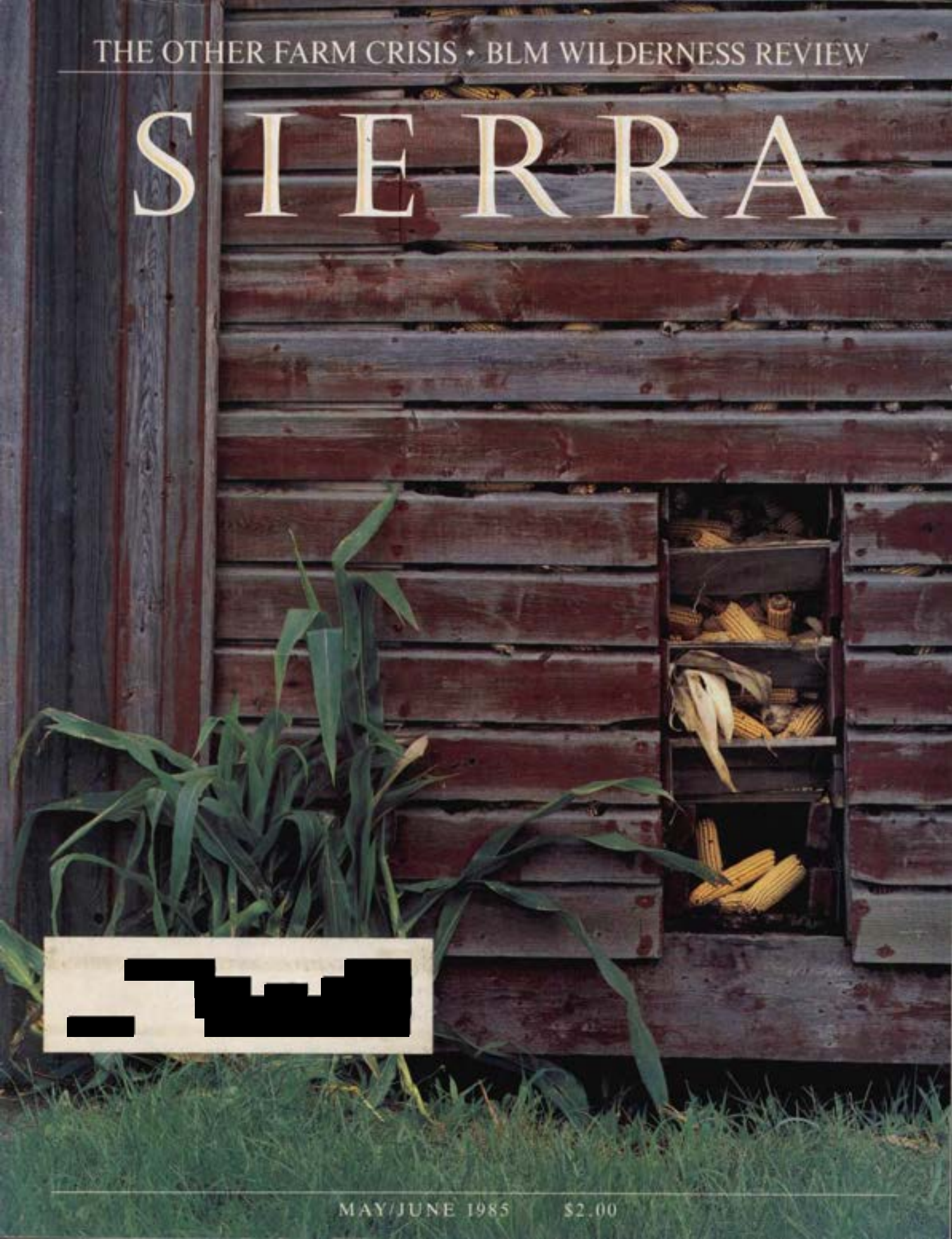
THE OTHER FARM CRISIS • BLM WILDERNESS REVIEW

SIERRA



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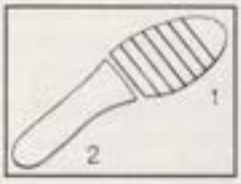

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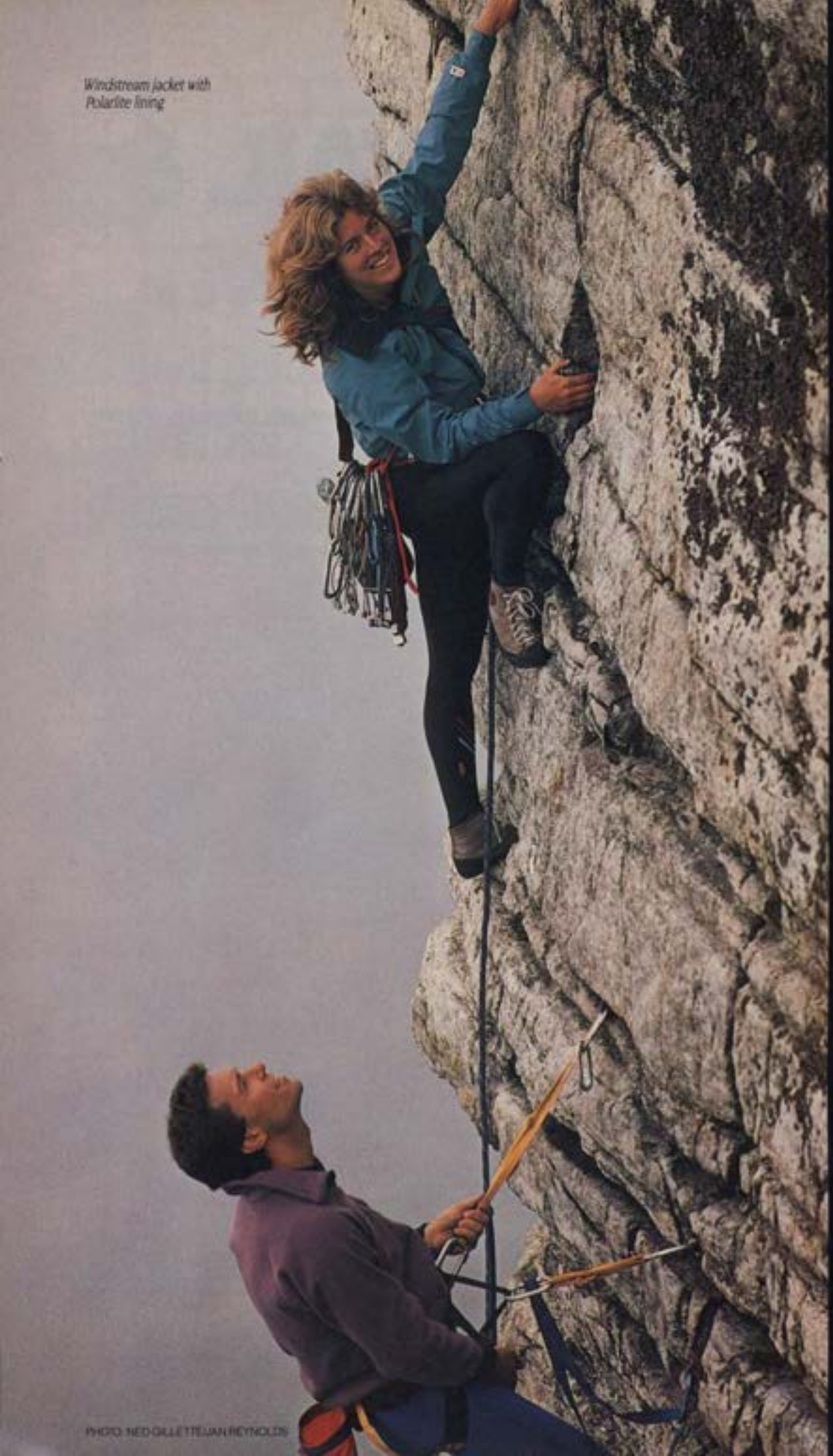

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SIERRA

THE SIERRA CLUB BULLETIN MAY/JUNE 1985 VOLUME 70/NUMBER 3

FEATURES

POLITICS

DEPARTMENTS

COVER: Now blessed with bountiful harvests, America's farmers could face a grim yield in the future. For more on the growing soil crisis, see page 40. Photo © Willard Clay.

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Wilderness Water Rights, page 14.

Exploring Caves, page 48.

Present Perfect Tents, page 66.

Along Came a Spider, page 86.

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CTL Today

Your article on Clair Tappaan Lodge (January/February 1985) left us with the impression that we live and work in a museum of memories. More recent developments and problems at the lodge have at least as much interest for those who care about CTL.

In the last few years the lodge has put together a complete and well-run nordic ski program. Nordic skiing has brought shouts of joy from the woods, personal breakthroughs in teaching, and shared experiences over hot chocolate afterward—all part of the fun and excitement of staying at the lodge.

A more somber but equally substantial theme is the lodge's financial situation. Fiscal 1985 is a watershed year, and the lodge must make it into the black if it is to survive. In the long run, patronage will make the difference—enthusiastic members and their guests who come to enjoy the lodge and help shape its atmosphere of today.

Scott Waichler
Bill Aaron
Winter Assistants
Clair Tappaan Lodge
Norden, Calif.

Weighing the Waste

Benjamin A. Goldman ("Another Toxic Time Bomb," January/February 1985) credits Grumman Aerospace Corporation with the production of more than 215,000 tons of hazardous waste in 1982, and projects the specter of 210,000 tons of toxic chromium waste being shipped through New York City, endangering the lives of its inhabitants.

If Mr. Goldman had wished to be objective, he would easily have discovered that in 1982 approximately 210,000 tons of wastewater flowed from Grumman's manufacturing processes to its on-site treatment plant, where it was chemically treated to yield approximately 1,000 tons of dry inert sludge, not the 210,000 tons reported. While this material is listed by the EPA as a generic hazardous waste, the required testing clearly verifies that no significant levels of hexavalent chromium are present.

The 5,800 tons of treated hazardous wastes generated by Grumman Aerospace constitutes a small fraction of total waste generation in New York state (over 400,000 tons, according to state Superfund tax collections), not a quarter of the hazardous waste generation in the state, as Mr. Goldman claims. In addition, I believe you would find that over the past several years many defense firms, including Grumman, have actively sought to reduce their generation of hazardous waste through changes in manufacturing processes and new or enhanced treatment facilities.

Joseph G. Gavin, Jr.
President, Grumman Corporation
Bethpage, N.Y.

Benjamin Goldman responds:

Mr. Gavin is correct: The suggestion that Grumman Aerospace probably ships its toxic chromium waste through New York City is misleading. Prior to publication of my article, a state report for the first time detailed the quantities and types of hazardous wastes generated by industrial plants in New York. The data listed only 409 of Grumman's 210,349 tons of chromium wastes as having been disposed of in New York, leading me to the misinterpretation that the inverse was also true: that the rest were sent out-of-state via the only land route out of Long Island—New York City. When a company representative was called upon to verify this inference, he replied that Grumman considers waste-management practices to be confidential business information.

It is very reassuring to hear that Grumman and other defense firms can afford relatively expensive treatment processes to render their toxic wastes less hazardous. In fact, Grumman buries only 1 percent of its hazardous wastes in landfills, according to the state data. If Grumman had volunteered to clarify its waste-management practices prior to my article's publication, more people might have heard the good news. Even without including its chromium- and PCB-contaminated wastes, however, Grumman shipped 4,870 tons of hazardous waste out of New York, according to the state data. That's the equivalent of a column of 55-gallon drums

stacked almost ten miles high, or some 563 truckloads traveling through the city each year.

At Arms' Length

William Ottenville writes in the March/April "Letters" column that the Sierra Club should stay out of geopolitical and nuclear arms matters because "the Club has no factual data regarding armament needs, and no one on the staff is qualified to take a leadership role in determining armament policy."

"Expertise" and "factual data" should be defined. What kind of expertise; what kind of facts? There seems to be a widespread notion that if one doesn't know how to build bombs, one should keep one's mouth shut and "leave it to the experts."

The simplest answer to this argument is twofold. First, we don't need expertise in building bombs to consider moral questions or to understand concepts such as nuclear winter. Second, should we ever need such "expertise," it can be found among our membership, which includes scientists, engineers, and others who work for weapons laboratories, think tanks, strategy research centers, and universities.

Any "factual data" we need is not hard to come by. Nor should strategic principles be too hard to understand. It would be curious if the world's leading environmental organization were to ignore the ultimate environmental disaster because nobody at headquarters could elaborate the distinctions between Type I and Type II deterrence trippingly off the tongue.

Nicholas Rosa
Campbell, Calif.

William Ottenville's letter perfectly states my own feelings about *Sierra*'s "excursions" into issues it is not prepared to deal with. Nuclear arms, energy policy and pricing, tax and fiscal strategies, and presidential politics are among the issues *Sierra* has written about without making any meaningful contributions or presenting a coherent point of view.

Klaus Wisiol
Glenview, Ill.

Mr. Ottenville to the contrary, *Sierra* is not out of bounds in discussing geopolitical and nuclear arms matters. Nothing could be further from the truth. We must assume that Sierra Club members are not only interested in the environment for their personal short-term pleasure and use; they also have a true respect for the planet and the generations yet to come.

Lloyd P. Tyler
Raleigh, N.C.

Clearing Up the Cover

Two letters in the March/April 1985 issue commented on the belay shown on the cover of the January/February issue. As the photographer I feel compelled to come to the defense of the climbers.

Marie Grayson and Dave Bishop are professional mountain guides who are well versed in mountaineering safety. Marie spent considerable time setting up a "bombproof" belay position, placing three anchors (a snow fluke and two ice axes) well back from the edge to give favorable rope angles. The rope around Dave went over the soft crevasse lip and through two carabiners, providing a high degree of friction. Marie was also tied in to an anchor in a position where she could have both visual and verbal contact with Dave.

Keith Gunnar
Langley, Wash.

Spare That Meadow

We agree with the point David Fullerton makes in his letter (March/April 1985) that it is entirely wrong for a Sierra Club service trip to reshape a wilderness area by thwarting the natural forces operating there. We would run neither of the trips into Yosemite if we believed they would do this.

Natural forces unaltered by human works, however, stopped operating both in Yosemite Valley and in Tuolumne Meadows some 80 or 100 years ago when people first built roads across, cut drainage ditches into, grazed cattle on, and even tilled the meadows. Although it is a natural evolutionary process for *wilderness* meadows to turn into forests, the meadows in the Yosemite Park front country are "evolv-

ing" into forests largely because of people. The parts of Yosemite that can be reached by road are as close to wilderness as many tourists will ever get. We believe that it serves the interests of the Club to help maintain the beauty of these meadows for those who will never be fortunate enough to visit a meadow in the wilderness.

David Simon
Service Trips Subcommittee Chair
Palo Alto, Calif.

Walking on Water?

