrior* for four years, he guided the ship through ice floes in the Gulf of St. Lawrence to protest harp-seal hunting, outmaneuvered Soviet gunboats to reveal illegal whale kills off Siberia, and evacuated the population of a Marshall Islands atoll contaminated by nuclear fallout. In the end, he watched in disbelief as the *Warrior* sank in the night waters of New Zealand's Auckland Harbor.

People often use words like "serious" and "tough" to describe Peter Willcox, a man who, at 35, has probably seen as much of the sea as Melville's Ahab. "There's a hard edge to him," says a former shipmate on the *Warrior*, Kathy Ryan. "He has high expectations of the crew, but he has those same expectations of himself."

"I have a vivid memory of him standing on the bridge looking through binoculars, his jaw set," says Ryan. Even at five foot three Willcox appears large, his upper arms so thick they could belong to a man twice his size. The time he has spent in the salt air has not hardened his still-boyish face. He has a chiseled jaw, blue eyes, and wavy, sand-colored hair. While he is articulate about issues, he is self-effacing and private.

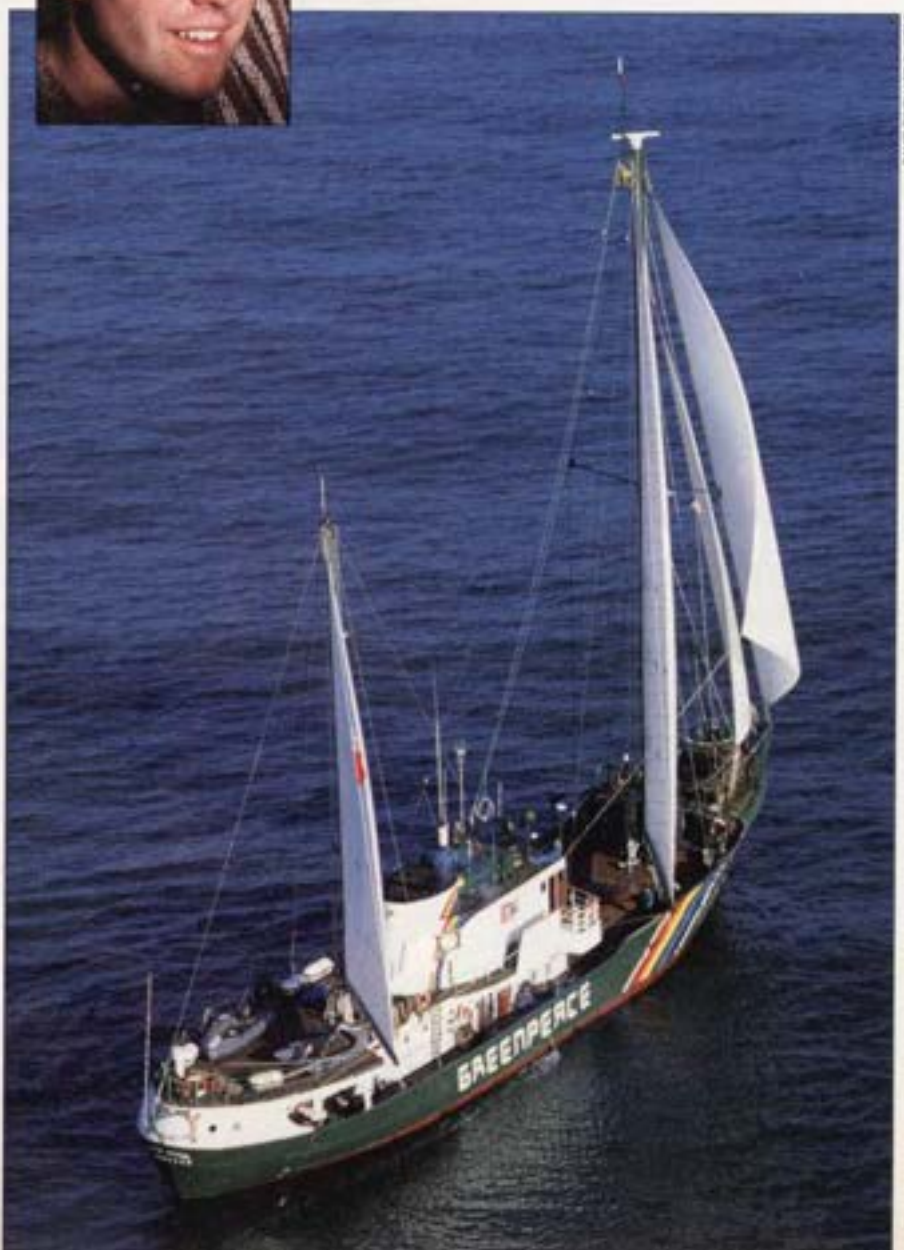
Before he came to Greenpeace, Willcox piloted the Hudson River sloop *Clearwater* for four years. A replica of ships that trafficked the Hudson River until the mid-1800s, the sloop and its crew educated people about the river's

history, its present importance, and its ecological plight. The Willcox family had been involved with the *Clearwater* organization from its beginning in 1969; in fact, Willcox's father had taught sailing to folksinger Pete Seeger, who helped found the organization and bring widespread fame to the boat.

Willcox signed on with the *Clearwater* in 1973 after he finished high school. A conscientious objector, he intended to work on the boat as an alternative to serving in Vietnam. The draft ended just weeks before he was to begin service, but he joined the crew anyway. After one season he took some time off to help



"I'm looking forward to another five years fighting for the ocean and its creatures. Nothing is more important right now." —Peter Willcox



a friend build a large, ocean-going sailboat, but he returned to the *Cleanwater* in 1976, this time as captain.

As part of his new position, Willcox taught middle-school students about the boat and the water. "The kids would leave knowing that the river was an important part of their lives, not just something you drive over on a bridge," he says. Through one *Cleanwater* program he helped establish, troubled children from New York State Division of Youth institutions volunteered on the boat for up to a month during the summer. "These young people learned about the ecology of the river and sailing," says John Mylod, executive director of the *Cleanwater* organization, "and working with the crew exposed them to a different kind of role model.

"Peter was always serious about what he did," Mylod says. "But there was reason to be serious. He was young when he became captain of the *Cleanwater*, and there's a fair amount of punishment living on a boat with a constantly changing work force and giving up to three educational programs a day."

Working on the *Cleanwater* changed Willcox's life. "It fit me so well," he says. "I love sailing, and while sailing I had a chance to do something useful about environmental problems. This was a life-style that made sense to me."

Usefulness was a social ethic Willcox acquired from his parents, who were both politically active. He vividly remembers the time in 1965 when his father took him to a march in Selma, Alabama, led by Dr. Martin Luther King, Jr. "It was my first big demonstration," recalls Willcox, who was 12 at the time. "As we marched through the black section of town there was a festive atmosphere. But in the white section you could hear a pin drop."

"He was the only young white child I saw on the last day of the march," says Willcox's father, Roger. "The march made a very big impression on him." Without telling his parents, Willcox called the local newspaper the day after he returned home; his story made the front page.

Home was in South Norwalk, Connecticut, at the end of a short, sandy

road. The Willcox house stood on a hill overlooking a dock, the gray-green waters of Long Island Sound, and, in the distance, the pine-tufted Norwalk Islands. From the deck off the living room you could almost leap into the water.

Roger Willcox, a passionate sailor, took Peter sailing before he was a year old; the boy was deep-sea racing at 14 or 15 and later worked on a humpback-whale research vessel for a year, sailed with America's Cup winner Dennis Connor, and clocked more than 100,000 miles in deep-sea races. Elsie Willcox, a junior-high-school science teacher who served on a state commission to save Long Island Sound, introduced her son to environmental issues. The family and place were perfect for shaping the future captain of the *Cleanwater* and the *Rainbow Warrior*.

Willcox left the *Cleanwater* in 1980. "It was apparent that Peter wanted to be more dramatically involved with environmental issues," Mylod says.

One catalyst for this change was a book about Greenpeace, *Warriors of the Rainbow*, by Robert Hunter. "I liked the

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The Grand Canyon of the Arctic



Photo © Debbie Miller

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**SIERRA
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idea of direct confrontation," recalls Willcox. "It really got the message across." A group of Canadians had founded Greenpeace in 1971 when they demonstrated against a U.S. nuclear test in the Aleutian Islands. They had since purchased a 160-foot trawler, renamed it the *Rainbow Warrior*, and begun protesting the commercial slaughter of sea life.

By the time Willcox joined the organization in 1981, it had well-established tactics: Using small, fast, inflatable boats carried on the *Warrior*, crew members tried to obstruct or interfere with environmental despoilers. If Greenpeace couldn't devise any other safe, non-violent way to protest, it photographed the scene and used the pictures to rouse attention. Because publicity was crucial, the crew, captain, and campaign coordinator all needed to be adept at talking to the press.

Willcox fit in well. "It's not so hard to find good sailors," says Steven Sawyer, executive director of Greenpeace USA. "But it is hard to find a good sailor who is comfortable talking to the press—and almost impossible to find one who is also a committed environmentalist. Peter is all three."

The first campaign Willcox fought was against National Lead Industries, a company in Perth Amboy, New Jersey, that was dumping a million gallons of concentrated sulfuric acid into the ocean every day. Following a year of petitions and meetings that failed to stop the pollution, Willcox and Sawyer, who was then Greenpeace's campaign coordinator, decided to publicize the problem by blocking the barge carrying the toxic waste.

"We shadowed the barge and its tugboat for days," recalls Willcox. "While we were playing hide-and-seek with the barge in a fog, we suddenly came upon it anchored toward the end of Staten Island. This was our chance." While three Greenpeace crew members handcuffed themselves to the barge's anchor chain, Willcox parked the *Warrior* alongside. "I remember feeling apprehensive about what was going to happen," Willcox recalls. But he was also excited about keeping the barge from its mission. "We took pictures, which hit all the six o'clock TV news shows in New York and New Jersey," he says.

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The Coast Guard later returned the crew members to the *Warrior*. Following the dramatic publicity stunt, public outcry forced the Environmental Protection Agency to look at the effects of National Lead's pollution on a major fishing ground and a recreational beach area only eight miles away. The Perth Amboy plant closed six months later.

The next campaign, also in 1981, was much more rigorous than the first one had been. This was a protest against hunters in the Gulf of St. Lawrence who were stunning young (harp) seals with clubs and then skinning them alive for their prized white pelts. "We had to make it 150 miles up the Gulf following fissures in the ice," recalls Willcox. "Many times a lane dead-ended—then we had to back up. I'd go up and down the steps of the bridge to make sure the stern didn't go into the ice and damage the propeller. It was exhausting."

When the *Warrior* finally arrived at the site two weeks later, the crew spent six days spray-painting green stripes on the backs of hundreds of seals. The paint doesn't hurt the seals, but it makes their coats worthless to hunters. In the mid-

dle of the campaign the European Economic Community banned importation of seal pup skins, effectively ending harp-seal hunting. In fact, except for one recent commercial hunt in the Soviet Union and another off the coast of South Africa, all the world's seal hunting has stopped.

Willcox's consummate skill as a sailor was also crucial to a campaign in July 1983 along the Siberian coast. In the small village of Lorino, the Soviets maintained a whaling station they claimed was part of a protected aboriginal hunt. The Whaling Commission's 1982 moratorium on commercial whaling allows native peoples to whale for their own consumption. But Greenpeace suspected the Soviets were hiding a commercial operation.



FEDERICA GREENPEACE

Greenpeace activists load Rongelapese children onto the *Rainbow Warrior* to evacuate them from their native island, contaminated by the first U.S. hydrogen bomb test 30 years earlier.

Willcox expected to encounter Soviet navy vessels when he arrived at the 12-mile limit off Lorino at dawn. When he didn't find any, he made a daring, impromptu decision and took the *Warrior* straight to Lorino. There he sent five



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crew members ashore in inflatables; at the beach they discovered row upon row of mink cages. Fed with whale meat, the mink were destined to become fur coats for wealthy people in New York and Paris. "Whales are intelligent, beautiful creatures," says Willcox. "There's absolutely no reason to slaughter them—especially to feed other animals kept for slaughter."

As Willcox watched from the bridge, Soviet troops arrested the *Warrior* crew on shore, and a boat carrying 15 soldiers started toward the Greenpeace flagship.

"I was sure they wanted to seize the boat," Willcox says. "The best help I could give the crew on the beach was to get the film we had back to Alaska." A helicopter, a freighter, and a destroyer tried to stop the *Warrior*, but Willcox evaded them. "We wiggled and wagged our way around them for about 20 minutes," he recalls. "I was running back and forth across the bridge like a soccer player. I kept expecting the destroyer to put a warning shot over our bow, but it never happened. If it had, I would have stopped." Fifteen hours later, around

midnight, the *Warrior* docked in Nome.