My congratulations to David Green for a superb article on map and compass use ("You *Can* Get There From Here," March/April 1985). While traveling against the clock may be anathema to many of your readers, to many active orienteers (such as myself) this is not the case. Though I run competitively, I still enjoy the solitude and beauty of the forest. Further, many orienteers are noncompetitive. They can move as fast or as slowly as they wish, pausing to watch wildlife or view a rippling stream.

Sierra readers wishing to learn more about orienteering can contact the U.S. Orienteering Federation at its new address: P.O. Box 1444, Forest Park, GA 33051.

Thomas Delaney
Linthicum, Md.

Your routefinding article contains a great deal of useful information, but it also contains one significant error. The ridge marked in the photograph on page 63 lies on the far side of Redfish Lake, not on the side near the Bench Lakes, as you indicated. The lakes themselves are higher than the near ridge, seen in the photograph only as a horizontal line with the far ridge visible above it.

Hillel I. Swiller
New York, N.Y.

Thank you for sending me a copy of David Green's article for clarification of the topography. Indeed, if a person were to walk into the photo from bottom to top (as laid out), he or she would *go through* all three lakes and onto the west morainal ridge your artist meant to indicate. And if he or she were to continue on, a dip in Redfish Lake would be inevitable.

Chuck Ebersol
Stanley Ranger Station
Sawtooth National Forest, Idaho

Editor's note: *Following up on a number of letters questioning our labeling of the "low ridge," we sent the editor of this article to make an on-site inspection. We expect to hear from him as soon as he climbs out of what we now call Redface Lake.*

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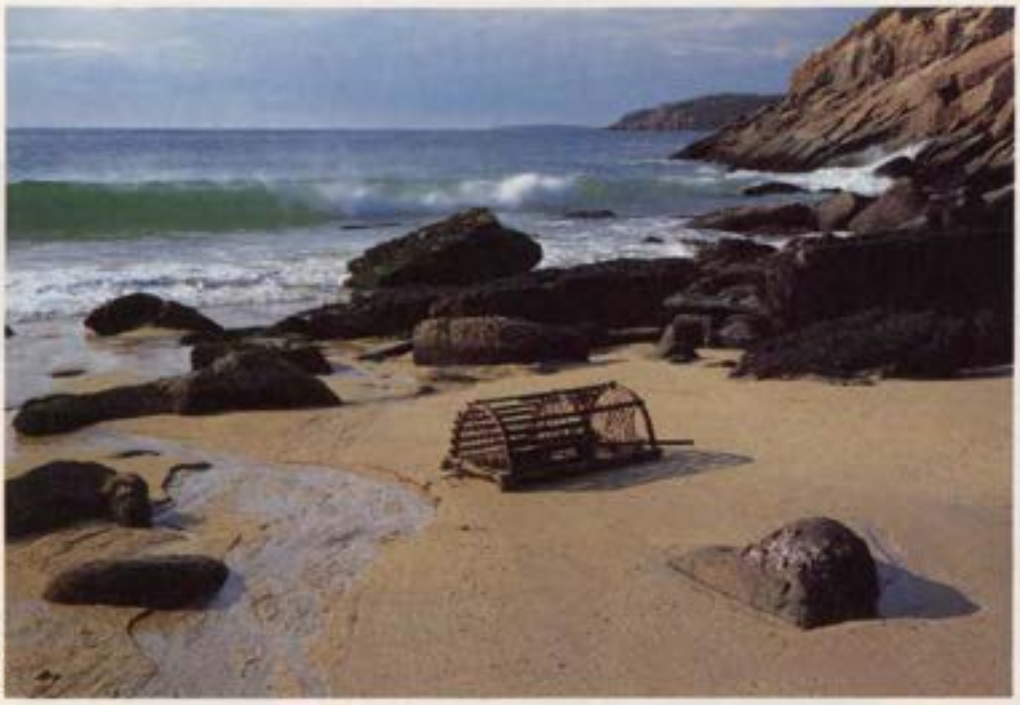
Acadia: Park Without Boundaries

Known for its coastal scenery and spectacular sunrises viewed from Mt. Cadillac, the highest point on the Atlantic Coast, Acadia National Park in Maine is a "patchwork" park composed entirely of donated parcels of private land.

But Acadia may soon lose its status as the only national park lacking permanent boundaries. Local towns consider the ongoing donations of land to the park a threat to their tax base, and they have been clamoring for a bill that would limit the park's size. Fulfilling a campaign promise, Sen. George Mitchell (D-Maine) is about to introduce legislation that would give the Park Service authority to acquire about 2,000 additional acres at Acadia while closing off future donations outside the new boundaries.

The Sierra Club believes the Mitchell proposal will exclude many areas and leave others open to development, including several of the Porcupine Islands, parts of Somes Sound (the only fjord on the East Coast), and other stretches of undeveloped coastline that are vital to the park's ecological and scenic integrity. Meanwhile, summer houses continue to sprout on private inholdings.

"The proposed legislation does not include all the land it should," says Ken Spalding of the Sierra Club's Maine Group. "It's a bill designed strictly to satisfy the local towns, and doesn't take national interest into account nearly enough."



Willard Clay

Reprieve for the Wolf–Again

Minnesota's eastern timber wolf was granted a second reprieve on February 19 when the U.S. Court of Appeals upheld a lower court ruling that blocked a proposed sport trapping season on the threatened species. (See "Reprieve for Minnesota's Wolves," March/April 1984.) While the Interior Department argued that a sport season on the wolf was necessary for population management, a coalition of environmental groups, including the Sierra Club, claimed that the proposal violated the Endangered Species Act.

The court ruled that before a sport season may be established on a threatened species it must be shown that population pressures within the ecosystem cannot otherwise be relieved. According to the coalition's attorneys, the court's strict interpretation of the Endangered Species Act is likely to affect sport seasons on other threatened species, notably the grizzly bear.

As this issue of *Sierra* went to press, government attorneys had not indicated whether they will ask the Supreme Court to review the case.

Unhappy Trails

Some 150,000 miles of hiking trails crisscrossed the national forests at the end of World War II. Today only 98,000 of those miles remain. Fully a third of the country's national-forest trail mileage has disappeared, sometimes through neglect, most often through out-and-out destruction. Logging roads, timber sales, and other developments have destroyed not only roadless areas but the trails that make them accessible to hikers.

With hiking one of the most rapidly growing demands on the national forests, this continuing pattern of trail destruction has aroused concern among conservationists. In March the Sierra Club joined the national Audubon Society

and The Wilderness Society in a national campaign to focus public attention on threats to foot trails, and to urge Congress to pay greater attention to the excessive funding of logging-road construction, which destroys trails and roadless areas. The American Hiking Society, the National Parks and Conservation Association, and other organizations are also participating. The campaign is being underwritten by a major grant from Recreational Equipment, Inc. (REI), the outdoor equipment cooperative.

"President Reagan's new budget proposes $3.3 million for new trails next year—about 400 miles' worth," says Douglas Scott, the Sierra Club's Deputy Conservation Director. "At the same time, Congress is being asked to spend $190 million of taxpayers' money and another $190 million of timber-cutting rights to finance some 7,000 to 8,000 miles of new roads. The REI grant will enable us to redress this unacceptable imbalance."

The L.A. Team Strikes Back

Madison Avenue may have fertile new ground to plow if the success of the Los Angeles Toxic Waste Strike Force is any indication. A full-page ad recently appeared in the business section of the *Los Angeles Times* in which a convicted toxic waste dumper confessed its guilt and urged other companies to remain honest.

The ad was part of the penalty levied against the American Caster Corporation of Los Angeles, whose illegal private waste dump containing highly toxic industrial solvents was discovered accidentally by city maintenance crews last year.

"Warning," the company's advertisement reads, "the illegal disposal of toxic wastes will result in jail. We should know. We got caught." The ad goes on to say: "Intentional clandestine acts of . . . 'midnight dumping'

are violent crimes against the community. . . . The risks of being caught are too high—and the consequences if caught are not worth it."

American Caster is indeed paying the price for its crimes. In addition to the $15,000 newspaper spread, a $20,000 fine, and $20,000 in cleanup costs at the dump site, the company's president and vice-president are serving six-month jail sentences.

Since January, California has been prosecuting waste-dumping crimes as a felony under the state's hazardous waste control law. Companies contemplating illegal disposal of toxic wastes in Los Angeles must also dodge the strike force's undercover monitoring and SWAT-style tactics.

Barry Groveman, who heads the Los Angeles Toxic Waste Strike Force, says the team's work has resulted in jail terms for ten presidents and vice-presidents of companies convicted of illegal toxic waste disposal

A Sore Sight for Eyes

Going out for a Sunday spin? In addition to an occasional tree, lake, or unusual building, you can expect to see 14 billboards for every ten miles of federally supported pavement. Although it has been 20 years since Congress passed the Highway Beautification Act, half a million billboards still loom over our nation's roadways. As many as 320,000 new legal billboards have been constructed since 1965; 16,000 perfectly lawful billboards were erected in 45 states in 1983 alone. On the other hand, 172,000 billboards in violation of the act remain standing along federal and interstate highways.

Loopholes in the Highway Beautification Act are big enough to drive your car through. Urban areas are exempt from billboard controls. Billboards in rural areas are regulated, but the definition of "rural" is left to local authorities, who are prime targets for the billboard lobby. And the act requires that compensation be paid to companies whose unlawful billboards are removed—an expensive remedy that has resulted in almost total ineffectiveness.

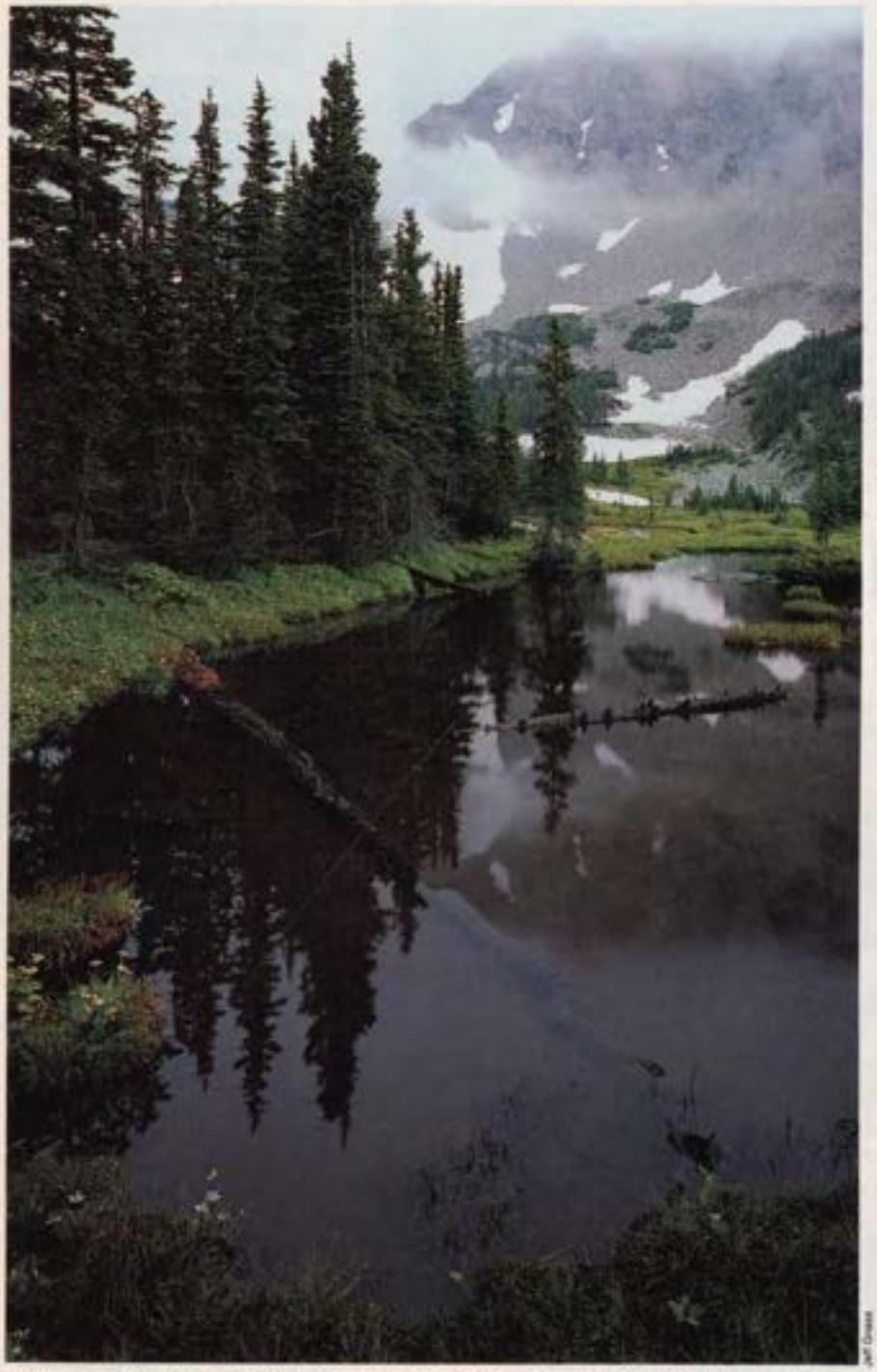
The Supreme Court has ruled that regulation and prohibition of billboards is constitutional. Hawaii, Vermont, and Maine have banned them, and the cities of Little Rock, Ark., and Houston, Dallas, and Ft. Worth, Texas, have declared moratoria on new ones. Advocates of an unlittered landscape hope to see billboard-freeze legislation introduced this year. □

POLITICS

Wild, High–and Dry?

Wilderness lands are supposed to be safe from development–at least that's what the law says. But in the West, much wilderness water is still up for grabs.

PHILIP WHITE



A July scene in the Indian Peaks wilderness in Colorado. What would it be like without water?

FLOWING WATER is the sculptor and catalyst of the wilderness, an artery of oxygen, a haven of life. From the primordial rock and the soil, water gathers minerals and nutrients needed for life downstream. The brook is home to myriad species of algae, insects, moss, reptiles, amphibians, mollusks, and fish. Nothing but a mountain stream serves so well the beaver and the cutthroat trout, the ouzel and the water strider. Nothing but the symphony of splashing, murmuring water renews so well the human spirit. Though water itself is inanimate, a wilderness without water would be dead.

In the central Rockies newborn water from melting snow has flowed for millenia from the west side of the Continental Divide to the Pacific. But during the past 20 years, dams, pipes, and tunnels have been built to channel that water east, to Denver and Colorado Springs and Cheyenne.

Even streams and rivers in designated wilderness areas may not be immune from these water-diversion projects. Denver's water board, for instance, has developed plans to divert water from the 133,000-acre Eagle's Nest Wilderness on Colorado's West Slope. Because it is within designated wilderness, such a project would require special authority from the President. But given the present climate in Washington, conservationists find little comfort in that. Instead they are asking an important question in the courts: By designating areas as wilderness and thus mandating their preservation in a natural condition, hasn't Congress required the maintenance of at least minimum stream flows and lake levels? Or does wilderness protection apply only to the land?

The Sierra Club Legal Defense Fund (SCLDF) raised this issue in a suit filed against the U.S. Forest Service in federal court in Denver early last year. The Club is asking the court to force the Forest Service to claim "federal reserved water rights" on all designated wilderness areas in the state. Within a few months the issue was also being raised in Congress, and it could be an important topic in wilderness discussions again this session.

States control the use of water within their borders. Under western states' water laws, anyone who puts water to a "beneficial" use can claim it, and those who first establish a claim have priority over later users, even if this means the latter will be left with no water in a dry year.

The idea of federal water rights for public lands was first established in *United States v. Winters* (1908), which held that when the federal government reserves land for federal purposes, it thereby acquires rights to enough water to accomplish those purposes. These "federal reserved water rights" date back only to the time a federal reserve was established, an important consideration given the first-in-time, first-in-right principle.

The courts have recognized that the reservation of vast national forests in the West gave the Forest Service enough water rights to carry out its forestry mission. The pending Sierra Club lawsuit claims that wilderness designation is another "reservation" that has additional federal water rights attached.

THE SUIT AROSE in Colorado, where state courts are currently divvying up all the state's water. While the federal government has made claims in Colorado for reserved rights for monuments, forests, and national parks, the U.S Forest Service has not made any additional claims for reserved rights in the 24 wilderness areas it manages. Sierra Club attorneys are thus asking the court to order the Forest Service to contend for such rights. Otherwise, says SCLDF attorney Lori Potter, the agency may lose the water rights forever.

Last July, when U.S. District Judge John Kane made a preliminary ruling supporting the Club's arguments, the reserved-rights issue quickly drew the attention of Colorado water developers, particularly those promoting rapid urbanization along the east side of the Rockies. The transbasin diversions on which these projects thrive are typically accomplished by damming wilderness streams at very high elevations and tunneling the water downhill to another drainage. Having large wilderness areas high up is bad enough, in their opinion, without the addition of federal government water rights.

In the last session of Congress, developers convinced Sen. William Armstrong (R-Colo.) to try to render the lawsuit moot by proposing an amendment to the pending Colorado wilderness bill. The amendment would have declared that no additional water rights accrue to the federal government from past or present wilderness designations in Colorado. Senator Gary Hart (D-Colo.), an ally of conservationists, was unable to find a compromise on the water-rights issue, and the wilderness bill sank.

The issue may resurface in the 99th Congress amid debates over wilderness in Colorado and several other states, including Montana, Idaho, and Nevada.

"Is it going to be a real wilderness or just the shell of a wilderness? That's what's at stake," says Sierra Club Washington representative Tim Mahoney. "We recognize that water is an emotional issue closely tied to the development of the West. But westerners also love their land, and we believe that having some water trickle through those places deemed the most special is very much in the western tradition."

Ann Vance, a lawyer on Sen. Armstrong's staff, says the Forest Service already has rights to enough water for its wilderness lands as a result of reserved rights for national forests and of Colorado's instream-flow law.

Sierra Club attorney Potter disagrees. The U.S. Supreme Court has ruled that national-forest rights cannot be invoked for wildlife or recreation uses. The Wilderness Act is directed toward protection of nature much more than are the national-forest laws. The act's statement of purposes is close to that in the National Park Act, Potter says, under which the National Park Service has obtained some rights to minimum stream flows and lake levels.

"In most cases, a reserved water right is the only means by which the land management agency can prevent water diversions upstream of the wilderness," Potter says. Such diversions can have effects ranging from destruction of critical wildlife habitat to desiccation of a stream. Denver is making plans to build a new storage reservoir to meet metropolitan needs late in this century. To fill the reservoir, Denver will need more water from the West Slope, "and many people fear they will get that water from Eagle's Nest," says Potter.

She claims that Colorado's instream-flow law is also inadequate protection for wilderness. "The state's program is good in theory, but it doesn't afford real protection to wilderness water sources because it is underutilized, underfunded, understaffed, and subject to political pressure." In addition, Potter says "it is the state's policy to claim only the minimum amount of water necessary to protect fish. This does not ensure that enough water will remain in the stream to serve other ecological or recreational purposes."

If federal reserved rights could discourage diversions from wilderness on the west side of the Rockies to cities on the east, one might expect West Slope developers to support the Sierra Club cause. But Vance says most West Slope users "are united in support of Senator Armstrong's water

language." The reason, she suggests, is that they see federal reserved rights as a possible barrier to their own water-storage plans.

Potter counters that developers can continue to build storage reservoirs and water diversion facilities, "but they must do so below the wilderness, not within it or above it." This might make water development more expensive for East Slope users because water would probably have to be pumped to its destination rather than gravity-fed. "We think more-expensive water is a reasonable price to pay for the integrity of our nation's wilderness," Potter says.

Judge Kane's preliminary ruling on the case supports the Club's argument that federal reserved water rights should be extended to wilderness. "No one in this case contests the fact that wilderness areas have been withdrawn from the public domain," Kane ruled. "Therefore, the United States has reserved water rights which are unperfected [unquantified] at this time." In his final ruling Kane will decide whether the Forest Service should be compelled to claim its wilderness water rights, as the Club contends, in state court proceedings.

After Kane's preliminary ruling, the city and county of Denver, the Colorado Water Congress, and the Colorado Water Conservation Board filed motions to intervene in the case and ask for a reconsideration of Kane's decision. Kane allowed their interventions in February but refused to back away from his declarations on wilderness water rights.

Until now, wilderness laws have been silent on the issue of reserved water rights. In the Wyoming wilderness bill passed last session, a proposed transbasin diversion in south-central Wyoming was exempted from any restraints that might be caused by wilderness designations in the area. The wilderness water rights issue was not specifically addressed, however. Vance thinks future wilderness bills will have to address the issue. "It's putting the cart before the horse to create wilderness and leave a water settlement until later," she says.

Sierra Club Southwest Representative Maggie Fox says "our opponents have come up with very few site-specific conflicts. They simply want to preserve all their options for future water projects, no matter what the effect on wilderness.

"We want the Forest Service to keep wilderness areas from drying up," Fox continues. "Wilderness in any state is entitled to that."

PHILIP WHITE, *a freelance writer living in Cheyenne, Wyo., has worked as an attorney, a fire lookout, a staff writer for the* Casper Star-Tribune, *and a field correspondent for* High Country News.

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JIM SIBBISON

The Agency of Illusion

At one time the EPA made sure both press and public were fully informed about environmental hazards. Now it's good news only, please.

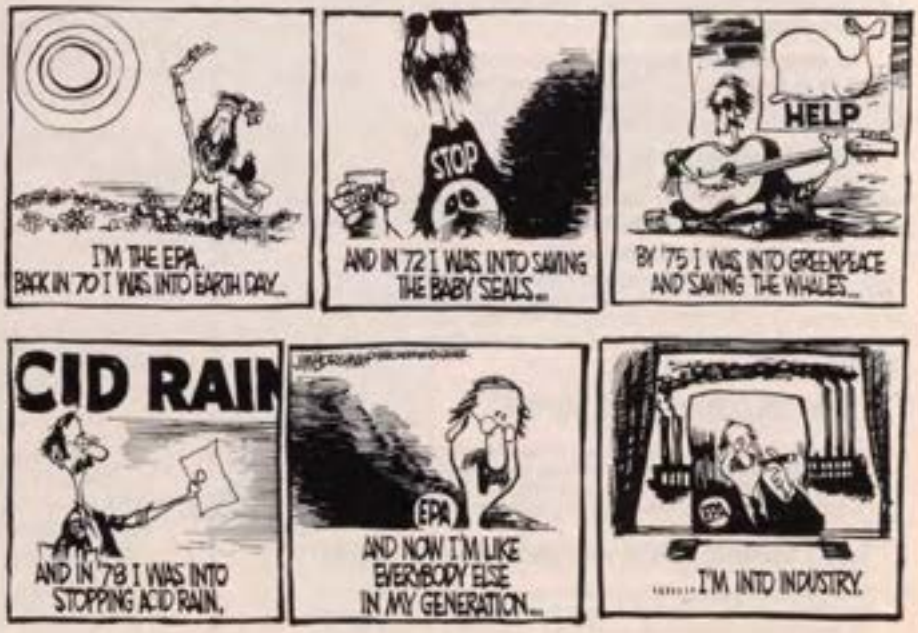
RONALD REAGAN probably has little in common with a man named Lee Thomas, but Thomas is important to the President: As Administrator of the Environmental Protection Agency he is responsible for preserving the administration's ecological image. And although he is no doubt an honest man in private, there will be times when Thomas will be obliged to be, like all previous EPA administrators, less than candid in public.

Given the heavy restrictions that the President and those around him will impose on the EPA, Thomas probably won't be able to do much about reducing environmental pollution. But because Reagan must avoid the kind of scandals that erupted when Anne Burford headed the agency, Thomas must create at least the illusion of accomplishment.

As an example of how EPA officials must yield to political necessity, consider an issue Thomas was involved in as EPA assistant administrator. This case concerned Compound 1080, the poison once used to kill coyotes in hopes of reducing livestock predation. William Ruckelshaus had banned the substance in his first term as EPA administrator in the early 1970s, because it posed a threat to nontarget wildlife and was not really effective in reducing sheep and cattle losses.

Many big ranchers had been smoldering over the ban for nearly ten years. Their day finally arrived in 1980, when Ronald Reagan was elected President. Under pressure from the ranchers and Secretary of the Interior James Watt, EPA Administrator Burford wrote to the sheep and cattlemen's associations, inviting them to request a hearing to lift the 1080 ban. So anxious was she to get the ban-lifting machinery in motion that Burford began her correspondence with the livestock groups even before the Senate had confirmed her nomination as EPA Administrator.

Hearings on the ban were duly held, and the time arrived to write the EPA decision. Thomas was assigned the task. What he faced was no routine decision: Such powerful senators as Paul Laxalt (R-Nev.), Orrin Hatch (R-Utah), and Alan Simpson (R-Wyo.) were vigorously lobbying the President up until the last moment, demanding the ban be lifted. Few were surprised when



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Thomas decided in the senators' favor.

As an EPA press officer at the time, I went over the Thomas decision, using data from the hearings themselves. It soon became clear to me that the decision could not be justified on the basis of either logic or fairness.

Thomas admitted, for example, a lack of evidence to support claims that the poison would reduce predation, or that predation had not increased during the ban. He made the flat misstatement that new evidence had shown single-dose 1080 baits to be effective. He dismissed the use of guard dogs to protect sheep, ignoring evidence that they often do the job well. (The ban was still in effect early this year, however, pending the outcome of litigation by the Defenders of Wildlife, the Sierra Club, and others.)

Such bowing to White House pressure goes with the job. On the day Ruckelshaus was sworn in, both he and President Reagan told the press that acid rain would be met, as the President put it, "head on." Ruckelshaus demonstrated his sincerity soon after by submitting to the White House a plan to reduce acid rain.

But after months of promising to take action, the White House vetoed his plan. Ruckelshaus then looked members of Congress right in the eye and said the matter needed more study.

The trick for Thomas will be to take such defeats and make them seem, if not triumphs, at least scientifically valid. To do this he needs public relations officers who are capable of feeding the media just the right kind of information to keep reporters contented.

Such a staff is already in place. From my own experience I can say without hesitation that the EPA press office has become far more manipulative of public opinion under the Reagan administration than it ever was before.

The explanation for this lies in the changing objectives of the agency. In the beginning, and for nearly ten years, the EPA was an aggressive organization riding high on public demand for cleanup of a severely polluted environment. That meant a frank and forthcoming public relations policy, which was initiated by Ruckelshaus himself in his first term. Anxious to bring the big polluters into line, he used the press to instill fear in their hearts by holding up a few of them as bad examples.

Every press release we wrote in those pre-Reagan days spelled out not only the nature of a hazard but its risk to human health, including cancer, birth defects, and damage to the central nervous system. We publicized lists of communities with carcinogens in their drinking water, cities with air pollution at levels still hazardous to health, and waterways that would take years to clean up.

It should be pointed out, however, that our motives were not entirely altruistic. Stories about pollution and cancer were certain to be given prominent display in the media. This would impress the White House and enhance the agency's prospects for a bigger budget. Publicity also roused congressional support and larger appropriations.

All this heavy publicity ended immediately after Reagan's first inauguration. Burford, his EPA administrator, announced that henceforth there would be no more "flashy press releases." She wanted smaller, not bigger, appropriations. Her main priority was the relief of regulated industries. The agency's public relations objective had suddenly shifted from disclosure of environmental hazards to soft-pedaling or suppressing the information.

In those days, if I wrote a press release that said a chemical caused cancer or sterility, an anonymous person at the top would draw a line through the words "cancer" and "sterility." I was not even allowed to report the unquestionable fact that a Los Angeles chemical dump had exploded. "Too alarmist," a new Reagan man informed me. Soon most of our press releases were so thoroughly sanitized they lost their usefulness to the press.

After Ruckelshaus replaced Burford, I am told, this policy was eased somewhat. The word "cancer" was reinstated on occasion, but it was played down. Information of importance was still being suppressed, as I discovered while researching an article on cancer-causing asbestos fragments in elementary and secondary schools.

At my request the EPA press office sent me a bulky package containing the latest surveys conducted around the country. These turned out to be of little use. Although the EPA estimated that 15 million schoolchildren were now exposed to this hazard, it did not provide key information: the locations of the schools.

This omission was quite deliberate. The EPA report contained an assurance to school authorities that all information they contributed to the survey would be "strictly confidential." While an honest EPA would want to alert the nation to this hazard, that's the last thing *this* EPA wants: Public exposure might produce some pressure for action.

These coverups seem to be standard practice now. We rarely hear from the EPA anymore on the extent of food contamination by pesticide residues, the quality of air in our cities, or the severe pollution remaining in many major waterways.

It's especially disquieting that a seemingly somnolent press allows Thomas and the

rest of the EPA's top management to get away with dictating the news. To begin with, environmental reporters don't really gather news at the EPA—they gather press releases written by EPA press officers. Having written more than a thousand press releases during my tenure at the agency, I can tell you how this process works.

Let's assume I am writing a release about the decision to restrict use of a certain pesticide. I get the details from the pesticide program, write the press release, and have it approved by as many as ten people throughout the agency, right up to the administrator's office. Once cleared, the news release is reproduced and distributed by messenger to the Washington offices of the Associated Press, United Press International, *The Washington Post*, *The New York Times*, *The Wall Street Journal*, *Time* magazine, and other big media.

After the release hits their desks, all that most reporters will do is evaluate its newsworthiness. If they are not interested (as some of them are not), they toss it in the wastebasket. But assuming my pesticide release was important, they would rewrite it, possibly call an environmentalist for comments, probably put their byline on it, and send it on for publication.