"As the pressure mounted, he seemed to get even calmer," recalls Sawyer, who was campaign coordinator at the time of the chase and kept in touch with Willcox by radio. "It was a matter of not being cowed and of knowing the limits of the ship. He did an excellent job." The crew detained in Lorino was returned to the *Warrior* five days later, and the Soviets admitted that they had been whaling for commercial purposes. Not long afterward the station closed down.

Life on the *Warrior* wasn't all action; often the ship was docked or in transit. Willcox spent idle time reading about environmental issues, exercising, and doing maintenance or navigational chores. At dinner, the big social event of the day, "we'd talk about campaigns, weather, the news," he says.

When Greenpeace planned a campaign, Willcox often met with the campaign's coordinator. "His input was always important," says Ryan, who was West Coast coordinator for toxic-waste issues. "He would tell us what the ship could do technically and strategically. His thoughts on how to attack a problem were also welcome because he's very knowledgeable about toxic waste and nuclear issues."

During most campaigns, Willcox's preoccupation with the safety of the ship and crew kept him from direct participation in confrontational action. On one antiwhaling campaign off the coast of Peru, though, he climbed the mast of a Peruvian whaler and sat in the crow's nest while five of his shipmates handcuffed themselves to a harpoon gun. Around three in the morning Willcox climbed down to join the others, where half a dozen soldiers with machine guns arrested them all. For five days the soldiers detained the *Warrior* crew, charging them with piracy—a crime punishable in Peru by two to three years in jail (often after a two-year wait for trial).

"Peter got involved with this particular action because he wanted to make a strong personal statement about whaling," says Campbell Plowden, one of the crew members who had handcuffed themselves to the gun. "During the days we were under arrest, the six of us did the deepest soul-searching of our lives. Was our commitment strong enough to

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withstand the consequences? Was our action effective if we rotted away in a Peruvian jail? None of us were able to answer these questions." After three weeks, as a result of lobbying by Greenpeace and local activists, the crew members were released. Peru stopped whaling six months later.

While Willcox felt strongly about the issues of whaling and toxic-waste dumping, no campaign touched him as deeply as one to evacuate the people of Rongelap, a small Marshall Islands atoll severely contaminated by radioactive fallout from the first U.S. hydrogen bomb test in 1954. Many islanders had been burned by the blast and others had become quite ill. After 30 years about 77 percent of those under the age of ten when the test took place had suffered problems requiring thyroid surgery; a few had died, and many expected shortened lives.

Worried about the health of their children, the Rongelapese had for years petitioned the Marshall Islands and U.S. governments for relocation. Finally, in 1985, they turned to Greenpeace and found the help they needed. Crowded with more than 300 people and their belongings, the *Warrior* looked like a floating bazaar as it made its way 120 miles across the sea to Mejjatta, the new island home of the Rongelapese. "I can live with a lot of other problems," says Willcox, "but I was never able to be blasé about the deformed babies I saw on the Marshalls."

Next the *Rainbow Warrior* went to New Zealand to prepare for a protest against a French nuclear test in Mururoa, Polynesia. On July 10, 1985, three days after docking at Auckland's Marsden Wharf, most of the crew went ashore to continue a celebration of Steve Sawyer's birthday. Willcox, who remained on board with a handful of the crew, remembers being jolted awake just before midnight. His first groggy thought was that the boat had been rammed, but when he looked out and saw the dock lights, he felt momentarily comforted. Then the generator went off and he knew something was seriously wrong. In the engine room he found the emergency lights on and water swelling toward the level of the deck. Confused, he yelled "Abandon ship!" Suddenly

there was a second explosion back by the propeller.

Willcox left the ship last, scrambling up a rope to the dock. He counted heads as the *Rainbow Warrior* slipped farther under the black water. Because the second engineer seemed to be missing, he returned to look for her, but the ship was nearly submerged and he had to give up. "We were all stunned and not communicating very well," Willcox recalls. They later realized that the engineer was at Sawyer's party, but Fernando Pereira, a photographer, was

missing. Police divers recovered Pereira's body the next morning. "I had to identify him," Willcox says. "It was an awful moment, and it was hard to go back to the crew across the street and tell them Fernando was dead."

By the next day local police knew the boat had been bombed; the French government, which had reacted violently to Greenpeace's demonstrations throughout its history, was implicated. Two agents of France's secret service were arrested two weeks later and charged with murder and arson. Arbitration

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ending last October won Greenpeace \$8.16 million in damages. The *Rainbow Warrior*, which had been rusting away at the pier, was ceremonially buried at sea off the north coast of New Zealand just before Christmas.

For more than a month after the explosion Willcox was preoccupied with the trial, the ship, and press questions. "Looking back now, I think I was in shock that whole time," he says. "But I also remember feeling more committed to my work than ever before. It may sound stupidly macho, but I thought, 'If things have gotten this weird, then what I'm doing is very important.'"

Willcox and some of his shipmates joined the crew of another boat to carry out the protest of the French Mururoa test. They were arrested and deported, and the test continued as scheduled.

Emotionally drained, Willcox returned home to South Norwalk to recuperate. For two years he worked on his own boat, took emergency medical training classes, and visited old friends. Then, last July, he returned to Greenpeace. In December the organization bought a new boat similar to the *Warrior*,



The Rainbow Warrior sinks at Auckland Harbor, New Zealand, where agents of the French government bombed it at the dock. The ship was buried at sea last December.

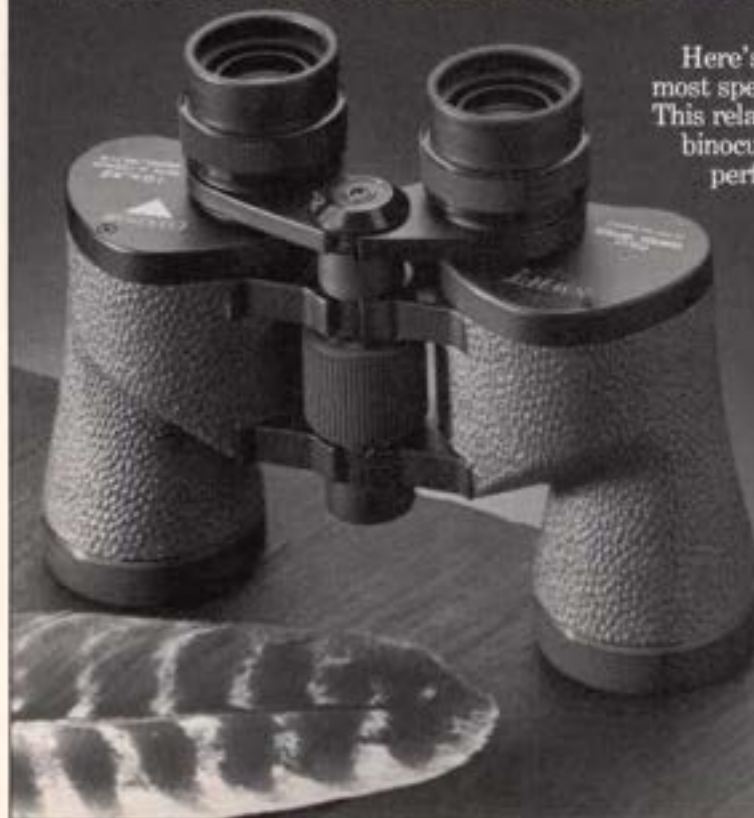
a 177-foot trawler not yet named. Willcox is now in West Germany fixing it up. When the ship is ready, he will be its captain in the Pacific.

"It took some effort to get used to running a ship again," says Willcox. "But now I'm excited. I'm looking for-

ward to getting back to the Pacific and spending another five years fighting for the ocean and its creatures. Nothing is more important right now." ■

HENRY FERSCO-WEISS is a freelance writer in Warwick, New York.

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Base coat/clear coat finishes require less maintenance, but they, like all paints, are susceptible to abrasives, which will scratch the finish or give it a hazy appearance, reducing both its gloss and imaging (mirror-like) qualities.

Wash any base coat/clear coat finish with gentle, non-abrasive cleaners, rinsing away all loose dirt with plenty of water before sponging on the soapy solution.

Rinse the cloth or sponge or change it frequently to avoid scratching the finish with dirt or

grit. If you use a commercial tar or bug remover, read the instructions carefully, then try it out on an inconspicuous area first.

If you use a commercial car wash, look for one that uses a soft scrub system. A few car wash systems employ harsh brushes, which may scratch the clear coat finish.

Base coat/clear coat paint need not be polished as often as a lacquer or enamel to remove the grime and effects of weathering. When you do polish it (once or twice a year), use a mild cleaning wax, not an abrasive. Polish gently, by hand.

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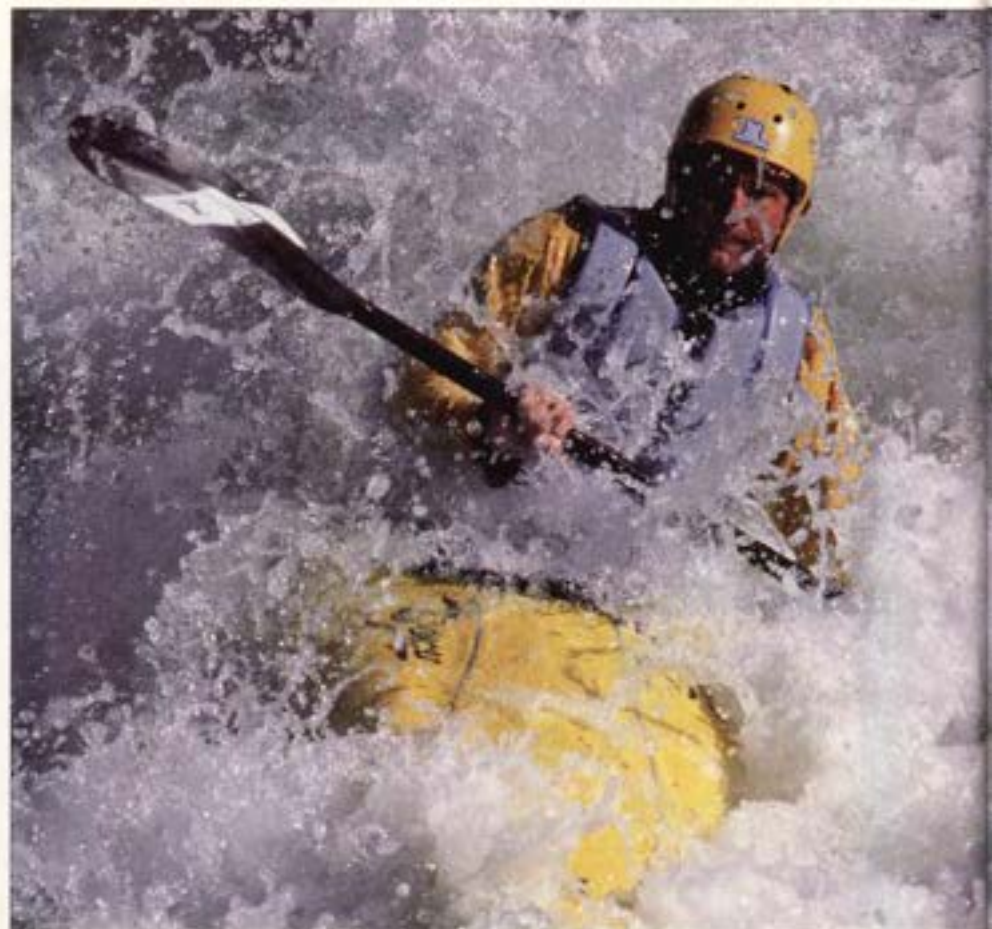
NORTH FORK PAYETTE, IDAHO

SOME KAYAKERS consider it the wildest whitewater ride in the United States. Dropping 260 feet per mile in stretches, Idaho's North Fork Payette River draws skilled paddlers from across the country. Parallel to Idaho Highway 55, the main road north from the state capital of Boise, the explosive river is also featured as a scenic attraction in state travel promotions. But recreational users and sightseers are not the only people interested in the North Fork Payette's rushing whitewater. In the early 1980s the Idaho Power Company planned to divert the river through a system of tunnels and turbines to generate electricity for Idaho consumers. An unexpected

energy glut and strong opposition from the Idaho Whitewater Association forced the utility to abandon its power plans, however.

Now the Gem Irrigation District, an organization of farmers holding rights to much of the North Fork's water, has revived and expanded those plans. Joining Gem as a primary backer and bankroller is Idaho's richest man, "spud king" and industrialist J. R. Simplot, with his company, Western Power, Inc.

The reincarnated Payette proposal includes a dam that would flood Round Valley, a scenic mountain bowl south of Cascade. From there tubes would carry much of the river's flow around a relatively calm boating stretch called the Cabarton Run, and around 15 miles of continuous Class V whitewater farther



Kayakers prize the North Fork Payette River's wild water, but implementation of a new hydroelectric

downstream. Gem would sell a third of the energy produced to the city of Tacoma, Washington. Western Power would sell the rest, most likely to cities in the Southwest.