This method is convenient for the reporter, but misleading to the reader. The release has been carefully culled at the agency for any part of the decision the EPA doesn't want the public to know: certain health hazards, for example, or weak enforcement.

But the worst feature of this system is that reporters allow the EPA to do their job for them. They not only get laundered versions of stories in press releases, they also miss stories of malfeasance—news the agency is suppressing. The only information these reporters do get about EPA lapses and misdeeds comes from an occasional leak by an indignant employee, or from a congressional investigation or environmental organization. It was these sources, not an enterprising Washington news corps, that broke the Burford scandals. Left to the reporters alone, the Environmental Protection Agency might still have Burford as administrator.

The import of all this is that the role of environmental organizations has never been so critical. They not only have the task of keeping the EPA honest in the courts, they must also face the continuing challenge of letting the public know what is really going on—or not going on—at the agency.

We certainly can't count on Lee Thomas to do it.

Jim Sibbison, a freelance writer living in Massachusetts, worked as an EPA press officer for 11 years. He left during the first year of Reagan's presidency.

STEVE FORRESTER

After the Fall

Prospects for the Northwest's economy dimmed with the collapse of the Washington Public Power Supply System, but only the bondholders were left in the dark.

The image of the Pacific Northwest has changed dramatically in the last ten years. In the mid-1970s, northwesterners and observers elsewhere saw it as a region poised for boundless demographic and economic expansion. But instead of being stormed by immigrants and developers, the Northwest has slowed down, and parts of the region are mired in a recession that has lingered so long it is now being called a depression.

While many factors contributed to this transformation, one casts a particularly dramatic shadow: the immense financial disaster of the Washington Public Power Supply System, better known as WPPSS—aptly pronounced "whoops."

The Washington state legislature established WPPSS, a consortium of state-affiliated municipal and public utilities, in the early 1960s. WPPSS did little in its first decade, but in the early 1970s it embarked upon the most ambitious atomic energy program in the nation: five nuclear power plants would be constructed to meet a portion of the projected energy needs of Washington, Oregon, Montana, and Idaho.

The chief architect of the WPPSS financial plan when it was being implemented was Donald Hodel, now Secretary of the Interior. As administrator of the federal Bonneville Power Administration (BPA) from 1972 to 1978, Hodel pedaled the plan to local utilities, eventually persuading them to accept the prodigious scheme. Over the years, WPPSS made visit upon visit to the municipal bond market, eventually becoming the largest single issuer of municipal bonds in American history.

The program began to sour in early 1980, when a new estimate put the cost of the projects at $24 billion, about six times as much as originally projected. Construction was subsequently halted on two of the five WPPSS nuclear plants. When Wall Street began to cast a cold eye on WPPSS' financial health, the organization's bonds were downgraded. Finally the two WPPSS plants were canceled altogether, bonds ratings for those plants were suspended, and WPPSS defaulted on an interest payment.

After a long slide toward bankruptcy, WPPSS went into financial default in 1984, establishing another national record by causing the biggest default in the history of the municipal bond market. This singular event devastated hundreds of individuals who had bought WPPSS financial securities because they once seemed so solid.

What is the legacy of WPPSS for the Northwest and the nation? The question is rather like a Rorschach test—everyone sees something slightly different in the aftermath. While many of the costs of the WPPSS default are intangible, some are clear to all: Although none of the plants will ever produce a kilowatt hour of electricity, the region's electric rates have skyrocketed. The WPPSS experience has discredited nuclear energy and the planning mechanism that spawned the whole gigantic scheme. The Northwest squandered its legacy of relatively cheap electricity from the federally financed dams on the Columbia–Snake rivers system. And not surprisingly, a dozen major lawsuits are keeping some 200 lawyers (by conservative estimate) busy.

Now the region is saddled with an immense debt, and it may end up owing an additional $8 or $9 billion once the bondholders' lawsuits are settled. Most people feel that Northwest utilities have turned their back on the WPPSS debt, which is true in the case of two of the plants; that is why bondholders are taking their cases to court. But the utilities *are* making good on the debt for the three other plants, built under a complicated financial scheme called net billing. Under this provision, the utilities were able to pass the debt on these three plants on to consumers by having the BPA purchase the plants' future output. Even though only one of the plants is completed, the BPA must pay interest on the debt for all three. These interest charges have driven electricity costs up dramatically.

"If there had been no WPPSS, what would Bonneville's electricity rates be?" asks Dan Meek, aide to Rep. Jim Weaver (D-Ore.). The answer to Meek's question is that the rates charged by the BPA to utilities and industry have gone up 600 percent since 1979. The average Northwest retail utility

rate is now 3.6 cents per kilowatt hour, compared to 1.9 cents in 1979. Payment on the debt for three of the WPPSS plants consumes between one half and two thirds of BPA's budget.

"Since 1979, each successive electricity rate increase has been the biggest absolute rate increase in Northwest history," says Meek. Ironically for WPPSS, those increases have caused northwesterners to conserve electricity by weatherizing their homes, a preventative measure they did not take when their energy cost a fraction of what was charged to other regions.

"There was substantial price-induced conservation caused by the rate increases," says Rick Applegate, associate director of the Northwest Power Planning Council. This phenomenon, which economists call the price elasticity of energy, was apparently not predicted by the region's planners when the WPPSS scheme was hatched, even though the General Accounting Office in a 1975 report and the Natural Resources Defense Council in a 1980 report demonstrated that extensive conservation was possible in the Northwest.

The phenomenal rate increases caused by WPPSS have had an effect on more than consumers alone. According to Meek, if

Plant #4 at Hanford, Wash., is one of the two WPPSS facilities that have been terminated in mid-construction. Who pays—the bondholders or the ratepayers—is still under litigation.

Northwest electricity rates had not increased so dramatically, the region's aluminum plants would still be operating. As it is, the increased energy costs have been a factor in forcing many of them to shut down.

Some believe there has been another economic cost to the region, although it is a bit harder to detect. They say the Northwest is already paying higher interest charges on bond sales that have been floated in the wake of the WPPSS disaster. It was predicted that Wall Street would levy this so-called WPPSS penalty on loans for other Northwest projects in retaliation for the utilities' default on WPPSS.

"There has been some penalty," according to Sterling Munro, administrator of the BPA during the Carter administration and now associated with the national bond brokerage John S. Nuveen Co. "I hear from bond traders that there is a narrower market for Washington state issues, but not for Northwest issues in general. The penalty is very hard to measure, but I see it showing up in utility issues. Then there's the additional uncertainty of the effects of litigation on the economy of the Northwest."

Munro also notes how the financial baggage of WPPSS has affected the region's business spirit. "There certainly has been a tremendous impact on the mood of the people," he says, "an impact on the way the Northwest—and Washington state in particular—views itself. There's less certainty, less confidence in the rightness of things."

One of the biggest losers in the fall of WPPSS has been the nuclear power industry. The Northwest is not alone in turning away from huge nuclear projects; WPPSS was only one of several regional nuclear programs that have either been scrapped or gone bankrupt in the last few years. WPPSS is the best known only because of its huge unpaid bill on Wall Street.

"I'm not sure whether the nuclear industry was a victim of WPPSS or whether WPPSS was a victim of the nuclear industry," says Howard Gleckman of *The Bond Buyer*. "It's clear that WPPSS tried to build something that was too big for them. But Wall Street people haven't learned from it. The people who learned from WPPSS didn't need to learn, but those who needed to learn didn't learn a thing."

In turning away from gigantic centralized nuclear plants, the Northwest has embarked upon a new mode of energy planning. This change, along with the media coverage and in-depth study of the fiasco, have been among the positive legacies of WPPSS. The method of energy forecasting that pushed the region into building five nuclear plants has been totally discredited by the project's downfall. As Gerald Mueller, a Montana member of the North-

west Power Planning Council, says, the straight-line method of forecasting used during the 1970s "was like driving an automobile at a very high speed looking only in the rearview mirror."

Coincidentally, the Northwest Power Planning Council came into existence just as WPPSS began to tumble headlong toward financial disaster. The council was created by the Northwest Power Act of 1980, a large, complicated piece of legislation designed to deal with what was believed to be an impending shortage of electricity in the region. The recession and widespread conservation measures have now left the Northwest awash in electricity, rendering parts of the Northwest Power Act moot. But one lasting impact of the law is the council and planning process it mandated.

Very simply, the Northwest Power Act brought energy planning out into the open. By creating a power planning council with members appointed from four states, the law established a watchdog for the federal BPA. Since its creation in the 1930s the BPA has behaved like a typical large bureaucracy, displaying more loyalty to its own prosperity, endurance, and turf than to the region it serves. Until very recently the BPA was also driven more by the desire to build plants and sell energy than by a willingness to look into the cost-effectiveness of conservation. Even the Northwest's major utilities, such as Pacific Power & Light Co., recognized the cost advantages of conservation long before the BPA was forced to consider its virtues.

"The new planning mechanism downplays forecasting and emphasizes smaller projects," says Ed Sheets, executive director of the Northwest Power Planning Council. "It's impossible to know what energy consumption or economic growth will be in 1990, so we say, 'Here's a high-growth boundary, and here's a low-growth boundary.' The key is planning resources to meet your energy load. But you don't *build* them to meet the load, as WPPSS attempted to do. You emphasize a smaller plant size, shorter lead time for construction, and lower capital costs. This options concept is a legacy of WPPSS. We now know that there's a risk in power planning—we've just paid for it.

"If there is a plus," Sheets continues, "it's the commitment by the region toward avoiding mistakes in the future. The options process is our insurance payment."

In the end, one may well ask, who won and who lost? "The law firms won," says Applegate. "The folks who lost are scattered all over. At the same time, I don't think there was a major elected official who could be said to have lost because of WPPSS. As with Vietnam, there is always the question of who ends up paying. Do the decisionmakers ever pay? What do we do when they are wrong? The answer is that they don't pay. In fact, in some cases we give them a promotion."

The most prominent example of someone prospering despite involvement in WPPSS is Don Hodel. As administrator of the BPA, Hodel was a staunch advocate of a large-scale nuclear power program in the region. Before becoming Secretary of the Interior, he was Secretary of Energy. Although the U.S. General Accounting Office placed responsibility for WPPSS' horrendous cost overruns on BPA oversight under Hodel, when he came before the Senate Energy Committee in November 1982 for confirmation as Energy Secretary, his relationship to the projects was barely mentioned. Douglas Scott, Deputy Conservation Director of the Sierra Club, was the only one to raise the matter, leading to a testy, toe-to-toe exchange with committee chair James McClure (R-Idaho).

While it is fairly easy to blame Hodel for WPPSS, one member of Congress from the Northwest says it should be remembered that Hodel did not have to beat the region into submission. Representative Al Swift (D-Wash.) says, "Did Hodel do it? Yes. Was he Machiavellian about it, clouding men's minds? No. It seems to me the problem of WPPSS was a problem of conventional wisdom in the Northwest."

As Energy Secretary, Hodel remained a staunch advocate of nuclear power. But in a recent interview with *The Washington Post*, Hodel said he thought history might judge that others, including nuclear power foe Rep. Jim Weaver (D-Ore.), were right. In 1977 Weaver said, "The Pacific Northwest does not need to rush into construction of extremely costly plants that will saddle the citizens of Oregon, Washington, Idaho, and Montana with higher electricity bills. We have time to carefully study our energy problems—rather than finance a crash program for disaster."

Hodel now concedes that "in all honesty, [Weaver] may be right. . . . Partly because of the things he has done and fought for, and partly because of circumstances, we've reached the situation where it looks like what he said had a lot of validity."

Economic cycles come and go, and there is reason to believe that the Northwest will regain its economic health some day. But for bondholders, energy planners, and Northwest electricity customers, the legacy of WPPSS will not soon be forgotten.

STEVE FORRESTER *is a Washington correspondent for newspapers in the Pacific Northwest. His article "Forest Service at a Loss" appeared in the November/December 1984* Sierra.

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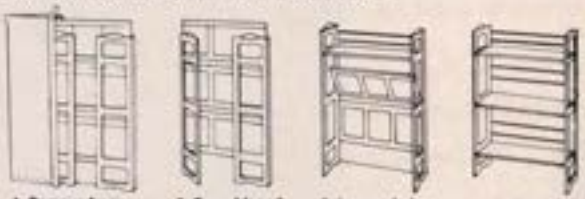

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POLITICS

EDWARD FLATTAU

Synfuels on the Skids

Created to reduce our dependence on foreign oil, the Synthetic Fuels Corporation has been plagued by managerial, technological, and political problems.

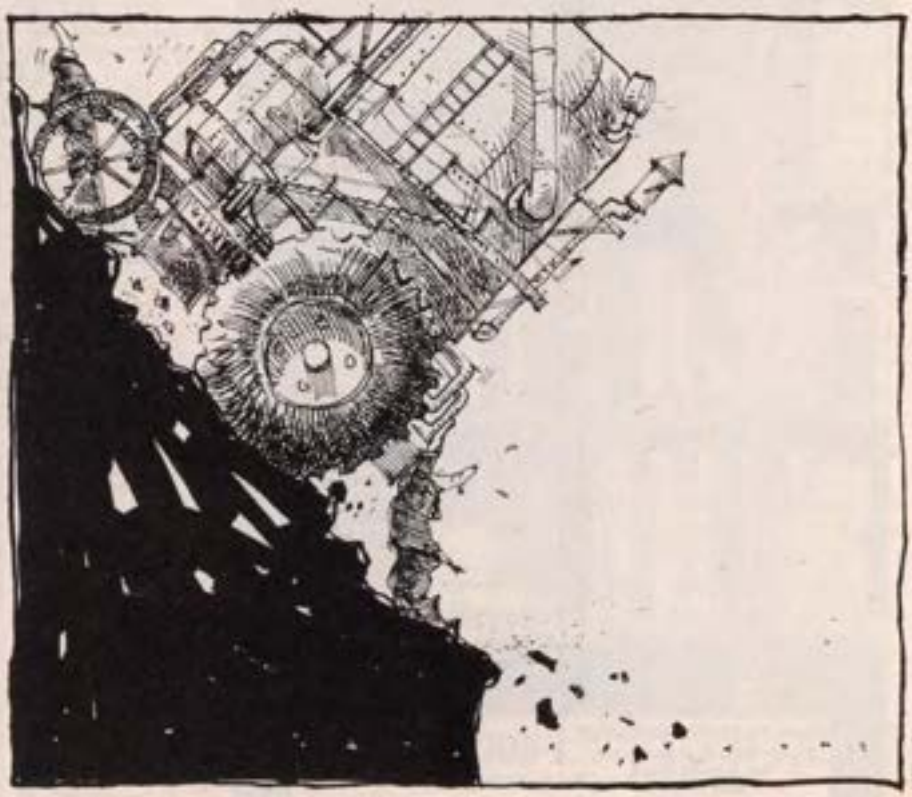
IT WAS THE SPRING of 1979, and oil prices and Mideast instability were approaching an all-time high. Under pressure to respond, Congress and President Carter approved the Energy Security Act of 1980, a law designed to move the nation from dependence on foreign petroleum to a workable alternative: domestic production of synthetic fuels. The act initially provided $15 billion for the creation and operation of the Synthetic Fuels Corporation (SFC), which would distribute federal subsidies to privately owned synthetic fuels ventures. The new corporation set a goal of producing 2 million barrels of synfuels a day by 1992.