The notion that Simplot and his associates could send the North Fork literally down the tubes in order to sell electricity out of state does not sit well with many Idahoans. Whitewater enthusiasts have responded by forming Friends of the Payette, with the goal of keeping the entire Payette River system free of hydroelectric development. The group is starting with donated office space in Boise and a cadre of volunteers.

Members have already secured endorsements from groups representing river runners, environmentalists, boating outfitters, jet boaters, and local chambers of commerce. Tom Menten of Boise, a kayaker and activist in the Sierra Club's Middle Snake Group, says he feels inspired by the enthusiasm of the volunteers, many of whom have never before been involved in conservation issues. Volunteers have put together

and presented a slide show and organized a phone bank to keep activists up to date and make state legislators aware of public concern for the river.

Wendy Wilson, one of the Friends' founders, says the organization has a multifaceted approach to preserving the Payette River system. It is trying to obtain "layers of protection" through local land-use-planning zones, state legislation limiting the sale of electricity out of state, and inclusion in a state river system.

Previous attempts to establish a state system have failed in the staunchly con-

servative Idaho legislature. But state Sen. Laird Noh (R) told an audience at the Friends' first meeting that some conservatives are beginning to view control of rivers as a state, rather than federal, responsibility. (Present requirements for Federal Energy Regulatory Commission permits for projects of this kind give that agency the biggest share of decision-making authority.)

Noh, with the support of Friends of the Payette, recently introduced a bill designed to increase the state's clout. The bill, which outlines a state plan to

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evaluate the Payette and four other rivers for protected status, was pending in Idaho's legislature at press time.

"If we can get some state protection for the river," says Wilson, "we won't need to come back and fight new projects like this each year." — Glenn Oakley

Developers Nibble Eastern Wilds

ADIRONDACK PARK, NEW YORK

The century-long fight to save Adirondack Park has entered a final, critical stage. What is preserved or lost in the next few years will shape the park for all time.

That dire warning from Charles M. Clusen, executive director of the Adirondack Council, appeared in a *New York Times* op-ed piece last year. The council is fighting to protect one of the nation's oldest and biggest parks.

Clusen's remarks were a warning about the plans of developers and speculators like Robert Jakubowski, who recently bought several thousand acres within the park and told a local reporter: "There is no other future for this park than private development, and anybody who doesn't understand that yet is going to learn very quickly."

Located in upstate New York, Adirondack is the largest park in the contiguous 48 states. Its 6 million acres, about a fifth of the state, are a mix of 3.5 million privately owned and 2.5 million public-forest-preserve acres, including 2,700 lakes and ponds, the headwaters of five major rivers, 40 peaks more than 4,000 feet high—and 120,000 year-round and 210,000 summer residents.

Established in 1892, the park resulted from one of the nation's earliest commitments to wildland preservation. After rapacious lumber companies cut over most of the land in the area, the state legislature formed the park from a large forest preserve and from nearby private land that it hoped eventually to acquire. New York's new constitution, enacted in 1895, contained an edict proclaiming that the state-owned portion would remain "forever wild."

Today environmentalists wonder



Silver rivulets tumble down Clifford Brook Falls in New York's Adirondack Park, where moose, lynx, and fisher share the landscape with an increasing number of vacation homes.

how long forever will be. The state has acquired very little of the private land, and now a strong market for vacation homes is spurring development within the park. The number of building permits increased by a third last year, to 387, and land prices have also climbed.

During the early 1970s developers wanted to build several cities of 10,000 to 12,000 vacation homes each on the park's private land. Environmentalists averted the large-scale development by persuading state legislators to pass some of the nation's strictest zoning laws.



The recent building boom, however, has shown that these laws do not adequately protect waterfront and roadside property. Since the boom began, lakes George and Placid, among others, have deteriorated in quality. Along the park's few highways, 89 percent of the land is owned by private interests and therefore is developable.

The Adirondack Council, with five full-time staff members and an annual budget of about \$400,000, is leading the fight to protect the park's integrity. Through a public-awareness campaign, it hopes to persuade the state legislature

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Lake Champlain (seen here from Mt. Defiance) forms much of the park's eastern boundary.

to enact stricter zoning laws for roadside and waterfront land. The group is also urging the state to speed up its land-acquisition process in order to better compete with developers. Meanwhile, the council and its affiliate, the Adirondack Land Trust, are devoting half of their budgets and personnel to buying

private land within park boundaries.

"If we want to succeed in rounding out the fragmented forest preserve and permanently protecting the park's lakeshores, roadsides, and river corridors," Clusen says, "we have to work fast. We only have a few years left."

—Michael Cooper

The Durable Delaware Pump

POINT PLEASANT, PENNSYLVANIA

Construction of a \$72-million on-again off-again water project in Point Pleasant, Pennsylvania, is on again—and so is the fight to stop it.

The "pump," as opponents call it, would suck 95 million gallons of water a day from the wide and lazy Delaware River and pump it into two tiny creeks for delivery to suburban water authorities and the Limerick nuclear power plant.

Victories and defeats for the pump's opposition have come in quick succession since the early 1980s. Hopes were high after the Pennsylvania Department of Environmental Resources decided to review alternatives to the plan last year, but in February the DER announced that it would continue to back the pump.

In quiet Bucks County, where the town of Point Pleasant perches on the Delaware's lush banks, a majority of citizens oppose the pump. Various groups

criticize the project because of its links to nuclear power and suburban sprawl and its potential damage to wildlife, water quality, and creekside private property.

According to a U.S. Fish and Wildlife Service biologist, the diversion could increase pollutant concentrations downriver, making the water unsuitable for some fish. Landowners along the 30 miles of creeks that would transport the water worry that the huge increased flow will erode their land and destroy streamside life. Pollutants in the river water could also end up in local wells.

An antipump majority elected to the county commission in 1983 stopped construction for a time, but the pump's builder and a prospective water user filed suit and forced it to resume last summer. Nonviolent protests and public outcry prompted the state DER to promise a study of problems and alternatives and halt construction again late last year. "Now the antipump groups are coordinating their efforts,



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It's an American tragedy. Family farms are being driven out of business by huge factory farms. And that's not just bad for farmers.

This year in the United States over 800,000 people will suffer *salmonella* food poisoning due to antibiotics in farm animals. The poultry industry admits that over one-third of the chickens that reach the market are contaminated. Veal and other factory farm products have been shown to contain not only *salmonella*, but also a wide range of toxic drug residue.

Half of all the antibiotics sold in the U.S. are now fed to farm animals. This dangerous and irresponsible practice accounts for over \$250 million each year for the big drug companies. Factory farms use antibiotics to speed growth and counter the disease-ridden conditions in which they confine farm animals.

Unlike the barnyard images evoked by childhood memories, millions of today's farm animals are forced to live in cages or crates barely larger than their own bodies. Unable

to walk, or even turn around, the victims of factory farming exist in a relentless state of sickness and distress.

By depriving farm animals of exercise, fresh air, and wholesome food, factory farms are a breeding ground for disease. To keep the animals alive under such torturous conditions, they are *continually given drugs which are passed on to consumers.*

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The Delaware flows peacefully while a battle rages over a long-lived diversion proposal.

considering their options, and talking to lawyers," says Jenny Harrison, an activist with the Bucks County Group of the Sierra Club.

Opponents' earlier litigation efforts were fruitful, if not definitive. A group called Del-Aware Unlimited won a suit last year that required the project to get two discharge permits from the DER before any Delaware River water could

be pumped to the two streams. Such permits have normally been required only for adding pollution, not for removing water. The Friends of Branch Creek won another suit, which was aimed at protecting streamside land.

"The pump battle is not over yet," says Harrison. "We're making sure citizens do everything they can."

—David Gilden

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Once a strong presence, the "winter run" of chinook salmon in the Sacramento River has dwindled to a mere trickle. But despite a rapid decline in yearly counts, the National Marine Fisheries Service (NMFS) has not moved to protect the salmon under the Endangered Species Act. As a result, scientists, environmentalists, and anglers filed suit on the salmon's behalf in February.



"It's outrageous that the agency has refused to list a species that's so obviously threatened," says Michael Sherwood, the Sierra Club Legal Defense Fund attorney handling the case. The Defense Fund is representing the California Sportfishing Protection Alliance, Defenders of Wildlife, the Mother Lode Chapter of the Sierra Club, and the American Fisheries Society (a 7,000-member scientific association).

If the plaintiffs succeed in obtaining "threatened" status for the salmon, their

lawsuit will be the first to add a species to the nation's list of endangered animals and plants.

The Sacramento-San Joaquin river system, which drains the Sierra Nevada and reaches the sea at San Francisco's Golden Gate, was once second in salmon population only to the Columbia River. By the 1920s, however, overfishing, siltation, dams, and diversions had devastated the system's salmon.

The chinook population that entered the Sacramento River to spawn each winter slowly recovered on its own, reaching an average yearly count of 84,000 by 1967. But in that year the federal Bureau of Reclamation completed the Red Bluff Diversion Dam, causing the population to decline sharply again. A drought in 1976 and '77 and poor feeding conditions when ocean currents shifted during the 1982 and '83 "El Niño" phenomenon were near-final blows. Now the count has fallen to only about 2,800, "so low that any new difficulty could wipe the run out," says

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Red Bluff Dam: a threat to salmon.

Cindy Williams, the American Fisheries Society's coordinator for the issue.

In 1985 the society formally requested that the NMFS give the chinook threatened status. Although the NMFS acknowledged that the run was in bad shape, it decided instead to make informal agreements with the Bureau of Reclamation to maintain water flow during crucial months and with the California Department of Fish and Game to continue habitat restoration.

According to Williams, these informal agreements aren't legally binding. "The winter run will become extinct without the protection of the Endangered Species Act," she says.

Under the act, threatened status would require the NMFS to identify habitat critical to the salmon's survival, then devise and implement a recovery plan for the species. Threatened status would also prohibit any federal agency from taking actions detrimental to the salmon's recovery.

Such protection could have a big impact on river users. Federal agencies that manage water projects on the river would have to alter the number and timing of diversions to suit the salmon. Effects on the salmon would also be considered in proposals that require federal permits, such as pending hydroelectric development.

The salmon population has held steady around 2,800 for the last few years, probably because the Bureau of Reclamation has voluntarily raised the gates at Red Bluff Dam during the winter. But those trying to protect the salmon agree that the winter run is in grave danger. "We want a court order that will force the agency to act, and act promptly," says Sherwood.

—Anders A. Price

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SIERRA NOTES

Sierra Club Books strips away the gloss of American business to reveal its underlying grit in a May publication, *Corporate Crime and Violence: Big Business Power and the Abuse of the Public Trust*, by Russell Mokhiber (\$25). Mokhiber presents a history of the kind of corporate malfeasance that affects the environment and our entire society. In another book, *Pesticide Alert* (\$15.95, cloth; \$6.95, paper), Lawrie Mott and Karen Snyder of the Natural Resources Defense Council examine the health effects of pesticide residues found in America's most commonly purchased fruits and vegetables.

Former *Life* magazine editor Joseph Kastner examines America's passion for birdwatching in *A World of Watchers* (\$10.95, paper). Kastner traces the evolution of birdwatching from a scientific discipline to a major sport.

For outdoor enthusiasts, Peggy Wayburn's revised and expanded *Adventuring in Alaska: The Sierra Club Travel Guide to the Great Land* (\$10.95, paper) includes new sections on bird migration, intertidal life, and the origins of place names. Other travelers will appreciate places far from the madding crowd highlighted in *The Sierra Club Guide to the Natural Areas of Idaho, Montana and Wyoming* by John Perry and Jane Greverus Perry (\$10.95, paper). For armchair travelers, the first paperback edition of Mark Abley's *Beyond Forget: Rediscovering the Prairies* (\$9.95) offers a journey across the Canadian prairies in what one review called "a trenchant, observant, and haunting book about a harsh yet beautiful land."

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

Downwind/Downstream is a new film from Toby McLeod, whose environmental documentary *Four Corners: A National Sacrifice Area?* won an Acade-

my Award. *Downwind/Downstream*, narrated by Peter Coyote, documents threats to Colorado Rocky Mountain ecosystems, water quality, and public health from mining, acid rain, and ski-resort development. To help distribute the film, McLeod is seeking mailing lists, media contacts, hosts for receptions, contacts in schools, and sponsors for local premiere showings around the country. To assist, contact Earth Image Films, P.O. Box C-151, La Honda, CA 94020; phone (415) 747-0685. Sierra Club chapters or groups interested in renting the film should contact Bullfrog Films, Oley, PA 19547; phone (215) 779-8226.

"Tropical Rainforests: A Disappearing Treasure" will open May 18 at the Smithsonian Institution's new museum, research, and education complex in Washington, D.C. The exhibition will remain at the museum's International Gallery through December 31 and then travel the country for four years beginning in March 1989. For information write to the Office of Public Affairs, Smithsonian Institution, Washington, DC 20560; phone (202) 357-2700.

Looking for slides for publication or for shows? Sea and Sage Audubon of Santa Ana, California, maintains a collection of more than 4,000 slides of birds, reptiles, mammals, insects, plants, and habitats. The slides, which are for loan or for sale at the cost of reproduction, are principally the work of James R. Gallagher, but they include images from more than 40 other photographers as well. None of the slides are copyrighted. For a catalog write to Lois Loughran, Education Committee, Sea and Sage Audubon, 822 E. Park Lane, Santa Ana, CA 92701.

The Wild and Scenic Rivers Act is 20 years old, and a celebration hosted by the Bureau of Land Management's New Mexico state office will take place in and around Taos, New Mexico, June 17-19. Hot-air balloons, music, barbecues, and a "mountain-man rendezvous" are

planned. For more information contact the BLM's Taos Resource Area, P.O. Box 6168, Taos, NM 87571; phone (505) 758-8851.

World Rivers Review focuses on a broader range of river and watershed issues than did its predecessor, the *International Dams Newsletter*. The editors say the beginning of the end is at hand for the big dam era, and although they have not yet claimed victory, they now promote alternative views of water management rather than fighting against individual dams. The bimonthly newsletter, sponsored by Earth Island Institute and the Tides Foundation, is \$15 per year. Write to *World Rivers Review*, 300 Broadway, Suite 28, San Francisco, CA 94133.

Mountain stewardship in the Northeast is the theme of an Appalachian Mountain Club conference to be held May 18-21 in Jackson, New Hampshire. Participants will discuss air pollution, endangered species, encroaching development, and the impact of recreation on ecosystems. For more information contact the Appalachian Mountain Club, P.O. Box 298, Gorham, NH 03581; phone (603) 466-2721.

The Prince George Mountaineering Group of British Columbia needs competent high-altitude climbers to participate in its fall 1991 "Everest Canada '91" expedition. Climbers will attempt to retrace the 1924 route of Briton George Mallory and to recover the camera Mallory used just before he died of hypothermia at 8,700 meters. (See "Afield," July/August 1986.) If film frozen in the camera for 67 years can be found and developed, it may help verify whether Mallory reached the summit some 40 years prior to Sir Edmund Hillary, who is now credited with the first ascent. Both Canadian and U.S. mountaineers are invited to apply for a spot. Write to team leader Peter Austen, Everest Canada '91, Box 3001, Prince George, B.C., V2N 4T7, Canada.

The Third Annual Mt. Whitney Climb to benefit the March of Dimes Birth Defects Foundation will take place

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Missing Minutes: With its centennial approaching in 1992, the Sierra Club is attempting to collect and record all Board of Directors' conservation and internal policies, from the Club's founding to the present. The vital minutes from the years 1892 to 1911 and "circulars" from 1892 to 1914 have not yet been located. Anyone with information regarding their whereabouts is urged to contact Gene Coan, Sierra Club Conservation Dept., 730 Polk St., San Francisco, CA 94109; phone (415) 776-2211.

The Experiment in International Living, which has been sending exchange students abroad to live with families since 1932, is promoting environmentally sound small-scale housing projects around the world through the *Construction Reference Manual: A Sourcebook for the Use of Local Materials in Construction.* The book, developed through fieldwork in East Africa, outlines uses of various abundant and readily accessible building materials in order to teach local people self-sufficiency.

Copies of the 113-page manual are available for \$10 (including shipping) from Projects in International Development and Training, The Experiment in International Living, Kipling Rd., Brattleboro, VT 05301-0676. Checks should be made out to "EIL."

Zero Population Growth, a national, nonprofit membership organization working to limit population growth and to restore a sustainable balance among people, resources, and the environment, is offering a fact sheet on "Computer Software for Population Education." Designed to help teachers find suitable programs for teaching population dynamics, the handout reviews a variety of programs, including mathematical models and simulations, data bases, and problem-solving games.

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

local people as possible. All hotels are five star. Air travel within Brazil is included in the trip price. The trip begins and ends in Rio.

[89846] The Southern Hemisphere: Patagonia and Iguazu Falls, Argentina and Chile—January 30–February 21, 1989. Leader, Bob Madsen, 3950 Fernwood Way, Pleasanton, CA 94566. Price: \$2,625, Dep: \$100. Patagonia and Iguazu Falls are perfect destinations for a South American summer adventure. We'll see outstanding natural highlights—and have ample opportunities to experience the local culture and meet the friendly inhabitants. A special thrill will be seeing the Ventisquero Moreno glacier calve into Lago Argentino. We will spend a third of our time in Patagonia backpacking around Chile's Torres del Paine National Park with its unique granite towers, glaciers, waterfalls, and

aqua-colored lakes. We'll also visit Punta Arenas on the Straits of Magellan and then complete the trip at one of the most magnificent sights in Argentina— Iguazu Falls, with its main falls gradually spreading to a width of two and a half miles while tumbling in a series of cataracts in lush rain-forest.

[89847] Mt. Kenya to Malindi, Kenya—January 31–February 16, 1989. Leader, Kern Hildebrand, 288 Fairlawn Dr., Berkeley, CA 94708. Price: \$3,645, Dep: \$100. Elephant, waterbuck, and impala will be the first objects of our game viewing from Land Rovers in Meru National Park. On the eastern slope of Mt. Kenya (the highest mountain in the country at 17,058 feet) we will make a three-day high traverse, hiking up to the moorlands and encountering alpine vegetation such as lobelia, groundsel, and senecio. The most hardy may opt to

OUTINGS

hike to Pt. Lenana at 16,355 feet. At the Masai Mara Game Reserve we will have unmatched views of plains animals. A flight will take us to Malindi on the coast for three days of "African Queen"-style boating on the Tana River Delta. We will see spectacular birds, crocodiles, and hippopotami. Leader approval is required.

[89875] The China Kaleidoscope—April 10-29, 1989. *Leader, Bud Bollock, 1906 Edgewood Dr., Palo Alto, CA 94303. Price: \$2,980, Dep: \$100.* Join us on this odyssey into exotic China: a long walk atop the Great Wall, the vast expanse of Beijing's Tian'anmen Square and Forbidden City, an encounter with the Qin Dynasty terra-cotta warriors in Xi'an, observation from a bicycle of farmers in Sichuan Province, an intimate glimpse of those beloved and protected pandas, an all-around sighting of Dafu (the Grand Sitting Buddha), a brief climb of Emei Shan (from 8,700 to 10,150 feet), an afternoon in a marketplace, a river trip through the Yangtze gorges, a walk through the prehistoric Dawn redwoods, and a possible stay at a farm home. We'll end our trip with shopping opportunities in bustling Shanghai. Travel will be by plane, train, bus, boat, and bicycle (optional), and on foot. Accommodations will be the best available hotels or guest houses.

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

[89885] Southern Spain and the Balearics—May 5-20, 1989. *Leader, Joe Lee Braun, 1323 Brandy Lane, Carmichael, CA 95608. Price: \$1,890, Dep: \$100.* This is Don Quixote country. We will travel from one end of "La Mancha" to the other, starting at Toledo and visiting the fabled white cities of Cordoba, Seville, and Granada. We will have the opportunities to hike through wildlife preserves and the Sierra Nevada and Sierra Segura ranges, and to visit such national treasures as the Alhambra and the Alcazar. This land seems not to have changed for centuries—which contrasts with our next destination, the Balearics. After an overnight ferry ride to

Ibiza, we will continue on to Mallorca and Menorca for a blend of the old and the new. Here we'll spend much time close to the crystal-clear Mediterranean, swimming from secluded beaches and taking interesting day hikes among the old villages and ancient ruins.

[89890] Madagascar—Mysterious Island at the End of the Earth—June 10-28, 1989. *Leader, Patrick Colgan, P.O. Box 325, La Honda, CA 94020. Price: \$2,945, Dep: \$100.* Madagascar: An exotic habitat for rare and unique species of plants, insects, birds and other animals beckons us. Despite rapidly diminishing wilderness, dense rainforests with stupendous waterfalls, vast coastal desert plains with strange forests of "upside-down" baobab trees, and magnificent coral reefs still remain. Roads are rough here, amenities primitive. On this exclusive Sierra Club "first" we will travel from point to point by minibus, small plane, narrow-gauge railway, and, perhaps, outrigger canoe. Accommodations will range from reasonably modern hotels to picturesque old French colonial guest houses with groaning plumbing. We will visit places of cultural and historical significance, mingle with the local people, and enjoy a rich mixture of ethnic food, folk art, music, and dancing.

Sierra Club ♦ Open-Trip List 1988

Space is still available on a number of 1988 Sierra Club Outings; if you act promptly, you can probably find a spot on one of the trips listed below. Refer to the 1988 Outing Catalog (*Sierra*, January/February) for a complete list of 1988 outings. For trips not listed below, check with the Outing Department—vacancies may occur. Please see the catalog for our reservation and cancellation policy. Read the policy carefully before applying. To order supplemental information on any of the 1988 Outings, send in the coupon on page 91. A trip application form is on page 90. For Winter 1989 Foreign Outings, refer to the March/April issue of *Sierra*. Spring 1989 Foreign Outings are described in this issue.

Trip Number	* = Leader approval required	Backpack Rating Key: L = Leisure Trip M = Moderate Trip S = Strenuous Trip	Date	Rating	Trip Fee (including Deposit)	Per Person Deposit	Leader
ALASKA TRIPS (Prices do not include airfare to Alaska or charter air costs on most trips.)							
88076	*		Swan Lake and Kachemak Bay by Canoe and Kayak, AK	July 3-16	1095	70	B. LeCheminant & P. Nelson
88077	*		Valley of the 10,000 Smokes, Katmai Park, AK	July 3-16	995	70	Jerry Lobel
88080	*		Atlin Lake Backpack, British Columbia	July 18-29	1195	70	Sigrid Miles
88081	*		Wind River Paddle Raft, Arctic Wildlife Refuge	July 25-Aug. 5	1295	70	Jon Kangas
88083	*		Alaska Range, East of Denali, AK	July 28-Aug. 10	935	70	Harry Reeves
88084	*		Noatak River Paddle Raft, Arctic Wildlife Refuge, AK	Aug. 1-12	1295	70	Kern Hildebrand
88085	*		Noatak River Canoe Exploration, Gates of the Arctic Park, AK	Aug. 7-20	1095	70	Steve Torrence
88086	*		Skilak Glacier, Kenai, AK	Aug. 18-27	795	70	Serge Puchert