But the SFC has been riddled with problems in the ensuing years, and little progress has been made toward that goal. Indeed, given Congress' recent $5.4-billion cut in SFC funding, the corporation's survival beyond this year remains very much in doubt.

Production of synthetic fuels by converting coal or oil shale into liquid or gaseous fuels is not a new process. Gas made from coal lit the streets of London almost two centuries ago, and shale oil was used to make alum in Sweden in the 1600s. The U.S. government has been conducting research on synfuels on and off since the 1920s. In fact, the problems the SFC faces today differ little from those encountered by British energy entrepreneurs in 1780: Synfuels are expensive, inefficiently produced, and harmful to the environment.

Nevertheless, the SFC hopes to extend its life a little longer. Tom Corcoran, a former member of Congress from Illinois and one of three directors recently appointed to the SFC's board by President Reagan, has been a driving force behind the issuance of a new set of principles intended to mollify the corporation's harshest antagonists.

Once an SFC critic in Congress, Corcor-



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an has used his position as vice-chair of the corporation's board of directors to promote the main theme of the corporation's statement of principles: that the SFC's primary mission is to develop the capability for mass production of synfuels in case the price of oil rises high enough to warrant domestic production.

This approach is very close to environmentalists' view of synfuels technology—that it is still in the investigatory stage and thus unable to support mass commercialization. The Sierra Club and other national environmental organizations argue that a far less expensive research program involving cost-sharing between government and the private sector would be more appropriate—and more effective.

Environmentalists warn that massive production goals are not only unrealistic, they carry considerable environmental risks as well. Coal conversion and oil-shale operations generate huge volumes of toxic wastes about which very little is known; even less is known about how to keep these wastes from leaching into water supplies. Coal conversion on an industry-wide basis would consume great quantities of water, creating serious water-use conflicts in many regions of the country. In addition, air pollution could result from the emissions of coal liquefaction and gasification plants, and peat mining would most likely release toxic chemicals into bogs, jeopardizing the biological viability of wetland habitats.

"The environmental impacts of any synfuels technology are at least twofold," says Brooks Yeager, the Sierra Club's energy specialist in Washington, D.C. "There are not only the impacts associated with operation of the facility, but also those of the massive extraction processes necessary to obtain fossil fuels. The so-called promise of synfuels does not bode well for many of the areas we care about."

For his part, Corcoran seems to be sincere about modifying the SFC's premature attempts at synfuels commercialization. "We [the board] are digesting what Congress did with us in 1984 and we want to make sure we do what Congress wants us to do in 1985," he asserts.

What they are digesting is Capitol Hill's $5.4-billion cut in the SFC's $13-billion budget last session. In fact, if it hadn't been for some influential lawmakers, the SFC's budgetary contraction might have been closer to $10 billion.

Corcoran's chances of staving off a renewed congressional attack on the SFC's depleted but still very substantial kitty seem slim. To begin with, the reform-minded Corcoran is still outnumbered on the board by Chair Edward Noble and his sympathizers, who have compiled a dismal management track record since the SFC's creation five years ago. Under Noble's aegis the SFC attracted the attention of Congress not only by a failure to demonstrate the economic viability of synfuels but also by administrative excesses and conflicts of interest. These improprieties led to the resignations of five board members, including President Victor Thompson in April 1984.

But management problems persist. It turns out, for example, that the two new board members appointed with Corcoran to establish a quorum (two of the seven seats on the board remain vacant) have financial interests in the most ambitious synfuels project pending before the corporation, the Great Plains coal gasification plant in North Dakota.

More significantly, despite the pledge in the SFC's new charter to pull back from unrealistic production goals and to concentrate on research, most of the projects currently on line are the same overly ambitious ones that got the SFC in trouble with Congress in the first place.

The eight projects currently being considered for more than $6 billion in loan guarantees are all mass-production giants that have languished in financial limbo for the last couple of years. Their progress has been stalled by doubts over the merits of their technologies, especially in light of the unexpectedly low price of oil.

At the top of the list is the Great Plains plant. This lignite gasification venture has already received more than $2 billion in loan guarantees. Its organizers are asking for an additional $790 million to keep the project in operation.

Another monstrosity is the Cathedral Bluffs oil-shale project in Rio Blanco, Colo., which is negotiating for $2.2 billion in loan and price guarantees on the basis of unproven, and in some respects discredited, technology.

Union Oil Company of California has already received a $400-million price guarantee for its oil-shale venture in Parachute, Colo.; yet the project shows no sign of achieving its production goals. Despite the operation's projected cost overruns and the absence of any reliable plan for disposing of voluminous solid wastes, Union Oil is seeking a whopping $2.7 billion in federal subsidies for phase two of the project.

Dow Chemical has received a $620-million price guarantee for a coal gasification plant it is constructing near Plaquemine, La. This sum is even more than Dow requested for the project.

The only other synfuels venture with a definite financial commitment from the SFC is the coal gasification cool-water unit in Daggett, Calif., which received a price guarantee of $120 million. Sponsored by a

consortium of U.S. and Japanese power companies, this is the sole project that has enjoyed any success. Not surprisingly, it has always been considered a demonstration facility, even by its owners.

Corcoran insists that the SFC will not fund any project that is not economically and environmentally acceptable. But given the largely unpalatable selection SFC officials have before them, they are truly caught between a rock and a hard place. They must either approve expensive clunkers or demonstrate by their abstinence that there is little to justify the corporation's existence. Either way they will be a conspicuous target for a Congress desperately combing the federal budget for ways to reduce the deficit.

Because Congress last year gave the SFC until June 1985 to come up with a new master plan, Corcoran believes the lawmakers will wait until at least then before making any major decisions on the corporation's fate. Of course, there is always the possibility that the SFC will come up with a convincing *raison d'être* that will defuse opposition on Capitol Hill. Preliminary drafts of the master plan indicate that the SFC is trying to eliminate wasteful duplication of projects and to specify more clearly which technologies it will and will not fund.

On the other hand, submission of this master plan to Congress is also likely to provide an official forum for the opposition to renew its attack. In previous years it was hard for critics to get a handle on the SFC because it was virtually exempt from congressional oversight and administrative disclosure.

The Sierra Club's Yeager thinks that lawmakers seeking abolition of the SFC face an uphill battle, but he points out that some powerful congressional leaders who have been neutral may now oppose the corporation. And as synfuels expert Jim Matheson of the Washington-based Environmental Policy Institute argues, the SFC is already in a worse position than it was in 1984 when it lost 40 percent of its funding. He believes the prospects for its abolition this year are therefore enhanced.

In fact, Reps. Mike Synar (D-Okla.) and Howard Wolpe (D-Mich.) let no more than a week of the first session of the 99th Congress elapse before they introduced a bill to abolish the corporation. Synar and Wolpe led the 1984 campaign in the House to terminate the SFC, and they believe they stand a better chance of realizing their objective this year. In a letter accompanying the SFC abolition bill, Synar and Wolpe give their rationale.

"Previously constructed synfuels projects continue to experience serious technical problems," they write. "[P]roject costs

continue to increase, project sponsors continue to return to the government for longer and larger subsidies, and industry's commitment to the commercialization of synthetic fuels continues to languish."

To attract support for their bill in these deficit-ridden times, the two legislators are pointing out a stark contrast: Wealthy energy companies are receiving millions of dollars in subsidies for deadbeat projects while farmers are seeing their federal assistance cut off even as they succumb to bankruptcy in record numbers.

Synar and Wolpe's bill has been referred to two (instead of last year's three) congressional committees, both of which are thought to favor the corporation's demise. This should remove many of the procedural roadblocks that kept an SFC termination vote off the House floor last year.

Perhaps most significant of all, there is even more pressure on Congress this year to reduce the federal budget deficit. Because nearly every sector of society is being asked to make considerable sacrifices, a program that receives billions of dollars in pledges with little to show for it can hardly expect a patient audience.

The SFC's $7.9-billion budget becomes an even more tempting target this session because synfuels' most influential and effective defender in the House, Jim Wright (R-Texas), cannot afford to be as assertive as in the past. Wright hopes to succeed Tip O'Neill as House Speaker in 1986, and thus would probably prefer not to be point man on any issue that would put him at odds with the Democratic colleagues he is relying on to help elevate him to the House's top spot.

With the departures of presidential advisors Mike Deaver, James Baker, and Ed Meese, the SFC has even lost its most powerful allies in the White House. Budget director David Stockman now has more of an open field to make a run at the corporation, which he has repeatedly disparaged. Already there are ominous rumblings from the Office of Management and Budget that the SFC should be brought under annual review rather than receiving a multiyear appropriation.

Critics of the SFC from Synar and Wolpe to the Sierra Club and the Environmental Policy Institute emphasize that they recognize the importance of developing synthetic fuels as an alternative to Mideast oil imports. But they envisage such a program taking the form of a compact research-and-development effort proceeding on a step-by-step basis to create prototypes that are environmentally as well as fiscally sound.

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In On the Act

Some of our largest corporations were getting away with gross violations of the Clean Water Act—until activists started turning their own evidence against them.

THE CLEAN WATER ACT of 1972 was intended to curb rampant pollution of our nation's waterways. Yet today, 13 years later, some 500 major industrial polluters continue to exceed permissible effluent levels by 20 percent or more, seemingly without fear of retribution from the Environmental Protection Agency or state agencies. The state enforcement record is scant, and the EPA has failed to crack down on polluters consistently and effectively—in some cases for reasons that do not exactly cover the agency's name in glory.

Fortunately, a unique provision of the Clean Water Act permits citizen groups to bring suits against polluters even if the EPA is looking the other way. The Sierra Club Legal Defense Fund (SCLDF), the National Resources Defense Council (NRDC), and other public-interest organizations have for several years been negotiating out-of-court settlements with polluters using evidence provided (under law) by the polluters themselves. These settlements have often had a twofold effect: Not only have they compelled corporations to comply with legal pollution standards, but in many cases the penalty money has been directed to education and environmental-protection projects. Fittingly, these projects benefit communities, institutions, and citizen organizations in the very areas where the water was befouled.

This strategy was adopted at the beginning of 1980. By 1981, early in Ronald Reagan's first term, it became apparent to conservationists and public-interest lawyers that under Administrator Anne Burford the EPA was failing to enforce the many antipollution laws enacted during the 1970s. Cases that would have been prosecuted by the EPA during the Carter administration were not being pursued under Reagan and Gorsuch. In addition, EPA personnel remaining from the Carter years let environmentalist allies know that a deliberate slowdown was in the works.

As reports from the General Accounting Office later showed, the number of prob-

lem polluters referred from the EPA's regional offices to agency headquarters started dropping in 1981, as did referrals from the EPA to the Department of Justice and the number of cases filed by the Department of Justice against polluters. This decline in enforcement, which continued until last year, was not the result of improved compliance by polluters, lack of agency funding, or increased enforcement by the states. No less an authority than Gorsuch's successor William Ruckelshaus attributed it solely to a lack of commitment on the part of top EPA management to the principles of environmental protection.

In response to this failure of faith by the EPA, lawyers for several conservation groups began to explore the possibilities for concerted private action under the Clean Water Act's citizen-suit provision. This provision was added to the act in 1972 by a Congress that foresaw the problems that could result if enforcement of the act were left to the discretion of government agencies. The prospect for successful private action appeared encouraging from the start, for among the unique features of the act's citizen-suit provision is the ease with which violations can be proved.

The Clean Water Act requires municipal and industrial holders of effluent-discharge permits to monitor discharge levels and keep records of them. These records must then be mailed to one of ten EPA regional offices at regular intervals, whereupon they become part of the public record. Public-interest attorneys scrutinize these records, looking for flagrant and persistent violations of permissible discharge levels.

When a major polluter is identified (usually excluding those operating under an enforcement agreement or compliance schedule), the attorney will compile a list that enumerates violations that are known to be still occurring. In the case of a major industrial polluter this list can go on for page after single-spaced page, citing violations that exceed permit limitations by hundreds or even thousands of percent per day. The polluter is then sent a notice of intent, which advises that a suit will be filed in federal court within 60 days unless steps are taken to reduce the cited levels of pollution.

Does an industrial giant cower in the face of this initial salvo from an environmental or citizen group? "They may not tremble from the start," says Vawter Parker, coordinating attorney for SCLDF, "but they do tend to sit up and take notice." In particular, corporations have come to fear that citizen suits will cost them dearly in attorneys' fees and cash settlements while leaving them open to prosecution by the EPA for the same violations.

Polluters who receive a 60-day notice of

intent from a citizen group tend to take the threat of litigation seriously. "The notice of intent," says Parker, "is essentially an invitation to the polluter to explain its case and discuss what can be done. A copy of this letter goes to both the EPA and the relevant state agency, either of which can intervene before our suit is filed—which they sometimes do in the most flagrant cases." Indeed, a 1984 draft study by the Environmental Law Institute claimed that "citizen suits have created a situation where some companies reportedly *welcome* the EPA to sue them over permit exceedances" [emphasis added].

From a total of six in 1981, the number of citizen suits filed under the Clean Water Act jumped to 108 in 1983 and to 87 in the first quarter of 1984 (the most recent period for which figures are available). To date, notices of violations have been sent to more than 200 polluters in New England, New York, Pennsylvania, New Jersey, Maryland, Illinois, Florida, Kentucky, Louisiana, Texas, California, and Washington. Suits have been filed against more than 50 of these companies. (The Sierra Club Board of Directors' Executive Committee has authorized 135 suits against polluters since 1981, 92 of which have gone forward to date.)

In a few cases corporate defendants have shown a genuine intention to improve their pollution records, including a commitment of the money needed to do the job. Often, however, defendant corporations have used various procedural devices both to make the litigation as costly as possible to the plaintiffs and to prevent or delay decisions on the merits of the cases.

The plaintiff and the defendant can settle out of court, of course, and very often do so because it is advantageous to each side. Environmentalists prefer a negotiated settlement as a means of securing a polluter's compliance without entailing massive legal costs. A polluter may well prefer a negotiated agreement to an expensive court-ordered settlement that may still leave it liable to prosecution by the EPA. Such an agreement usually entails an assessment of financial penalties against the polluter. Although the sums involved are generally not very large by corporate standards, they tend to serve as a disincentive to pollution because unlike damages awarded in civil cases, they are not tax-deductible.