OUTINGS

Trip Number	* = Leader approval required	Backpack Rating Key: L = Leisure Trip M = Moderate Trip S = Strenuous Trip	Date	Rating	Trip Fee (including Deposit)	Per Person Deposit	Leader
BACKPACK TRIPS (See Alaska and Foreign Trips for other backpack outings.)							
88091	*Pleasant Valley, Yosemite Park, Sierra		June 20-29	M	225	35	Bob Berges
88094	*Humphreys Basin, John Muir Wilderness, Sierra		June 29-July 6	M-S	195	35	Bill Hoover
88095	*Mono and Silver Divide Peakbagging, John Muir Wilderness, Sierra		June 30-July 9	M-S	265	35	Howard Drossman
88099	*Natural History In and Around the Clark Range, Yosemite Park, Sierra		July 16-23	M	215	35	Gerry Dunie
88101	*Mount of the Holy Cross, Sawatch Range, CO		July 18-27	M-S	270	35	Bob Berges
88102	*Sphinx Quest, Kings Canyon Park, Sierra		July 18-27	M-S	235	35	Jim Watters
88105	*Pacific Crest Trail, Donner Pass to Johnsville, Sierra		July 23-31	M-S	225	35	Jim Carson
88107	*Mt. Brewer, Kings Canyon Park, Sierra		July 24-30	M-S	225	35	Jim Halverson
88109	*Moon Lake, John Muir Wilderness, Sierra		July 24-31	L-M	220	35	Don Endicott
88111	*Ritter Range Survey, Sierra Forest, Sierra		July 24-31	M	220	35	Chuck Schmidt
88113	*Back of Beyond, Selway-Bitterroot Wilderness, ID		July 25-Aug. 4	L-M	415	35	Sherri Serna
88115	*Sequoia High Country, Sequoia Park, Sierra		July 29-Aug. 7	M	230	35	Don Lackowski
88119	*Among Monarchs and Kings, Kings Canyon Park, Sierra		July 31-Aug. 7	M	215	35	Lasta Tomasevich
88121	*High Uintas Wilderness, UT		Aug. 2-11	M-S	385	35	Bill Lewis
88127	*Golden Bear Lake, Kings Canyon Park, Sierra		Aug. 8-18	L-M	350	35	Ray Stafford
88128	*Baxter Park, ME		Aug. 11-20	M-S	400	35	Philip H. Titus
88129	*Cirque Crest, Kings Canyon Park, Sierra		Aug. 13-21	M-S	275	35	Joe Uzarski
88131	*Devils Panchbowl, John Muir Wilderness, Sierra		Aug. 14-22	L-M	240	35	Suzanne Riess
88133	*Above the Roaring River, Sequoia/Kings Canyon Parks, Sierra		Aug. 19-28	M-S	245	35	David & Frances Reneau
88135	*Mono Rendezvous, John Muir Wilderness, Sierra		Aug. 20-28	M	225	35	Gary Swanson
88136	*Alpine Lakes, Sequoia Park, Sierra		Aug. 21-Sept. 3	L-M	335	35	Mac Downing
88138	*White Divide, Sierra Forest/Kings Canyon Park		Aug. 24-Sept. 2	M-S	245	35	Gordon Peterson
88141	*McGee Lakes Peakbagging, Kings Canyon Park, Sierra		Aug. 28-Sept. 5	M	225	35	Vicky Hoover
88143	*Lake Reflection, Sequoia/Kings Canyon Parks, Sierra		Sept. 7-14	M	210	35	Bob Madsen
88144	*Fish Creek Basin, John Muir Wilderness, Sierra		Sept. 7-15	L-M	235	35	Bill Engs
88145	*Sachse Monument, Emigrant Wilderness, Sierra		Sept. 10-18	L-M	220	35	Paul Cavagnolo
88146	*Summer's End in the Adirondacks, NY		Sept. 11-17	M-S	290	35	Frank J. Traficante
89302	*Shinumo Amphitheater, North Rim, Grand Canyon, AZ		Sept. 25-Oct. 1	S	220	35	Sid Hirsh
89303	*Clear Creek, Grand Canyon, AZ		Oct. 8-14	S	180	35	John Malarkey
89306	*Clear Creek Winter Solstice, Grand Canyon, AZ		Dec. 18-23	M-S	205	35	Bob Madsen
Junior Backpack Trip							
88150	*Convict Canyon Junior Backpack, John Muir Wilderness/Inyo Forest, Sierra		Aug. 13-20	M-S	215	35	Jenny & Keith Moon

BASE CAMP TRIPS (See Foreign, Hawaii, and Canoe Trips for other base camp outings.)

88153	John Day Fossil Beds National Monument, OR		June 11-19		330	35	Marvin Pistrang
88155	Historical Meadow Lake, Tahoe Forest, Sierra		July 17-23		290	35	Serge Puchert
88156	Palisade Mountaineering, John Muir Wilderness, Sierra		July 18-29		490	35	Melvin Wright
88159	San Francisco Bay Discovery, CA		Aug. 3-10		265	35	Jim Maas & Betty Watters
88161	Foerster Lake, Sequoia Park, Sierra		Aug. 8-18		580	70	Bob Maynard
88164	Bodie Fall Photography Workshop, CA		Sept. 18-25		485	35	Tom Roy
89311	Geology of Death Valley, CA		Dec. 24, 1988-Jan. 1, 1989		395	35	Jim McCracken

BICYCLE TRIPS (See Foreign and Hawaii Trips for other bicycle outings.)

88168	*Vermont Bicycle Tour		June 5-11		425	35	George Neffinger
88169	*Wisconsin Hills and Valleys		June 5-12		345	35	John Arthur
88171	*Cycling Colonial Virginia		June 26-July 3		275	35	Bob Mathis & Tali Stopak
88174	*Lake Placid Circuit, Adirondack Park, NY		Aug. 7-13		375	35	John Borel
88176	*Cycling Through the Shenandoah Valley, VA		Sept. 17-24		360	35	Martin Joyce
89314	*Hudson River Valley Fall Foliage Bike Trip, NY		Oct. 2-8		300	35	John L. Kolp

OUTINGS

Trip Number	* = Leader approval required	Backpack Rating Key: L = Leisure Trip M = Moderate Trip S = Strenuous Trip			Date	Rating	Trip Fee (including Deposit)	Per Person Deposit	Leader
BURRO TRIPS									
88179		Around the Triple Divide, Ansel Adams Wilderness/ Yosemite, Sierra			July 31-Aug. 14		770	70	Mark Roderick
FAMILY TRIPS (See Base Camp, Burro, Hawaii, and Service Trips for other suitable family outings.)									
88186		Gaspé Family Outing, Gaspé Peninsula, Quebec			July 17-24	Price Per Adult 370	Price Per Child 245	35	Wanda & Tom Roy
88187		Redwood Park Family Outing, CA			July 17-24	Price Per Adult 320	Price Per Child 215	35	Beth & Bob Flores
FOREIGN TRIPS (Prices do not include airfare.)									
Africa									
88635	*	African Safari Spectacular, Tanzania			June 29-July 13		2790	100	Bud Bollock
88700		Walk on the Wild Side in Kenya			Sept. 7-27		3655	100	A. Lass-Roth
89820	*	Christmas Camping and Wildlife Safari, Kenya			Dec. 17-30		3285	100	John DeCock
89840		A West African Adventure, Togo, Benin, and Ghana			Jan. 18-Feb. 2, 1989		3200	100	Ruth Dyche
Asia									
88615		Guilin and Yunnan Bicycle Tour, China			June 13-July 2		2760	100	Sy Gelman
88630		Tilicho Lake, Nepal			June 25-July 23		1550	100	Bob Madsen
89800		Yangtze Valley—Grand Canal, China by Bicycle			Sept. 25-Oct. 15		2750	100	Phil Gowing
89810		Helambu, Majesty and Monasteries of Nepal			Oct. 30-Nov. 17		1295	100	Carolyn Downey
89815	*	Mountains to Jungle, Gorkha—Chitwan Photo Trek, Nepal			Nov. 21-Dec. 10		1775	100	Dolph Amster
89817		Thailand, A Journey to Its Temples, Hills, and Beaches			Nov. 22-Dec. 8		1415	100	David Horsley
89825	*	Lamjung Christmas Trek, Nepal			Dec. 17-31		955	100	Peter Owens
89830		South China Sea Hike and Leisure Backpack			Dec. 20, 1988-Jan. 2, 1989		1650	100	Phil Gowing
89855		Annapurna-Chitwan Trek, Nepal			Feb. 20-March 1, 1989		1195	100	Peter Owens
Europe									
88605		Walking in the West Country, England			June 5-21		2225	100	Robin Brooks
88645		Hiking the Northern Basque Country, France			July 10-23		1675	100	Nancy Auker
88650		Tyrolean Hiking Tour, Austria			July 18-Aug. 2		1480	100	Vicky Hoover
88665		Cultural and Historical Outing to the Rooftop of Europe, Switzerland			July 28-Aug. 6		2175	100	Bert Gibbs
88670	*	Service Trip to the Austrian Tyrol			July 31-Aug. 14		805	100	Jean Ridone
88680		Around the Feldberg, West Germany			Aug. 15-27		1510	100	Sigrid Miles
88690		Central Alps, France			Sept. 4-16		1670	100	Jerry South
88695		Biking in Denmark			Sept. 4-17		2345	100	Len Lewis
88710	*	Hiking Tour of the Austrian Alps			Sept. 21-29		1155	100	Jeanne Blauner
89845		Cross-Country Skiing in the Austrian Alps, Salzburg, and the Austrian Tyrol			Jan. 29-Feb. 12, 1989		TBA	100	Lynne McClellan Loots
Latin America									
88610		Tawantinsuyo: The Four Quarters of the World, Bolivia and Peru			June 4-27		2570	100	Jerry Clegg
88620		Peru-Bolivia Adventure			June 20-July 10		2540	100	Chuck Schultz
89807		Sea of Cortez Kayaking, Baja California, Mexico			Oct. 24-30		895	100	Tony Strano
89812		Sea of Cortez Kayaking, Baja California, Mexico			Nov. 19-25		895	100	Bob Hansen
89835		Sea of Cortez Kayaking, Baja California, Mexico			Dec. 26, 1988-Jan. 1, 1989		895	100	Sallee Menning
89850		Magdalena Bay Sea Kayaking, Baja California, Mexico			Feb. 20-26, 1989		895	100	Karen Short
89860		Magdalena Bay Sea Kayaking, Baja California, Mexico			Feb. 27-March 5, 1989		895	100	J. Victor Monke
89870		Sea of Cortez Kayaking, Baja California, Mexico			April 8-14, 1989		895	100	Bill Bricca
Pacific Basin									
88685		Australia's Northern Territory Wilderness			Aug. 29-Sept. 18		2160	100	Pete Nelson
89865		Backpack New Zealand			March 5-26, 1989		2440	100	Jim W. Watters

OUTINGS

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HAWAII TRIPS (Prices do not include airfare.)							
88190			July 2-16		745	70	Thelma Rubin
88191			July 24-31		650	70	Steve Griffiths & Suzanne Ortiz
89315			Sept. 30-Oct. 9		690	70	Eunice Dodds
89316			Dec. 20, 1988-Jan. 1, 1989		960	70	Judy Nelson

HIGHLIGHT TRIPS (See Alaska and Base Camp Trips for other highlight-type outings.)

88197	Mineral King Leisure Highlight, Sequoia Park, Sierra	July 10-19	795	70	Len Lewis
88199	Clark Range, Yosemite/Ansel Adams Wilderness, Sierra	July 29-Aug. 8	890	70	Walt Goggin
88202	The Grand Tetons West Slope, Targhee Forest, WY	Aug. 8-17	750	70	David Horsley
88203	To the Roof of the Sierra Around Four Gables	Aug. 21-28	525	70	Bert E. Gibbs
88204	Southern Yosemite, Sierra	Sept. 10-17	620	70	G. & E. Benner
88205	Three Sisters Llama Trek, OR	Sept. 12-17	790	70	Madeleine Watters
88206	North Rim, Grand Canyon, AZ	Sept. 21-30	505	70	Edith Reeves

SERVICE TRIPS (Also see Foreign Trip #88670.)

88212	*Schell Canyon Trail Project, Apache Forest, AZ	June 4-11	80	35	Rod Ricker
88218	*Pocket Meadow Trail Maintenance, Sierra Forest, Sierra	June 26-July 6	125	35	Stuart Swan
88219	*Chub Pond, Adirondack Park, NY	July 3-9	125	35	Richard Grayson
88220	*Cloud Peak Trail Maintenance, Bighorn Forest, WY	July 5-15	125	35	John Albrecht
88222	*Meteor Lake Trail Maintenance, Klamath Forest, CA	July 7-17	125	35	Tom Gefell
88223	*El Rito Azul Trail Construction, Rio Grande Forest, CO	July 8-18	125	35	Rob Dorival
88228	*Piute Lake Trail Maintenance, Inyo Forest, Sierra	July 17-27	125	35	Lee Bowen
88230	*Deer Creek Trail Maintenance, Shasta/Trinity Forests, CA	July 18-28	125	35	David Stern
88229	*Yampa River Trail Maintenance, Routt Forest, CO	July 20-30	125	35	Jack Brautigam
88231	*Lost Remuda Trail Maintenance, White River Forest, CO	July 20-30	125	35	Scott Larson
88232	*Grand Canyon Potpourri, Grand Canyon, AZ	July 21-30	125	35	Peter Curia

OUTING RESERVATION FORM

MEMBERSHIP NO.		TRIP NO.		TRIP NAME		DEPARTURE DATE	
YOUR NAME				HAVE YOU RECEIVED THE TRIP SUPPLEMENT? YES <input type="checkbox"/> NO <input type="checkbox"/>			
STREET ADDRESS				YOUR HOME PHONE ()			
CITY		STATE		ZIP		YOUR WORK PHONE ()	
PLEASE PRINT YOUR NAME AND THE NAMES OF OTHER PEOPLE IN YOUR PARTY				MEMBERSHIP NO.	AGE	RELATIONSHIP	NO. OF OUTINGS YOU'VE BEEN ON CHAPTER NATIONAL
1.						SELF	
2.							
3.							
4.							
PER PERSON COST OF OUTING:		TOTAL COST THIS APPLICATION:		DEPOSIT ENCLOSED:		FOR OFFICE USE ONLY:	

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

OUTINGS

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SERVICE TRIPS CONTINUED							
88235	*		Sixth Annual Beginning Campers' Trail Reconstruction and Wilderness Restoration, Washakie Wilderness, WY	July 26-Aug. 5	125	35	Ed Thomas
88236	*		Piute Pass Meadow Restoration and Trail Maintenance, Sierra Forest, Sierra	July 28-Aug. 7	125	35	Anne Stork
88238	*		Naturalist Basin Trail Repair, High Uintas Mountains, UT	Aug. 3-13	125	25	John Fischer
88249	*		Wind River Trail Eradication, Pupo-Agie Wilderness, WY	Aug. 3-13	125	25	Bob Hayes
88241	*		Santa Barbara-Trampas Lakes, Pecos Wilderness, NM	Aug. 6-13	105	35	Linda & John Buchser
88242	*		Parker Lake Trail Maintenance, Panhandle Forest, ID	Aug. 6-16	125	35	Tim Cronister
88243	*		Lost Man Trail Construction, White River Forest, CO	Aug. 9-19	125	35	Dan Bittle
88244	*		Minam Lake Restoration, Wallowa-Whitman Forest, OR	Aug. 9-19	125	35	Laurie-Ann Barbour
88245	*		Minarets Avalanche Cleanup, Sierra Forest, Sierra	Aug. 10-20	125	35	Jon Nichols
88246	*		Targhee Teton Trail Maintenance, Targhee Teton Forest, WY	Aug. 17-27	125	35	Eric Bowman
88247	*		Boulder Basin Trail Maintenance, Shoshone Forest, WY	Aug. 18-28	125	35	TBA
88251	*		Silver Pass Wilderness Maintenance, Sierra Forest, Sierra	Aug. 22-Sept. 1	125	35	TBA
88252	*		Tuolumne Meadows Trail Maintenance and Cleanup, Yosemite Park, Sierra	Aug. 24-Sept. 3	125	35	C. E. Vollum
88254	*		Mt. Whitney Trail Maintenance, Inyo Forest, Sierra	Sept. 7-17	125	35	Bill Weinberg
88255	*		Five Ponds Wilderness Trail Maintenance, Adirondack Forest Preserve, NY	Sept. 11-17	130	35	John L. Kolp
88256	*		New Wood Trail Construction, Lincoln County, WI	Sept. 15-25	125	35	TBA
89318	*		Ozark Trail Maintenance, Mark Twain Forest, MO	Oct. 23-29	115	35	Rick Rice

WATER TRIPS

Rafting

88260			San Juan Paddle Raft Trip, UT	Sept. 23-30	915	70	Bert Fingerhut
Sailing							
88261			Queen Charlotte Island Wilderness, British Columbia	June 26-July 2	1450	70	Gary Dillon
88262			Totems, Sails, and Orca Whales—An Inland Passage Journey, British Columbia	July 14-20	1265	70	Mary O'Connor
88263			Totems, Sails, and Orca Whales—An Inland Passage Journey, British Columbia	Aug. 24-Sept. 1	1450	70	Wheaton Smith
88264			The Great Northwest Sailing and Natural History Adventure, British Columbia/WA	Sept. 6-11	950	70	Sallee Menning
88265			The Great Northwest Sailing and Natural History Adventure, British Columbia/WA	Sept. 12-17	950	70	Margie Tomenko

Canoe

88267	*		Canoeing and Backpacking the James River, VA	July 10-15	280	35	Connie Thomas
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For More Details on Outings

Outings are described more fully in trip supplements, which are available from the Outing Department. Trips vary in size, cost, and 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 to save 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.

Send supplements (order by trip number):

_____ # _____ # _____

NAME _____

ADDRESS _____

CITY _____ STATE _____ ZIP _____

Enclosed is \$ _____ for extra supplements at 50 cents each.

Enclosed is \$2 for a 1988 Outing Catalog.

#2

Please allow 2-4 weeks for delivery. Do not mail cash.

Clip coupon and mail to: Sierra Club Outing Department, 730 Polk St., San Francisco, CA 94109

Tents to Lighten Your Load

Snug shelters for outdoorspeople who want to shed a few pounds.

Mike Scherer

BECAUSE touring cyclists, climbers, and backpackers must keep the weight of their gear to a minimum, most of them are familiar with a variety of techniques for paring ounces from their loads—from forgoing luxuries to cutting toothbrushes in half. But another strategy they might consider is carrying ultralight shelters that weigh two or more pounds less than standard tents.

An ultralight shelter weighs less than 2.5 pounds per person and will provide protection in "three-season" conditions.

(Don't expect one to withstand gale-force winds or heavy snowfall, however.) Worthwhile candidates include tarps, pitched rainflies, bivouac sacks, and small tents.

Tarps are light, inexpensive, basic shelters. Along with a campfire and toasted marshmallows, a well-pitched tarp can be one of camping's simple joys. A complete tarp "system" requires only waterproof fabric, cord, a few well-spaced trees, a grasp of simple geometry, and a little time. But a tarp must be large enough to provide good coverage, and finding a site for it can be difficult. Because a tarp shelter is not enclosed, it offers poor protection from snow, wind, and bugs, it won't keep you warm, and it's

worth little above timberline, where good anchorages are few.

Sculpted tarps solve many of these problems. Some are tent rainflies that can be pitched independently. They weigh up to four pounds less than a tent-and-fly combination, offer airy interior space, and use standard tent poles (so you won't have to hunt for trees). Because they extend almost to the ground, sculpted tarps offer good protection from wind and rain.

A bivouac sack is the simplest fully enclosed shelter. Waterproof cocoons large enough to hold one prone body and a sleeping bag, most "bivies" have

floors of coated nylon and tops of breathable but waterproof fabrics such as Gore-Tex. Like a tent, a bivouac sack adds 10 to 15 degrees Fahrenheit of warmth to a sleeping bag and provides protection from howling winds, rain, and snow.

Bivouac sacks do have their problems, however. By morning they are nearly always damp from condensation. Furthermore, while they're ideal as just-in-case shelters, the protection they provide is too limited for extended bad-weather use. And you can't sit up in one. While lying in your bivy, though, you can mull over its most endearing quality: It weighs only about one pound.

When two or more people travel together, the scales tip in favor of tents. Tents protect you from all angles, no matter which way the wind, rain, or snow blows. Most have separate, waterproof rainflies that you pitch above a breathable fabric layer. Two layers provide insulation as well as protection from the elements, condensation, and bugs. An ultralight tent weighs around four or five pounds.

A tent that protects is not necessarily pleasant. A truly livable tent allows you, your partner, and some amount of gear to weather a storm or mosquito attack in relative comfort. Total square footage is one criterion to con-



Light nights: Sierra Designs' two-person Clip Flashlight weighs less than four pounds.

sider, but be careful: Because ultralight designs eke maximum floor area from a minimum amount of fabric, some tents are so low-slung and short that you may not be able to sit up or stretch out in them.

To test a tent, lie in it with your feet and head at least four inches from the walls. With less space your sleeping bag will get wet from vapor condensation, and the walls will press against you when the wind blows. Many people need at least 12 inches between their head and any wall to feel comfortable. You may be content with just enough space to prop yourself up on your elbows, or you may want room for a seated card game. Avoid floor shapes with small, unusable spaces, and consider a tent that allows you to store gear in an outside alcove rather than inside.

Since the first pup tent sagged on an unhappy camper, designers have worked hard to make tents efficient and light. A Conestoga shape is the most practical design because it requires as few as two tent poles. The uneven hoops create an efficient coffin shape; a long pole bent into a hoop creates a front area large enough to sit up in, while a smaller rear pole barely clears a pair of feet. Conestogas are not like free-standing domes: They require stakes and sometimes Keystone Cop antics to set up.

Ultralight designs shave ounces wherever they can. While most tents have fabric sleeves to hold the poles, tents by Sierra Designs use strong, lightweight clips that facilitate quick setup. Some North Face and Kelty models use heavy fabrics only in high-wear areas, and many ultralights use thin-walled alloy poles. Finally, a tent with a large area of bugproof netting instead of solid fabric may save half a pound of weight. You give up warmth, especially in a wind, but the rainfly still affords privacy.

A well-chosen ultralight shelter won't be a castle, but it will provide protection from the elements and a fair amount of comfort. At the same time, it will free you from the aggravation of lumbering around the wilderness with more tent than you need. ■

MIKE SCHERER designs outdoor equipment for Kelty in Boulder, Colorado.



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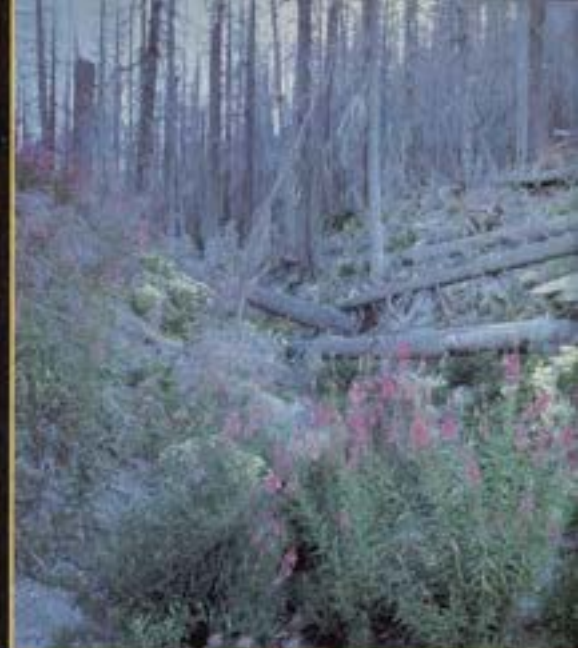


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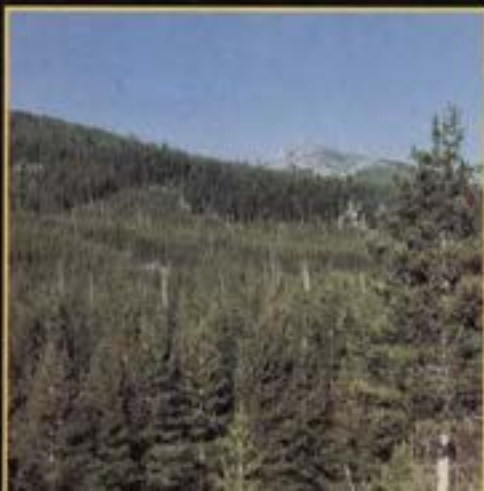
Fire destroyed this forest and watershed. While many trees die in a forest fire, some that have only been charred will live. These veterans may help reseed the burned forest. On the other hand, a tree doesn't have to burn completely to die or become vulnerable to disease. Damage to its cambium layer (just inside the bark), which transports nutrients and water throughout the tree, can also be lethal.

BILL GABRIEL



It may take 150 years for a mature forest to rise again where fire has run its course. Sixty years after a major blaze in what is now Montana's Bob Marshall Wilderness, the older Douglas fir stands (background) are easy to distinguish from the younger lodgepole pines (foreground) that grew after the fire.

BILL GABRIEL



Left to its own devices, nature would use lightning to create frequent fires. Periodic fires clear undergrowth, dead trees, and other materials on the ground, keeping fires low and protecting the forest's healthy, mature trees. If fuel is allowed to build up (which happens when humans prevent natural fires from occurring), a small fire can become a raging inferno that reaches the crowns of full-grown trees. Foresters in Rocky Mountain National Park (right) imitate nature's "spring cleaning" by setting "prescribed" burns.

KENT & DONNA DARRIN



Of Fire and Forests

A new forest rises out of the ashes. Wildflowers such as fireweed and yarrow, which can grow in dry, scorched soil (left), may appear in burned areas almost immediately. While a wildfire destroys habitat, it may do so for a relatively short period; as the forest regenerates, small animals will thrive on new plant growth, and hawks and other birds of prey will gain better views of hunting grounds now cleared of their forest cover.

CHARLES MAUZY/APERTURE PHOTOBANK

Huge fires, started by lightning, swept through western forests last fall. Before the danger was over, thousands of small fires had combined to form dozens of bigger ones, burning millions of acres. The fire in California's Stanislaus National Forest alone burned enough wood to build houses for a population the size of San Francisco's. It will take as many as 150 years for the forests to again reach maturity.

While it's easy to talk about losses from fires of this size in terms of lumber, the damage to fish and wildlife habitat is also important. Some soils, sterilized by intense heat, wash into streams with the first rains, destroying spawning grounds and even suffocating fish. Most large animals have the instinct and speed to outrun an advancing fire, but rodents and other small animals sometimes burrow underground, where they may die.

But even large burns will heal. Except after the hottest and most devastating fires, regeneration begins almost immediately. Fire turns dead logs and litter on the forest floor into mineral ash, providing rich fertilizer for new plants. Fire also removes diseased trees, helping to prevent the spread of pest infestations. Unburned trees near a scarred site supply seeds for new growth. In some kinds of pine forests, fire opens pinecones, seeding the soil. (If the fire is too hot, however, it can destroy the pinecones and their seeds.)

A forest that experiences small burns periodically is usually diverse, with varying patterns and types of trees and plentiful wildlife. When fire opens up the dense canopies of old forests, for example, trees that need direct sunlight flourish, and animals can take advantage of the new food in regenerating areas as well as the protection offered by unburned areas.

STUART WASSERMAN is a writer and photographer in Oakland, California.