Penalties assessed against a polluter by a court are paid directly to the U.S. Treasury, but negotiated settlements often provide for payment of substantial sums to charitable, educational, or community organizations. In one case penalties from a large corporate polluter were donated to a regional historical museum that does environmental education work. In a Kentucky suit penalties were used to fund a program to breed and care for injured bald eagles, whose young were then released in the lower Ohio Valley. In a case brought by the NRDC in New York, penalties are contributing to an upstate university's experimental programs designed to help communities meet requirements of the Clean Water Act without large capital investments. A Sierra Club settlement with another New York polluter resulted in a fund of $7,500 to further conservation projects in the Seneca River Barge Canal area. The citizen groups that negotiate these settlements do not profit from them; they receive only attorneys' fees and reimbursement for their out-of-pocket expenses.

One short-term goal of the citizen-suit strategy has been to establish the efficacy of these suits regardless of who controls the EPA politically, and no matter what extra-legal agreements may have been reached between the EPA and corporate polluters. "We are, I think, forcefully displaying our intention to monitor polluters every bit as closely as the EPA does—or ought to do," says SCLDF's Parker. "Those companies are going to see that they will be penalized for their actions by due process of law, regardless of what kinds of deals may have been made with the EPA in the past."

But what kinds of deals *have* been made between industrial polluters and the EPA? There's very little public information on any such agreements, of course, but corporate officials have been known to claim that citizen suits "betray" previous informal understandings between government and industry. Under those agreements, sporadic violations of permitted effluent levels were not to be prosecuted if bona fide efforts were being made by the company to meet permit limits. For its part the EPA has maintained that such "tacit understandings" were arrived at much less often than industry would have people believe. Environmentalists simply note that the Clean Water Act is a strict-liability statute that makes permit violators liable for civil penalties regardless of mitigating circumstances.

The current Clean Water Act citizen suits may be the most notable development in environmental law in recent years. Properly embarrassed by their impact, the EPA brought a large number of suits against polluters in 1984 after Administrator Ruckelshaus publicly criticized the agency's enforcement officers for their idleness.

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POLITICS RICK GREEN

Year of the Superfund

Congress is likely to strengthen the nation's effort to clean up toxic waste dumps this year. But will the law be tough enough–and *allocate the money*–*to do the job?*

Amid the blur of budget-cutting and tax reform, the first session of the 99th Congress promises to yield at least one major environmental achievement: reauthorization of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, more commonly known as the Superfund. Funding authority for the act, which mandates cleanup of abandoned and closed hazardous waste sites by the EPA, expires on September 30.

The EPA has been dogged by mismanagement and slow-moving cleanup programs since the Superfund was passed in the final days of the Carter presidency. Now EPA Administrator Lee Thomas has promised the Senate Environment and Public Works Committee that "implementation of Superfund is the EPA's highest priority" and that "its reauthorization is my own top legislative goal."

Of the approximately 22,000 abandoned waste sites scattered throughout the country (according to EPA estimates), 541 are slated for urgent cleanup on the EPA's ever-expanding National Priority List; another 245 sites are proposed. The EPA estimates that as many as 2,000 sites may eventually be placed on the cleanup list.

Only a small portion of Superfund money comes from the general treasury. The rest—87 percent of the total—comes from taxes on the petrochemical industry. While everyone, including the American Petroleum Institute and the Chemical Manufacturers Association, agrees that the Superfund should be expanded beyond its current five-year, $1.6-billion level, there is strong disagreement over just how much money the fund needs to be effective.

The EPA claims that it can only spend about $1 billion per year efficiently. Yet a recent study by the Office of Technology Assessment (OTA), a nonpartisan congressional think tank, expressed concern that the EPA's present and contemplated future spending on cleanup efforts makes "permanent cleanup of even 2,000 sites" impossible "in less than several decades." The OTA also warned Congress in its report that "over the next 50 years the cost of a federal Superfund cleanup program could mount to $100 billion for 10,000 or more uncontrolled hazardous waste sites."

Senator Robert Stafford (R-Vt.), one of the original authors of the act and a key player in the reauthorization effort, has called President Reagan's request of around $5.3 billion for the Superfund over five years "inadequate" even to maintain existing cleanup efforts.

In contrast to the President's request, environmentalists support a five-year, $13.5-billion bill. Washington Sierra Club representative A. Blakeman Early says the Reagan proposal "should be called Superfarce instead of Superfund." Aside from what the Club believes is inadequate funding, the Reagan bill would significantly increase the cleanup burden of already hard-pressed

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states. It would also cut back on the scope of the Superfund program, leaving hundreds of threatened communities unprotected. It would not allow use of the the Superfund to clean up mining wastes, for example, or pesticide runoff from agriculture.

"The Reagan bill would leave most of the western part of the country with no recourse to the Superfund for its most serious hazardous waste problems," says Carl Pope, the Sierra Club's toxics specialist.

Both the Reagan administration and the chemical and petroleum industries have opposed the idea of adding a victim's compensation provision to the bill to meet the emergency medical needs of those exposed to hazardous wastes. On the other hand, Sen. Stafford claims that without a victim's compensation provision the Superfund would be unable to cope with a human disaster like the Bhopal, India, incident.

Environmental and consumer groups support both a victim's compensation provision and a "federal cause of action" provision, which would allow victims of chemical exposure to seek damages through the federal courts. Citizens exposed to hazardous wastes currently have little legal recourse under federal law, and their ability to seek damages through state courts varies widely.

The White House and a number of legislators are supporting a tax on waste treatment, storage, and disposal as another means of broadening the funding base of the Superfund. Theoretically, this "waste end" or "waste management" tax would not only provide additional cleanup funds, it would also offer an economic incentive not to pollute. Representative James Florio (D-N.J) and the Hazardous Waste Treatment Council, an association of waste handlers, are skeptical. They say the tax would be difficult to enforce and would produce an unpredictable amount of tax revenue. Environmental groups have expressed cautious interest, but they stress that the tax should be used only to supplement the petrochemical industry's major funding of the cleanup effort.

Other important Superfund issues involve cleanup standards and timetables, emergency response provisions, broader Superfund taxing authority, and citizens' right to sue the EPA to enforce the law.

Legislators aren't expected to approve a revised Superfund with the same lightning speed the month-long "lame duck" Congress showed in voting the original bill into existence. The unequivocal September 30 deadline is likely to propel the often-languid Congress into action, however. Further delay in cleaning up the nation's worst toxic waste dumps is a reality no politician wants to face. □

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The Other Farm Crisis

JAMES RISSER

Behind agriculture's well-publicized financial problems is a soil crisis of Dust Bowl proportions. Farmers and environmentalists hope to make the 1985 farm bill part of the solution.

LATE LAST YEAR, following the landslide re-election of the Reagan-Bush ticket, a committee of soil conservation leaders and government officials resumed planning for a lavish Washington banquet to commemorate the 50th anniversary of the U.S. Soil Conservation Service (SCS).

A letter inviting Vice-President Bush to be the featured speaker at the spring affair had been drafted before the election. The Vice-President's aides were receptive, but asked that the letter not be sent until the Reagan-Bush team was securely in place for another four years.

With the election over, the letter was dug out of the files, and the Vice-President's staff was notified that it would soon be on the way. Before it could be mailed, however, the committee was told by Bush's office that a problem had arisen and that it would be best to delay again.

Puzzled committee members quickly ferreted out the problem: White House budget director David Stockman was preparing a new federal budget that proposed eliminating the SCS altogether. The agency that best represented the conservation movement that had sprung up during the Dust Bowl was to be abolished after a half century of fighting soil erosion on American farmland.

If Bush were to address the banquet, he would be in an impossibly embarrassing political position. He would come not only to praise the SCS, but to bury it.

Press accounts of Stockman's budget move drew sharp protests from members of Congress representing farm states. "They're out of their minds even to propose [eliminating] it," said Rep. Berkley Bedell, Democrat from Iowa. "We're not going to stand for it."

Agriculture Secretary John Block appealed to President Reagan. With his standing in the administration already low because of the unexpectedly huge cost of federal farm programs the year before, the embattled Block still managed to score a partial victory: The final administration budget proposal kept the SCS in existence. But the wily Stockman had won an unprecedented cut of two thirds of the agency's operations, and had further solidified his power as the real administration czar of agriculture programs.

For soil conservationists, the episode was all too familiar. They had hoped that this year would be an auspicious time both to celebrate conservation history and to launch a new commitment to protecting threatened croplands. Instead it appeared that much of their energies would be devoted to fighting rearguard actions, as so often before, just to keep current programs from being drastically reduced. Their chief legislative goal—getting a strong dose of conservation into the

A soil crisis spawned by all-out production of wheat and other crops could jeopardize the long-term future of America's amber waves of grain.

Intensive irrigation and poor drainage have made water salty and selenium-laden in the San Joaquin Valley, California's valuable fruit and salad bowl.

In southeast Washington's Palouse hills, erosion has reached staggering levels—up to 100 tons per acre each year, 20 times the acceptable rate—and productivity has dropped.

Encouraged by federal tax laws, sodbusting—the plowing of virgin grasslands—has exposed soils to devastating wind erosion in the High Plains.

Terraces and no-till planting help conserve soil in this corn field in Iowa. Cropland in the state, the nation's top corn producer, has lost half its topsoil in the last hundred years.

1985 farm bill—would be tougher than ever.

One encouraging sign, though, was the awakening of mainline environmental organizations to the severe erosion of American farmland. Another was the formation of coalitions, like those successfully used to push through earlier environmental reforms. If members of farm, soil, environmental, religious, and other groups could work together, there was hope—especially if urban members of Congress mainly concerned about the consumer and food-stamp aspects of farm legislation could be brought into the fold.

UNTIL RECENTLY, agriculture had been all but forgotten by the environmental movement. In the 1970s environmentalists focused on the auto industry and other producers of air pollution, and on the factories and sewage treatment plants that were fouling public waters. In the 1980s their attention shifted to the chemical manufacturers of toxic substances and the coal-burning utility companies responsible for acid rain.

With the exception of the pesticide-regulation effort inspired by Rachel Carson, the environmental ills associated with modern big-time farming have been largely ignored. But the evidence has now become overwhelming that agriculture is the last of the largely uncontrolled big polluters.

Soil losses, caused by both water and wind, are greater now than in the Dust Bowl era despite the billions of private and government dollars spent on conservation. Silt, chemicals, and animal wastes wash into rivers and reservoirs, poisoning aquatic life and depriving the water of life-sustaining oxygen. Agricultural runoff is the nation's single greatest source of untreated water pollution. Eroded soil also settles in rivers, lakes, and harbors, reducing navigability and making dredging necessary. Disposal of the dredged soil sometimes creates yet another environmental problem. A study by The Conservation Foundation indicates that the total cost of these off-site agricultural damages may top $2 billion annually.

Besides causing water pollution and other nuisances, soil erosion strips fertile topsoil from the land and eventually reduces agricultural productivity. For example, the "sodbusting" or plowing of the remaining virgin lands in the High Plains states is exposing fragile soils to devastating wind damage. Meanwhile, deep-well irrigation depletes the Great Plains' Ogallala Aquifer (the nation's biggest underground water supply), and the future of the huge vegetable and fruit crops of California's San Joaquin Valley lies in doubt as intensive irrigation and poor drainage turn soil and water supplies salty.

Soil scientists say that topsoil can erode at rates no higher than five tons per acre per year, a layer about the thickness of a dime, before damaging the long-term capability of the land to grow crops. At a higher rate the lost soil is not replaced by naturally generated new topsoil. In fact, on some thin soils the tolerable loss is much less—as little as one or two tons annually.

Studies conducted by the SCS show that more than a third of American cropland is eroding at rates higher than these tolerance levels. Each year some 3 billion tons of soil wash and blow away from croplands. When erosion from pastureland, rangeland, and forests is added in, total erosion in the United States comes to more than 5 billion tons annually.

And soil erosion is not a U.S problem alone. The Worldwatch Institute says world croplands are losing 25 billion tons of soil a year, and that half these lands face impaired productivity. But because the United States is the world's largest agricultural producer, the long-term consequences of severe erosion are especially critical here.

Of course, erosion rates are not uniform throughout American farm country. Much of the worst erosion is concentrated in certain areas. This would seem to make the task of controlling erosion somewhat easier, if it weren't for the fact that these areas are often among the country's most important and intensively cultivated farmlands.

In Iowa, the leading corn-growing state, the average cropland erosion rate is about ten tons per acre—twice the allowable limit. When Iowa was natural prairie and before it was plowed and planted, it had an average topsoil layer of about 16 inches. A hundred years of farming has carried off half that layer, so that today a scant eight inches of topsoil keeps Iowa in the top rank of food growers for the world.

In western Tennessee, conversion from cattle grazing to soybean production brought erosion rates of 20 tons per acre, along with sediment-clogged streams and further siltation of the Mississippi River and its tributaries.

Erosion has reached staggering levels of 50 and even 100 tons to the acre in the winter-wheat country of southeast Washington's rolling Palouse hills. The Palouse is one of the few places where productivity has been slightly lowered, as eroded hilltops and slopes support wheat crops only reluctantly, and yields have begun to decline. Elsewhere, the chemical fertilizers, insecticides, and herbicides that came into widespread use after World War II have managed to mask the fertility-robbing aspects of erosion. But, as the Palouse has shown, they won't be able to do so forever.

The Department of Agriculture estimated in one study that at current erosion rates corn yields in the Corn Belt states could fall by 30 percent over the next 50 years—a disastrous figure that some experts think is too high. Another Department of Agriculture researcher surveyed several studies of soil loss in the Corn Belt and reported that, on the average, the studies showed each inch of topsoil loss causing a 6 percent drop in corn yields.

More than one third of U.S. cropland is losing topsoil faster than it can be naturally replaced—at rates that endanger long-term productivity.

Whatever the figures, it is clear that erosion robs the land of fertility, and farmers must apply more chemicals to make up the loss. Some find themselves spending more money for tractor fuel because eroded soils are compacted and more difficult to till. Thus, farmers' financial problems are multiplying along with the public's pollution

burden. These facts, unpleasant as they may be for farmers to face, offer them ample reason to take part in a new conservation effort.

BEFORE DECIDING on a future course for soil conservation efforts, one must examine the question of what has gone wrong.

Serious soil conservation work began in the United States in the mid-1930s, when years of drought led to severe wind erosion in the Southern Plains region of Texas and Oklahoma. Dust Bowl conditions combined with a depressed economy produced one of the great social and geographic movements in U.S. history. Impoverished farmers abandoned farming and moved to the cities, or joined the migration west in search of better farmland in California.

When families in eastern cities began sitting down to dinner at tables streaked with dust blown in clouds from Oklahoma, the political pressure for conservation was born. The Soil Conservation Service was created in 1935, and federal programs were enacted to provide financial assistance to farmers who wanted to protect their land. With government help, farmers began installing soil-conserving terraces, raising crops in ways that used the natural contours of the land to hold soil in place, and planting trees along field borders to act as windbreaks. They also rotated crops, alternating grain one year with hay or grass for grazing livestock the next year.

This revolutionary new program proved successful, and wind and water erosion began to decline. The nation also entered a long period of relatively favorable weather conditions, which alleviated dust and drought and promoted conservation.

But circumstances changed in the early 1970s. Beginning with the first large sale of wheat to the Soviet Union, the United States began emphasizing the export of grain both as a means for disposing of continual surpluses of wheat and corn and to increase farm income while improving the nation's slipping balance of trade.

The direction of American agriculture changed radically. Idle cropland—some 60 million acres of it—was brought back into production. Earl Butz, then secretary of agriculture, exhorted farmers to plant all of their land, from fencerow to fencerow. Farmers responded by maximizing grain production. Soil conservation measures were reversed so that all land could be put into row crops. Terraces and rows of trees were bulldozed because they kept valuable land idle and got in the way of the big new farm machinery being developed by the implement manufacturers. Hilly, erosion-prone, marginally usable land was plowed and planted—some of it for the first time. Crop rotations were abandoned, and farmers became less diversified. Many of them got rid of their livestock and opted to plant only corn, wheat, or soybeans.

The result was a sharp increase in U.S. grain production, a boom in export sales,

The Grim Yield of Modern Farming

WILLIAM MUELLER

IN THE BEGINNING there was a good deal of excitement and quite a lot of pride connected with the agricultural revolution. You had to be impressed the first time you watched an unloading semi at the grain elevator get tipped like a Matchbox toy to spill its load into the bowels of that place faster than the driver could swill down an Orange Crush in the office, with the scales manager waving a fare slip in his face and yelling for him to get a move on. There was no time to shoot the breeze between loads anymore—we had a world to feed. Power and pride were reflected in the Omaha stockyards, in the semis, filled with beef and hogs, backed up for miles along access roads, the patchwork of pens stretching to the horizon, and the hulking packinghouses scattered throughout the latticework. It was hard to look at the new machinery and methods, the ways people used the technology for high production, and feel anything but good could come of it.

Hindsight reveals the agricultural revolution to be a double-edged sword bringing disaster to the rural way of life. But farmers were aware of the dangers years ago, and felt they had more options. Some tried to stay small: one tractor, only enough cultivation equipment to get by, hire out the special work, and hold down the size of the farm. This worked as long as they could avoid any contact with the new technology, for the price of chemical fertilizers alone might wreck their budgets, as would a single new tractor or a four-bottom plow. To ignore the future, a farmer had to retreat deeper into the past—more manure spreading, smaller herds of cattle and pigs, strict crop rotation, and, ironically, more reliance on neighbors who owned combines and new hay balers. But if a farmer was finally faced with the need to buy a new tractor, the only ones available might cost as

The agricultural revolution was a double-edged sword that brought excitement and pride to farmers in the 1970s, followed by serious economic and environmental woes.

and a rise in farm income. Although some of the grain went to developing nations and helped feed the hungry, the vast majority of the new grain exports were commercial sales to industrialized nations. The principal benefit to the United States was increased foreign exchange, which helped offset the high price of imported oil.

The bad news, which few knew or wanted to hear, was that the new approach to farming brought with it great increases in soil erosion. Land no longer protected by time-tested conservation methods began washing and blowing away. Topsoil began eroding from cropland by the ton, clogging roadside ditches and choking waterways with soil and chemicals. The new policy of all-out production was working at cross purposes with protection of the natural resources upon which agriculture depends.

The new crop-export boom was short-lived. U.S. grain shipments started falling by the beginning of the 1980s, while land prices, inflated by the boom, began dropping. Farmers, many of whom went into debt for land and machinery purchased in rosier times, are today experiencing their worst economic problems since the Great Depression. They became tied to an intensive, high-volume agriculture that let them down but that they could not afford to give up. The financial shakeout in farm country continues, with accounts of farm bankruptcies, forced auction sales, and rural bank failures appearing regularly in the newspapers. (See "The Grim Yield of Modern Farming," below.)

Either way, in good times or bad, soil conservation seems to be the loser. If things are going well, farmers put off conservation work in favor of maximum crop production and profits. When times are harder, farmers can't afford to idle land, build terraces, or try other conservation measures.

"Soil conservationists often speak of the need for a land ethic," says William K. Reilly, president of The Conservation Foundation. "It is a noble, important ideal. But we indulge in selective moral assignment if we expect farmers to hold strictly to this ethic when their economic survival is at stake. We expect farmers to place social interest ahead of individual interest in a way that we expect from few other groups in society."

THE POLITICAL CONTEXT in which the 1985 farm bill is now being considered dates back to 1977, when Congress responded to the growing evidence of severe soil erosion by enacting the Resources Conservation Act (RCA). The law required the SCS to make an extensive survey of national soil and water conditions, and to submit to Congress a plan for a national policy. The survey has produced a great deal of valuable data, but no policy to date. The RCA has been plagued by bureaucratic bungling and delays, some of which was caused by the change from the Carter to the Reagan administration in 1981.

When President Reagan submitted the

much as $50,000, and to justify such an expense the farmer had to increase production, which meant acquiring more land and more equipment. Less and less were people offered the choice of remaining small or growing with the times.

The younger farmers who stuck around and bought up small farms from the older folks became industrialists. They brought to their farms a pride in bigness and power. As prices rose, these new farmers began expecting more from the technology. There were practical considerations: horsepower, gearboxes, turning radius, instrumentation, and flexibility of usage. Enormous balloon tires allowed a tractor to enter a field while it was still muddy. Implements were being built that could do two and three operations for each pass through the field. The interior environment of the cab continued to evolve for greater comfort over longer periods of time, with not only heat and air conditioning, but also radios, CBs, bucket seats, and even shock absorbers. Styling also began to crop up. Tractors were sleek, and they could do 30 in road gear. They had enough power to push over a building, and they kept growing in size. Their prices reflected the new signs of status. Today, an operation with a pair of good tractors, a combine, and the necessary related equipment spends as much on the machinery as the entire farm would have cost 15 years ago.

To stay in farming means to live with perpetual debt of astronomical proportions—sometimes carrying more than $1 million in liabilities while awaiting the harvest. And then there are the unknowns. It is the unknowns that turn modern farming into a nightmare: grain sales to the Russians, a petroleum shortage, no natural gas for the corn dryers or the fertilizer business in the South, a discovery by the FDA, OSHA, or the Agriculture Department that some feed supplement you've been using is toxic or carcinogenic. Or maybe the conservation board determines that your cattle operation pollutes the stream running through your property; or you open the morning paper and discover that the Deere employees are on strike in Waterloo, so the tractor you ordered for the planting will not arrive on time; or your prime-beef buyer has been indicted on five counts of fraud; or the truckers are on strike; or the railroad has just gone bankrupt when you are sitting on top of 100,000 bushels of corn worth more than half a million dollars and nowhere to store it. You can see this mountain of corn from your kitchen window, and it is just sitting there, with rain falling on it, while the Secretary of Agriculture is telling you what a great service to humankind you are performing. The implement company is not so patriotic about withholding its bill, nor is the feed-service company or the fertilizer company.

I am not surprised when each winter those crazy coots jump into their heated tractors and drive east, like migratory waterfowl, to be enjoyed and ogled by the cosmopolites in Washington, who try to read the logos on their feed-service caps. There is a rage in this pilgrimage, and what these people have to say is simply this: I have learned how to produce more food than anyone else in the history of the world; I can handle the chemistry and the economics, the heat and the cold, the dust and the insects, and I can even be patriotic and turn over my sons to your army with hardly a flinch; but I can't stand to see all my careful work get screwed up because of some fool ass who has never set foot on my land. Point out this idiot to me, and maybe we can have a cup of coffee and chat. Where is this jackass who can't manage his own railroad, who can't even add up a few barrels of oil on a sheet of paper? You say the man claims that we live in uncertain times. I'll show him uncertainty in the farrowing pens, staying up two and three days straight with thirty sows—that's uncertainty.

WILLIAM MUELLER *has worked in various aspects of farming for more than ten years.*

final RCA report and recommendations to Congress at the end of 1982, conservationists were angered and deeply disappointed. The report clearly stated that the present level of soil erosion was unacceptable. Future farmland productivity was at risk. But at the same time, Reagan said the nation could not afford to do all that was needed to combat the threat.

While sending its RCA report to Congress, the Reagan administration simultaneously asked that funding for current conservation programs be cut by 30 percent. The administration has made similar recommendations in subsequent years; but each time Congress has refused to go along.

In 1981, when Congress was adopting a new four-year farm bill to govern all federal agricultural programs, there was a move to include some strong conservation provisions for the first time. The administration objected on grounds that supporters should wait for the RCA report. An impatient Congress included new conservation initiatives in the farm bill anyway, only to have the administration refuse to implement them.

After the RCA study was finally completed, Congress again prepared to propose new conservation measures. This time the administration reversed course and asked that any new programs wait for inclusion in the 1985 farm bill, which would have to be passed when the old law expired. The Republican-controlled Senate acceded to Reagan's request, effectively blocking Congress from acting in both 1983 and 1984.

In the meantime, Block pushed Congress to adopt a "payment in kind" program (PIK) in 1983, which gave farmers government-surplus grain in exchange for a promise to take some of their land out of production that year. Its purpose was to control supplies and raise farmers' grain prices, but supporters also claimed that the program would benefit soil conservation, because farmers would remove their poorest-quality, most erodible land from production.

In fact, the conservation provisions of the hastily conceived PIK program were not enforced. One study showed that only 10 percent of the land idled in the central grain states had been adequately protected from erosion; most had been left bare to the ravages of wind and water. PIK turned out to be a disaster for conservation, the federal budget, and for Block's political credibility.

Despite foot-dragging by the Reagan administration, Congress came close to passing two new programs in 1984 that form the centerpiece of this year's conservation effort. One was a bill to deny all federal farm benefits to "sodbusters." It was aimed at farmers who plow and plant native grasslands with a high potential for erosion. The bill would have denied sodbusters the right to qualify for federal loans, price supports, disaster payments, and other government farm programs.

The other bill proposed the establishment of a "conservation reserve" from which the federal government would pay farmers to retire erodible cropland from production for up to 15 years. Initial suggestions set funding at a relatively modest $225 million, with farmers bidding to take part in the program. The administration's budget-cutters balked at even this figure, but their objections were as much philosophical as financial.

"They're not full of grain, they're full of topsoil. I'm gonna sell it for $1,000 a bushel when nobody else has got any!"

The Sierra Club and the Farm Bill

SIERRA CLUB LEADERS across the country are gearing up for a full-scale lobbying campaign to promote tough soil-conservation provisions in the 1985 farm bill. "Soil erosion is an enormous, growing environmental problem," says Douglas Scott, the Club's Deputy Conservation Director. "The Sierra Club is now focusing the same intense dedication and grassroots clout on the soil erosion problem as have helped preserve our national parks and wilderness areas."

The Club is working with the American Farmland Trust to form a broad coalition of environmental, civic, church, and farming groups. The key to the Club's strategy, Scott says, is mobilizing constituents to urge urban and suburban members of Congress to insist on tough conservation provisions as their price for voting to pass any farm bill.

"The social fabric of the family farm is something this nation should cherish," says Bob Warrick, the Nebraska farmer who chairs the Club's farm-campaign steering committee. "But more and more of our agriculture is being dominated by large agribusiness and corporate farms. Farms that produce heavy soil erosion are just another kind of industrial polluter, and the day is coming when the public is going to demand that farms be firmly regulated, like industrial polluters, if that's what it takes to clean up their pollution and protect the long-term productivity of the land."

The Sierra Club has produced a 54-page handbook on the conservation issues surrounding this year's farm bill. *Resource Conservation: New Opportunities in the 1985 Farm Bill* has been distributed to every member of Congress and to reporters and editorial writers across the country, as well as to Club activists. It is the basis for the intensive lobbying and letter-writing campaign to be mounted by Club volunteers.

To get involved in the Club's farm bill campaign, write to Campaign Desk, Sierra Club, 530 Bush St., San Francisco, CA 94108, for information. Please include your membership number (from your *Sierra* address label). Members who enclose $3 will receive a copy of *Resource Conservation*. The price for nonmembers is $4.

In the end neither the sodbuster bill nor the conservation reserve made it through the congressional maze. Despite general support from the farming and environmental communities, the sodbuster bill got bogged down in disagreement over whether an offending farmer should suffer the loss of subsidies on all crops or just on those planted on "sodbusted" land. The conservation reserve bill, which arose later, was opposed by the administration and never had the unanimous backing of farm groups.

CONSERVATIONISTS ARE HOPEFUL about winning congressional battles this year, however, because of a growing sentiment that the longstanding discrepancies between crop production and conservation programs should be eliminated. Even Secretary Block accepts this notion. Earlier this year he asked, "Does it make sense to spend a billion dollars a year to reduce soil erosion when our farm programs encourage sodbusting of erosive land?"

But when it comes to the details of what should be done, there are sure to be some bitter battles within the administration and on Capitol Hill. David Stockman didn't quite succeed in his desire to abolish the SCS, but he did convince the President to overrule Block's wish to support a conservation reserve this year. Representative Bedell accuses Stockman of knowing "the cost of everything and the value of nothing. . . . Our soil is perhaps the major source of wealth in this country."

A large number of groups representing environmental, farming, soil conservation, and other concerns have come together for the first time this year to push for conservation reforms. The American Farmland Trust, for example, which previously concentrated on keeping prime farmland from being eaten up by housing, highways, shopping centers, and other nonfarm development, has taken a strong lead in the fight. Last November the group produced a comprehensive document on future U.S. farm policy that called for support for the sodbuster and conservation reserve ideas, as well as for reforms in basic farm programs. Robert Gray, the group's legislative director, has been instrumental in getting environmentalists together and convening the Working Group on Farm Policy, which proposed reforming farm price-support programs and adopting a national policy of "nondegradation" of soil and water resources.

Another key player is Norman Berg, who works with the American Farmland Trust and the Soil Conservation Society of America. A career Soil Conservation Service official, Berg headed the agency until Block removed him and turned the top job into a political appointment.

Secretary of Agriculture Earl Butz exhorted farmers to plant all of their land, from fencerow to fencerow, to produce more grain for export.

Environmental organizations such as the Sierra Club and the National Audubon Society are also taking an active role in this year's fight. The Sierra Club recently hired an additional Washington lobbyist to work on soil conservation. Dan Weiss believes the Club's priorities—sodbuster penalties and a conservation reserve in the 1985 farm bill—can succeed even in a tight budget year. "These programs will actually reduce the cost of multibillion-dollar federal agriculture programs," he says, because the cost of the reserves will be less than the federal subsidies that now keep highly erodible lands in production.

The Audubon Society's agricultural policy coordinator, Maureen Hinkle, who was at the forefront of the 1984 effort, has worked behind the scenes on some of the more technical details, such as how erodible lands are classified. This year Audubon is working with the Natural Resources Defense Council and other organizations.