BACKGROUND PHOTO: STEPHEN J. KRASEMANN | ORN PHOTO



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BOOKS

Defender of the Everglades

Voice of the River
by Marjory Stoneman Douglas
with John Rothchild
Pineapple Press
\$17.95, cloth

Julie Hauserman

IT WOULD BE EASY for Marjory Stoneman Douglas to retreat quietly into the role of environmental figurehead. She's 98 now, and her landmark book on Florida's Everglades, *River of Grass*, has been around for 40 years. In fact, it would have been easy for Douglas to retire 20 years ago, when she was 78. But, as she's quick to tell you, she was just getting started in a new fight then—devoted to preventing Florida developers from filling what they considered to be a vast, worthless swamp.

Marjory Stoneman Douglas has never done things the easy way. Even now, with her eyesight failing, she turns up at public meetings, clad in her trademark floppy hats and dark glasses, to make life difficult for high-rolling developers and sluggish bureaucrats. Her reputation as "the state's premier tweaker of engineers' noses," as the *Miami Herald* once called her, is a Florida legend. But the hard road she has taken since her 1890 birth in Minneapolis is not.

This is where *Voice of the River* comes in. Two years ago Douglas set out to put her life history on paper, telling more than 200 hours' worth of stories to writer John Rothchild. The result is an honest and compelling book, full of non-nonsense philosophy and Florida history.

Voice of the River is about an early conservationist and pioneer feminist who preached environmental consciousness before most people realized that the acres and acres of Florida slash pine, palmetto, swamp, and beach were a finite commodity. It is about a stubborn old lady who lives in a tiny Coconut Grove house and who lets hardly anybody get away with anything. Most

of all, it is about a woman who stands up for things she believes in.

When Douglas first boarded a train going from New York City to Miami in 1915, she was fleeing a bad marriage to a sometime journalist and full-time thief who tried to bilk money from her relatives. In Miami she linked up with her father, Frank Bryant Stoneman, founder of the *Miami Herald*. At the *Herald* she embarked on what became a long and successful writing career, beginning as a society editor hobnobbing with the likes of William Jennings Bryan and other high-powered Florida pioneers.

Douglas' society-reporting career was cut short, however, when she went on what should have been a routine assignment to a Miami dock where the Navy was recruiting personnel for a Reserve ship. She was supposed to write about the first Florida woman to enlist in World War I's Naval Reserves.

But, as she tells it, things went awry. "I arrived at the ship, and the next thing I knew I was sticking up my hand, swearing to protect and defend the United States from all enemies whatsoever. . . I called my father at the paper and said, 'Look, I got the story about the first woman to enlist. It turned out to be me.' He said, 'I admire your patriotism, but it leaves us a little shorthanded.'"

After a stint in Europe, Douglas returned to the *Herald*. But nervous breakdowns forced her to quit that high-pressure world, and she settled into her Coconut Grove house to write magazine articles. When the editors of the *Rivers of America* book series (Rinehart and Company) asked her to write about the Miami River, she convinced them to let her focus on the Everglades. She didn't know much about science, but she did know how to use words. She used three that would change forever the way Florida's swampy middle was perceived. The three, *river of grass*, later became part of the title of her most important work.

The Everglades: River of Grass affected

Floridians the way Rachel Carson's *Silent Spring* would later spark the nation. The book's publication coincided with the establishment of Everglades National Park, for which Douglas had lobbied for 25 years. In the years after *River of Grass*, Douglas turned her attention to other projects, including the book *Florida: The Long Frontier*, published in 1967.

Douglas was in her late 70s before she joined the day-to-day battle to protect the Everglades from the state's development boom. It was on a shopping trip sometime in the 1960s, she says, that she became interested in the fight to keep a jetport out of the park. Joe Browder, then head of the Audubon Society chapter in Miami, was organizing opposition to the jetport. In a grocery-store check-out line, Douglas ran into a woman who worked for Browder. "I said, 'I think you and Joe are doing great work. It's wonderful.' She looked me square in the eye and said, 'Yeah? What are you doing?' 'Oh, me?' I said. 'I wrote the book.' 'That's not enough,' the woman countered. 'We need some people to help us.' To get out of the conversation, I mumbled some platitude like 'I'll do whatever I can.'"

Browder, who later learned of the exchange, challenged Douglas to start a grassroots group. At a garden party, she mentioned the idea to an acquaintance. "I asked him what he thought about an organization called something like Friends of the Everglades—which anybody could join for, say, a dollar. Without hesitation, he handed me a dollar. Now I had not only the idea of an organization, but also one member and an endowment. What choice did I have but to carry this further?"

Today Douglas, the state's environmental heavy hitter, still speaks publicly about the Everglades. Even at 98, she remembers events in remarkable detail. At times her book bogs down in those details: We learn the address of the house where she was born, the floor plans of successive houses, and everything we ever wanted to know about her New England relatives in the early 1900s.

Still, the many gems in *Voice of the River* are worth the wade through the family album. Douglas knows she's lived an unconventional life—and has the sense to use some of that quirkiness

as material. For example, in describing her sex life she writes: "It can be dealt with in one sentence. I didn't have any sex life." She then says that she hasn't had any sex since 1915, and adds, "I've done very well without it, thank you."

Conservation, Douglas-style, is a holistic science. The Everglades, she maintains, can't be separated from central Florida's upper chain of lakes, or from the Kissimmee River and Lake Okechobee, the state's 730-square-mile "liquid heart." At a speech last year she called the pollution of Lake Okechobee the state's number-one environmental problem and urged the conservationists in her audience to lobby state legislators on the lake's behalf.

After the speech an elderly man raised his hand and asked who his group might employ to lobby state politicians. Perhaps recalling her supermarket encounter years earlier, Douglas peered at him from beneath her wide-brimmed hat. "How about you?" she suggested.

JULIE HAUSERMAN writes for the *Stuart News in Stuart, Florida*.

Climbing to Perilous Extremes

K2, Triumph and Tragedy

by Jim Curran
The Mountaineers
\$22.95, cloth

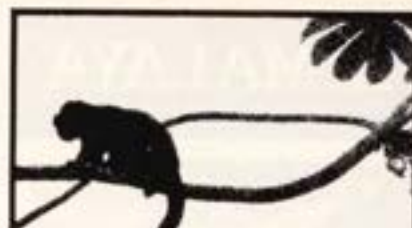
K2: Savage Mountain/Savage Summer

by John Barry
Oxford Illustrated Press
(c/o Haynes Publications)
\$14.95, cloth

Michael Light

WHILE SECOND in height to Mt. Everest, K2 is ranked by climbers as the most challenging of the world's four-teen 8,000-meter peaks. The summer of 1986 was particularly rife with ambition there—with notable achievement, but also with a shocking number of deaths. Jim Curran and John Barry examine the events of that summer in two books.


The 1986 climbing season brought




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some heady successes at K2, not the least being the sheer number of climbers—27—who reached the summit. Wanda Rutkiewicz of Poland, Julie Tullis of Great Britain, and Liliane Barrard of France became the first women on top (though both Tullis and Barrard died on the descent), and Benoit Chamoux scaled the summit via the Abruzzi Ridge and returned to base camp in a record less-than-24 hours. In addition, the season's climbers negotiated two difficult new routes on the peak's South Face and South-Southwest Ridge.

Unprecedented achievement came at an unprecedented price, however. By the time the 1986 season concluded, it ranked as the most disastrous in the history of K2 climbing. Thirteen mountaineers from seven nations perished, making the casualty-to-summit ratio an appalling one-to-two, and more than half the victims died after they had reached the top. The ultimate horror came at season's end, when five of the world's leading climbers (from England, Poland, and Austria) died in a storm high on the Abruzzi Ridge after reaching K2's summit.

Authors Curran and Barry were both on the mountain that summer as members of the unsuccessful British Fullers' Expedition. Barry, an ex-Royal Marine and one of Britain's foremost ice climbers, served as the expedition's number-two man after charismatic and erratic leader Alan Rouse; Curran, a mountain cinematographer, filmed the climb. When the expedition broke up midway through the season after failing to ascend the long and hitherto unclimbed Northwest Ridge, Barry quit, leaving Rouse to attempt the Abruzzi Ridge alone. Curran, Rouse's close friend, remained at base camp to continue filming, only to wait helplessly below as Rouse died of hypothermia high on the ice after becoming the first Englishman to reach the summit.

In *K2: Savage Mountain/Savage Summer*, Barry masks the daunting nature of these events with a liberal application of humor. Very much the British iconoclast, he taps a store of comic irony to enliven an otherwise nationalistic expedition account. Barry's recollections of the climb itself are nicely balanced by snippets of playful conversation among

the men at base camp. The writing bogs down only following the section in which the author describes his decision to abandon the expedition.

Unfortunately, Barry's package fails to do justice to the grim issues of the 1986 season. He confines himself to the technical details of the climb, including provision lists and a 100-page description of the walk to the mountain's base camp. He resolutely refuses, it seems, to explore his feelings about the summer's carnage, which makes the book frustratingly limited. Barry declares that "to deal in death takes courage and I have not the guts for it," adding that "a soft heart is all wrought up in a tangle of loyalty and friendship." In what may be the book's single moment of emotional substance, Barry finds himself too vulnerable to grief and clams up again. Remembering a night on the walk away from the mountain, he chases his thoughts of death "as far into that darkness as I dared. Introspection had begun in earnest, no particularly healthy thing. Mountaineers should stay roped to whatever sanity they can hitch their minds to." Finally, he delivers a tight-lipped conclusion: "There are no lessons. Mountaineering is dangerous."

Curran's *K2, Triumph and Tragedy* is a very different book, private and general where Barry's is public and specific. The author wastes no time in cutting to the painful quick of the summer's events. Filmmaker Curran talks freely of his hopes, fears, successes, and failures on the mountain, and of each death as it occurs. He takes pains to be candid: His climbing abilities, while impressive, are not in the same league as his mates', and he's big enough to make light of his awkwardness. He "stupidly" gets lost alone on the Savoia Glacier, wrestles with "dreaded" skis that render him "increasingly neurotic" as they lurch out of control across man-eating crevasses at 6,100 meters, and cheers triumphantly at 6,500 meters when he suddenly realizes that he is "actually doing something that could loosely be described as climbing!"

Curran's candor also reveals other, darker aspects of the mountain. Lacking Barry's emotional barricades, he reacts as we ourselves might react to tragedy: He says to a Frenchman who has barely

escaped alive from a whiteout, "God, Michel, don't do that again, please." Curran "fights unsuccessfully to hold back the tears" with news of each new death, and without ever being maudlin, his material is powerfully moving. His description of his ten-day base-camp vigil is almost too painful to read.

For anyone who regularly climbs high mountains, the tragedies of K2 during the summer of 1986 must be frightful to contemplate; today's style of high-altitude climbing without the aid of bottled oxygen makes the line between risking the summit and ensuring disaster very thin. Climbers know that death is more intimately entwined with their endeavor than ever, and many, like Barry, avoid talking about it.

Yet an objective evaluation of the facts—however messy emotionally—could be crucial to the success of future expeditions. Curran, not Barry, risks the summer's most important conclusion: "Alpine-style, oxygen-free ascents by small teams will inevitably become the norm. But a much higher proportion of unsuccessful attempts will have to be accepted as the price one pays. Otherwise the carnage will continue. Exploring and pushing the limits has always been the name of the game . . . but the limits are still there."

MICHAEL LIGHT is a freelance writer living in San Francisco.

The Hidden Springs of Nature

The Lost Notebooks of Loren Eiseley
edited by Kenneth Heuer
Little, Brown
\$24.95, cloth

Marisa Gaines

FOR THREE DECADES people have read Loren Eiseley's natural-science writings with the same gratitude for simplicity that students studying Shakespeare feel when they discover "Lamb's Tales."

The Lost Notebooks of Loren Eiseley is a final encore, gleaned from the author's

journals and early unpublished writings known only to Eiseley and a very few others during his lifetime. "They were lost," writes Kenneth Heuer, Eiseley's editor for more than a decade, "like the ruins of ancient cities in the mountains of Peru."

Arranged in chronological order, *The Lost Notebooks* gives Eiseley devotees an intriguing overview of his development as a writer and a thinker. Spanning the greater part of his life—from age six in 1913 to the year of his death, 1977—this collection of writings contains some early poetry, brief reflections on a difficult childhood, and descriptions of his life as a near-derelict during the Depression. In addition it includes much of Eiseley's later correspondence with such literary lights as W.H. Auden and Ray Bradbury.

Nature as the product of slow, unrelenting change and people as the sometimes bumbling instigators of overly rapid change are themes that echo throughout much of Eiseley's work. "For it is of change I want to speak," he wrote in his notebook on October 15, 1957, "change and the deaths that it is possible to die of change, but which we have forgotten until lately, having been, as a race, fortunate."

Eiseley's admirers have always delighted in his ability to reveal, in simple terms, the significance of the smallest events, what he called the "hidden springs of nature." In this way Eiseley has educated a generation of natural-science readers, creating in them an ecological consciousness, a sensitivity to man's "blundering about with new-found powers." He wrote, for example, of the construction of a new building near his home: "It has destroyed an acre or more of wild land and the field mice have flooded into the apartment. Poor little fellows—the end of their world—and now everyone is hunting, poisoning, and trapping them. . . . Civilization has taken the last truly wild field in Wynnewood."

Heuer has divided the notebooks into three parts. The first, entitled "The Gate and the Road, 1907–1947," is primarily a collection of Eiseley's previously unpublished poems and short stories. One short story, "The Toad," was inspired by his archaeological work during this

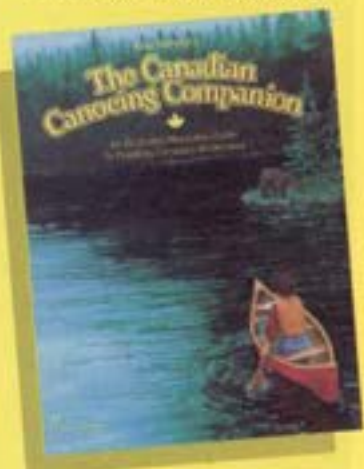
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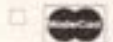
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Listening to Nature: How to Deepen Your Awareness of Nature

by Joseph Cornell

Photographs by John Hendrickson

Dawn Publications

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Nevada City, CA 95959

\$11.95, paper

"Find a quiet place, where you can be alone," advises Joseph Cornell, a Californian who for many years has been conducting nature-awareness workshops for children and adults. "Listen . . . for the silences between the sounds." In this guide to meditating on the beauty of nature, Cornell brings together thoughts from Whitman, Muir, Carson, and others and includes inspirational exercises for each day of a typical month. John Hendrickson's photographs of quiet places, including Lake Pakaki in New Zealand's Mt. Cook National Park (above), illuminate the text.

period; it has a compelling, mystical quality not typical of his later writings, which focus more on demystifying the natural world.

Eiseley's writings in part two, "The Sorcerer in the Wood, 1947-1966," demonstrate his increasing interest in evolutionary theory, which led to the 1958 publication of *Darwin's Century: Evolution and the Men Who Discovered It*. One of the writings, "Evolution Can Be Seen," reveals Eiseley's sense of unity with nature: "I have carried seeds up the sheer walls of mesas and I have never had illusions that I was any different to

them than a grizzly's back or a puma's paw." Natural selection, Eiseley believed, is a function of chance, of "pure and unreturning opportunity."

The final section, "The Ultimate Snow, 1966-1977," includes an unfinished introduction to Darwin's *The Formation of Vegetable Mould Through the Action of Worms*. Here Eiseley wrote with characteristic simplicity of Darwin's celebration of the "all-conquering, all-devouring worm . . . against whose terrors great vaults and mausoleums would be erected to this day."

An air of melancholy hangs over

Eiseley's writings from these last years. His fear for humanity and for the planet itself, his sadness at growing old, and his precarious health combined to give him a decidedly dark vision of the world. "I am aging," he reflected wearily the day he returned home after unsuccessfully searching for the road leading to a cemetery and his family grave. He recalled that years before he had stretched out on the plot to look at the autumn sky. "And to think," he had mused at the time, "this will sometime be forever, though nothing, geologically speaking, ever is."

Eiseley's archaeological background

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MARISA GAINES is Sierra's editorial intern.

BRIEFLY NOTED

A host of recent adventure travel books, written by and about courageous explorers, offer a summer full of imaginative journeying across the mountains, ice floes, and tropical landscapes of the globe. In *Journey on the Crest* (The Mountaineers; \$10.95, paper) Cindy Ross states her philosophy succinctly: "To walk in the wilderness is freedom.

To work a routine, in a subservient situation, is death." Ross describes the physical challenges she faced, and her interactions with other hikers as her determination and strength took her from Mexico to Canada on the rugged, 2,600-mile Pacific Crest Trail. . . . On January 26, 1977, Englishman George Meegan started walking northward from Tierra del Fuego, and, as he relates in *The Longest Walk* (Dodd, Mead; \$19.95), he didn't stop until seven years and 19,000 miles later, when he reached the northern fringe of Alaska's Prudhoe Bay. At first ARCO officials refused him permission to cross their company's Alaska landholdings, but finally they relented and he planted the Union Jack at the edge of the Arctic Ocean. . . . Inspired by Admiral Robert Peary's 1909 expedition to the North Pole, seven men and one woman set out by dogsled from Ellesmere Island across the Arctic Ocean in 1986. Team leaders Will Steger and Paul Schurke recount the trials of navigating across a thousand miles of shifting ice in *North to the Pole* (Times Books; \$19.95). . . . It was the winter of 1936 and Shell Taylor, a 24-year-old clerk in New York City, fantasized about taking to the Hudson River in a canoe. With the help of some maps and the backing of his nightclub-singer sister, Taylor and a friend quit their jobs

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and embarked on a six-month river journey across Canada and Alaska. Based on Taylor's recollections, Rick Steber tells the tale in *New York to Nome: The Northwest Passage by Canoe* (North River Press; \$17.50). . . . San Francisco native Eric Hansen was *A Stranger in the Forest* (Houghton Mifflin; \$17.95) when he walked through a 1,500-mile expanse of Borneo's rainforest in 1982. For seven months he survived the jungle's rigors by trusting his instincts, earning the goodwill of the natives by bartering Western goods. . . . Leonidas Hubbard did not survive a 1903 canoe- and portage-crossing of Labrador's unmapped barrens, but his best friend, Dillon Wallace, did. Two years later, Hubbard's widow followed the same route to prove that Wallace could have done more to save her husband. Wallace, in a rival expedition, also retraced his course. James West Davidson and John Ruge reconstruct these travels in *Great Heart: The History of a Labrador Adventure* (Viking; \$19.95). . . . "Come with me and learn how to be vulgarly robust," wrote Grace Gallatin Seton-Thompson in *A Woman Tenderfoot*, originally published in 1900 and reprinted now by Nick Lyons Books (\$9.95, paper). The wilderness spirit of this upper-class, feminist outdoorswoman contrasts with her era's Victorian sensibilities. . . . Edward Whymper's classic *Travels Amongst the Great Andes of the Equator*, first published in 1892, is again in print (Peregrine Smith Books; \$24.95). . . . John Roskelley, one of the world's great mountaineers, recounts the tragic events of a 1976 climbing expedition up India's 25,645-foot *Nanda Devi* (Stackpole Books; \$16.95). The book's title honors Nanda Devi Unsoeld, who died during the expedition on her namesake mountain. . . . The climbing death of Scotsman Tom Patey in 1970 "occurred in a black period for British mountaineering," writes Christopher Brasher in his introduction to Patey's autobiography, *One Man's Mountains*, now in paperback (from Great Britain's Victor Gollancz, distributed by David & Charles in the United States; \$12.95). "Yet what is a man if he does not explore himself," Brasher writes, "if he does not challenge the impossible?" ■

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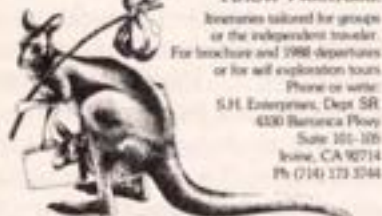
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QUESTIONS & ANSWERS

Some scientists say Earth is heating up, while others assert that we're heading into a new ice age. Your comments? (William Holden, Fair Oaks, California)

Proponents of both theories agree that Earth is getting warmer. Between 1880 and 1970 average global temperatures rose by about 0.2 degrees centigrade, according to climatologist Marlyn Shelton of the University of California at Davis. Since then Earth has warmed by another 0.2°C, he says. But opinions are divided about what that rise in temperature means.

The End: The Imminent Ice Age and How We Can Stop It (Celestial Press, 1988) by Larry Ephron suggests that during a global warming the tropics would heat up much more than the poles. Ephron is a psychologist with an interest in climatology who believes that such warming will increase evaporation and cloudiness over the tropics. The warm air rising, he theorizes, will cause pressure differences and high winds that move the clouds to the poles, where their moisture will build up glaciers.

Most scientists disagree with Ephron—and with the people who have made similar cases in the past. Climatologists predict many years of warmer temperatures around the globe rather than a big chill, with most of the increase at the poles, not the equator.

"Evidence indicates that average temperatures were 7 to 11 degrees centigrade cooler during the last period of glaciation than today,"

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Shelton says. "Glacial development occurs very slowly. For ice age conditions to prevail, the warming trend would have to be reversed."

Which of our states have the most progressive environmental policies? (Kevin Yocum, Columbus, Ohio)

Some useful (but limited) comparisons are available in the recent "State of the States" report prepared by the Fund for Renewable Energy and the Environment. The group's researchers looked at all 50 states' work in six areas: surface-water protection, reduction of pesticide contamination, land-use planning, elimination of indoor pollution, highway safety, and energy pollution control.

Massachusetts and Wisconsin scored the most points overall, tying for first place. California and New

Jersey tied for second place, Connecticut was third, New York and Oregon tied for fourth, and Florida was fifth.

North Carolina won the highest marks for surface-water protection, California for reducing pesticide contamination, Oregon for land-use planning, New Jersey for eliminating indoor air pollution, Maryland for highway safety, and Massachusetts for energy pollution control.

Last overall was Wyoming, which was just barely beaten by Mississippi, Arkansas, Texas, Oklahoma, and Nevada.

For more information, contact the Fund for Renewable Energy and the Environment, 1001 Connecticut Ave., N.W., Suite 638, Washington, D.C. 20036; phone (202) 466-6880.

Is it useful to write foreign governments to express opinions on environmental issues? What if I write in English? Where do I get addresses? (Joe Meeker, Georgetown, Indiana)

A politely worded letter can help demonstrate to foreign decision-makers that an issue is of international concern. Often government officials are surprised to learn that anyone outside their country cares how they manage their natural resources—let alone cares enough to write a letter.

It's preferable to write in the language of the country you are addressing. But because English has become the language most often used in international communications, chances are good that the officials who receive your letter will be able to read it.

An almanac can help you find the addresses you'll need. *The World Almanac and Book of Facts*, for instance, has addresses and phone numbers of all the embassies in Washington, D.C., as well as the names of ambassadors, envoys, and heads of state.

Earthcare Appeals, a new quarterly newsletter linking the 80 environmental groups in the Sierra Club's International Earthcare Network, may also be helpful. The publication describes environmental problems as a country's own citizens see them and lets activists worldwide know how they can help. Subscriptions are \$15 a year from the Sierra Club, 330 Pennsylvania Ave., S.E., Washington, D.C. 20003. ■

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For more information and dealer listing, contact: Caribou Mountaineering, Inc., Dept. S - P.O. Box 3696, Chico, CA 95929-3696 - 800/824-4153

THE 1 TO SEA (PART TWO)

CANADA TO MEXICO ON THE PACIFIC COAST HIGHWAYS.

Route 1, US 101, El Camino Real—the Royal Road. From Canada to Mexico, the Pacific Coast Highways lead to the unexpected. Look where they led us—a magazine series about a compact van. So you get a travelogue of places worth seeing. Because we drove the West the way you do—a family loaded with gear—we know Chevy Astro can sell itself. All you've got to do is drive it.



BIG SUR

Suddenly the sun disappeared into the majestic fury of a Pacific storm. On the roller-coaster road to Big Sur, turning, stopping, holding-the-road, Astro's sure responses tamed wind and water. The smooth Vortec V-6 had power to spare even pulling our camper-trailer. (It's the most powerful compact van engine now available.)



tight 39.5 foot turning circle, available power steering and compact 'garageable' size. We winners just enjoyed touring the Marina by boat.

THE WEST Nobody knows the USA better than Chevrolet. And nothing proves it like Astro. Your Chevrolet dealer

SANTA BARBARA (Sunday in the Sun)

A picnic brunch at the polo match. Then quick action on a freeway lined with flowers and confusion. With Astro's impressive view, you can see both right-and left-hand exits. Finally, the art fair by the ocean and a huge 'Mission Santa Barbara' to commemorate our road. After all, El Camino Real was built in 1790 to link California's 21 original missions. With all our gear and souvenirs from the Canadian border south, Astro still had room inside for a 'mission.'



has a family van just made for the way you drive the West. Test

drive an Astro today. Let's get it together. Buckle up.

Have fun and drive carefully.
Chevy Astro

MARINA DEL REY (Largest man-made small-craft harbor in the world)

Some say its the toughest place to park in L.A. So when the captain of a medium-sized yacht bet I couldn't park, I took the bet. Of course, we didn't mention Astro's



See your Chevrolet dealer for the terms and conditions of this limited powertrain warranty. **GM 6/60** QUALITY COMMITMENT PLAN