Beyond this year's tactical considerations, however, there is a need to look at new conservation techniques, and to reexamine some of the premises of modern American farming. Partly because it's cheap to do so, Secretary Block has devoted much of his department's conservation energies to proselytizing farmers to adopt "conservation tillage," a system of farming that reduces cultivation and leaves residues of the previous year's crop on the land. But conservation tillage frequently requires the use of herbicides to control weeds, and there is some evidence that this leads to pollution of vital groundwater supplies. This method also has been used as an excuse to plant crops on hilly and erodible lands better kept out of production.

Today's Agriculture Department has shown a noticeably cool attitude toward alternative systems of farming that might better protect the environment and reduce agriculture's heavy energy use. Block fired the department's organic-farming coordinator and has downgraded research aimed at reducing agriculture's reliance on chemicals. But Robert Rodale, an organics expert who talks of developing a new "regenerative" agriculture, believes "the failure of conventional agricultural methods to enable many farmers to earn a decent living assures a growing interest in alternatives."

Using this year's farm bill to begin vitally needed conservation work is a smart political tactic, but it carries risks as well. While this strategy ensures that conservation will be considered, it makes conservation part and parcel of the entire bill's approach to the tricky issue of the federal government's role in crop production and support of farm income.

In the worst possible outcome for conservationists, the framers of future farm legislation would decide on a heavily free market-oriented stance in all farm programs. But experience has shown that the strict market approach to conservation simply does not work. The costs are too high and the payoffs too remote to induce a farmer to forego present profits in favor of conservation for posterity.

Strong new conservation initiatives in the 1985 farm bill are the best that can be hoped for this year. More far-reaching measures, such as land-use controls, inducing farmers to return to crop rotation, and mandatory soil conservation, will have to wait. While the long-term objective must be to make American agriculture environmentally sustainable, it will take far more than can be accomplished this year to achieve that goal. □

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SEARCHING FOR THE BIG ROOM

ALAN DARLING

WE ENTERED Mystery Cave on our bellies. Its first passage was a series of crawlways leading downward, bending and winding until it dropped us into a large room 30 feet underground.

We had no map of this cave in the Shawangunk Mountains of southern New York, but had heard that it was extensive and contained beautiful formations. The path from the big room to the next level was a dark, narrow, vertical shaft. We tossed a rock down the shaft and heard it hit bottom a few seconds later, but were unable to tell whether it had landed 30 or 100 feet below. A few caves have vertical pitches more than 500 feet deep.

We rigged a 30-foot ladder and dropped it down the shaft. It didn't hit bottom. Veteran caver Frank Morgan began climbing the ladder with a belay line wrapped around his waist. A few moments later we heard a crash.

"Are you all right, Frank?"

"Yeah, I'm still here. That was my helmet. It's down at the bottom of the shaft; there's a ledge about five feet below me."

A few minutes later Frank was on that ledge, hollering up that the cave branched out from there. Mystery Cave continued for nearly two miles of mazelike passages, complete with several underground waterfalls and the spectacular limestone formations we'd been promised.

The inside of a cave is another world. Reminiscent of the fantasy worlds of J.R.R. Tolkien or the planets that Captain Kirk visited on the starship *Enterprise*, a cave is unlike any other place on Earth. It is a world without weather, where the temperature is always equal to the mean annual temperature of the world above, and where the humidity level hovers near 100 percent. Strange formations hang from the ceilings and stick up out of the floor. In a cave you might encounter passages, crawlways, fissures, slopes, streams, lakes, waterfalls, arches, pits, and domes, none of which are quite like their counterparts on the surface. And aside from the occasional drip or gurgle of water, silence and complete darkness characterize the underground world.

On even the darkest nights on the surface, your eyes can see something. Not so under the earth. Turn off the lights and there is a darkness darker than the side of a planet that doesn't face the sun.

For those who suffer from claustrophobia or who have a great aversion to cold, muddy environments, digging, squeezing, sliding, and maneuvering one's way into a dark hole in the ground may not sound like much fun. On the other hand, it is the dissimilarity of the cave environment from that of the surface that constitutes one of caving's great appeals.

CAVES ARE FOUND predominantly in areas with limestone deposits, which includes nearly every state in the nation. The Appalachians are prime caving territory; some states along this range have more than 3,000 caves each. The Mammoth Cave system of Kentucky is now the longest in the world, with more than 300 miles of mapped passages. The Midwest's Ozarks are rich in caves, and Wyoming contains a cave that is more than a quarter mile deep.

Limestone caves far outnumber other types and are also the most extensive. They are formed by groundwater that becomes slightly acidified by bonding with carbon dioxide as it passes through the soil. This weak carbonic acid solution seeps into faults, joints, and other fissures in the limestone bed, dissolving it and excavating a cave over thousands of years. Surface streams are often diverted into these passages, where they dig longer passages and large rooms. Caves can also be formed by stable water when the water table eats away at the limestone underneath and gradually creates a water-filled cave. When the water table shifts, the cave will become dry.

Speleothems (cave formations) are created by water containing dissolved limestone that drips from a ceiling or wall, leaving a tiny residue of limestone with each drop. Some speleothems can form in a hundred years or less, but many take thousands of years to develop, making caves an extremely delicate, nonrenewable resource.

Lava caves, or lava tubes, are created when surface lava cools faster than the lava underneath, and hardens into a tube. The molten lava inside eventually flows out, leaving the tube hollow. Caves can form in other water-soluble rock in the same manner as in limestone, and some caves even form inside glaciers, where water flowing through or beneath the ice has hollowed out passages.

On a hillside in eastern Pennsylvania we searched for the entrance to a long, deep cave we had heard of from a local farm boy. The hill was dotted with sinkholes, depressions in the ground caused by the collapse of the limestone underneath. Sinkholes are indicators of underground drainage, and thus of caves in the area.

Two of the sinkholes had passages large enough for a person to squeeze into. One led down ten feet, twisted, and came to an abrupt halt. The other seemed more promising—a cool wind blew from its entrance, hinting of a long passage below. After two sharp turns, this tunnel ended in a muddy wall about 25 feet from the entrance. We might have been able to unearth a longer

Stalagmites such as these take thousands of years to develop through the slow dripping of water containing dissolved limestone.

passage by digging, but we had no tools.

Digging is not an unusual pastime for cave hunters. On a cold winter day speleophiles might also be seen scanning the hillsides of a cave-filled area, looking for a patch where the warm air inside a cave has melted the snow above it. A caver will do almost anything to find a new cave, a new passage, or *that big room*.

"Oh, the projects you get involved in!" laughs Al Hulstrunk, former director of the National Speleological Society's Northeast Regional Organization. "There's always a challenge. It may be that there's a little water leaking out of the wall, and I can't stand back far enough to see where it comes in from, but there might be something big. How do I get up there when I'm standing at the bottom of a cave?

"In Mitchell's Cave in upstate New York, there was a waterfall with quite a bit of water coming down. We built a 100-foot pipe ladder in sections and lowered it by ropes from the surface 160 feet underground. Then I climbed the ladder to the top of the waterfall. The passage funneled back into a small opening, three times as big as a garden hose, and all that water was blasting out of it."

No big room.

"And then there's the digging projects," continues Hulstrunk, who shot the first film of a wild cave back in the 1950s. "The amount of dirt and rock we've moved out of sinkholes, hoping to unearth the world's biggest cavern, is mind-boggling. We've never found one, but that doesn't stop us. In caving you live in hope. Always, around the next bend is the big room."

Sometimes that next bend can take a lot of work to get around. What seems like a mile in a cave might really be only ten feet. My first experience of this was in the Gun Barrel in New York's Knox Cave, a 52-foot-long, 14-inch-wide tube. Beyond it lies a chain of large rooms, just enough incentive for me to pull myself through the tube, an inch at a time, with my elbow.

The Gun Barrel is a long way from being the tightest crawlway. The rule is that if you can get your head through a passage, you can usually get the rest of your body through it. The human body is amazingly flexible—shoulders and hips twist, and even bones can bend. Only the head remains inflexible.

Caving *can* be dangerous, but danger is not caving's lure. The truly courageous caver is one who spends an hour squeezing through a tight passage without having any idea whether there is anything at the end: The dream of discovering something that has remained untouched for centuries prods these explorers on.

Now imagine the lucky caver who does find something at the end of that tight tube one day. Having found a room filled with delicate, pristine formations, should the discoverer tell the world about it?

Most caves that are easy to enter have been stripped of their best formations, and many are littered with beer bottles and trash. In one popular cave, a passageway was discovered containing a floor-to-ceiling sheet of clear calcite. Soon after its discovery the sheet was ruined by a clumsy rockhound. Although many states now have laws making it illegal to remove or damage a speleothem, these laws are obviously difficult to enforce.

The question of whether or not cave locations should be revealed has been debated for years. "I think caves are educational, and are there for us to enjoy," says

© David Bowman

By twisting hips and shoulders, the truly dedicated caver will inch through a passageway just wide enough to accommodate his head, like this tight squeeze in Colorado's Groning Cave.

Gearing Up for Going Under

YOUR FIRST, SHORT TRIP into a cave won't require much in the way of fancy equipment—no bright designer jumpsuits or suave après-spelunking wear. You'll have to borrow a helmet with a light, but beyond that all you'll need to get started are two spare light sources, some sturdy old clothes, a good pair of boots with lug soles, and leather work gloves. If you decide later that you want to get serious about the sport, you can evaluate your needs as you reach different skill levels. The high-quality gear you can buy will then last you through many a maze.

In general, caving clothes should keep you warm without being bulky or tight. Wool pants are superior to bluejeans in this respect because wool keeps you warm when it's wet. Polypropylene will do the same with less weight—and unlike wool you can throw it in the wash, which you'll need to do often. Polypro probably won't last as long as wool, however, and it has a tendency to hold odor no matter how often it's washed. For those caves that require crawling or wading through water up to your neck, or rappelling down a shaft as part of a waterfall, a wet suit is a necessity.

In dry caves, usually found in the Southwest, warmth is not a major concern, but for trips of longer than two hours in caves 50° Fahrenheit or colder, wear long underwear made from warm, breathable fabric. Your two pairs of socks, one light and one heavy, should ideally be made of wool.

Cavers often wear coveralls over their other clothes to cover any loops, pockets, or loose ends that might catch on something. Because cave mud can soak through all layers of clothes and destroy zippers and snaps, coveralls also serve to protect other clothing.

Look for heavy material in a pair of coveralls, especially in the seat, where some cavers sew in an inner pouch for an Ensolite fanny pad. Opt for buckles over zippers and snaps, and try to find a pair of coveralls without loops and pockets. If you get

A single flashlight reveals the mysterious landscape of the underground world. Even the simplest cave can become a bewildering maze without light, so cavers always bring three sources—plus spares to last twice the expected visit.

Hulstrunk. "But it's destructive to the cave to have people go through it. The cave's environment is damaged. That environment is unusual—it's like visiting another planet. How much can you contaminate an area without making it look like the rest of the Earth?"

Those who love caves tend to be especially attuned to the need for conservation. The National Speleological Society (NSS), with more than 6,000 members, intentionally maintains a low profile in order to protect wild caves from destruction.

"We're not out to develop a new generation of cavers," says Paul Stevens, president of the NSS. "We don't put ads in the paper saying, 'Hey, you should come caving with us.' But we do encourage those who are already caving to become part of organized caving—that way they learn our ethic of conservation."

Cave grottoes (the spelunkers' word for caving clubs) often feud with each other, and cavers are characteristically among the most tight-lipped of all outdoor enthusiasts. If you run into a caver at the entrance of a popular cave, chances are he or she won't tell you about the entrance to a favorite, lesser-known cave. Some people say this policy will leave the National Speleological Society without any members in ten years, and it has given cavers and the NSS a reputation as an elitist group that sees caves as their domain alone.

"It's difficult to distinguish elitism from conservationism," says Stevens. "Imagine a small cave that is just fantastically beautiful, but a couple of years after the entrance becomes known, the cave's beauty is destroyed. It's simply irreplaceable. Having experienced that once, I think most people would be secretive when they discover a very pretty cave."

Because it takes only one clumsy movement to destroy a spelothem that may have taken thousands of years to create, every person who enters a cave must be concerned about preservation. The NSS advises spelunkers to take nothing but pictures; leave nothing but footprints (and then only on established trails); and kill nothing but time. (This last rule was added because some caves contain life forms found nowhere else on Earth.)

Another reason the NSS doesn't publicize cave entrances is out of concern for safety. "You only have to get out and pull

hooked on caving, you might consider buying rubber coveralls made especially for cavers by the French company Petzl (distributed in the U.S. by Pigeon Mountain Industries in Lafayette, Ga.). These not only keep you dry (though they won't quite substitute for a wet suit), they also make it easier to slip through tight passages.

Proper footwear is important in caving. Tennis shoes aren't recommended, because they provide no ankle support and tend to slip on smooth, wet surfaces. Genuine army surplus jungle boots were once popular with cavers, but they are now much harder to find than cheap imitations. Lug-sole (Vibram-type) boots with canvas or leather uppers are probably the better choice, because they'll give you flexible ankle support and provide good traction.

Make sure your boots have at least some heel (to grip footholds and ladder rungs) and that the welt is cut to medium or narrow width. You need to be able to feel through the boot when climbing.

Because caving involves a lot of ankle and foot twisting, your boots should fit tighter than those used for hiking but looser than rock-climbing boots. They should also offer adequate protection for your toes. Be sure to clean and waterproof your boots after every caving expedition to protect them from cave mud and to keep them strong and supple.

A hard hat with an electric or carbide lamp (each type has its advantages) is mandatory every time you set foot in a cave. The kind of hat used by rock climbers is preferable to the plastic mining or construction type. A hard hat is practically useless without a chin strap since the hat will fall off on impact. The chin strap should be nonelastic and attached to the hat at four points.

For carrying food and equipment into the cave, choose the kind of canvas shoulder bag available at army surplus stores rather than a daypack. These bags usually open and close easily and have buckles rather than zippers or snaps. The long strap will also let you drag the bag behind you in a tight spot.

At least one person in your group should carry a first-aid kit containing bandages, gauze, tape, first-aid cream, aspirin, and possibly a space blanket. It's also a good idea to have a more complete kit, along with food and water, in the car. Everyone should pack water and high-protein snacks to ward off exhaustion and hypothermia.

A few other things might be useful: a compass, a pocketknife, a watch to keep track of time, and a paper and pencil to jot down notes or a quick map.

someone from a cave so often" before you stop mentioning where your favorite caves are found, says Stevens. "Caves are safe for those who know what they're doing. For those who don't, caves are not the place to be. If you're going with an organized group, you'll be safe. If you're going in on your own, caves are dangerous."

Although most experienced cavers have never had a serious accident in a cave, it's important to see the sport as *potentially* hazardous. Certain rules must be followed diligently to avoid endangering yourself, your companions, and those who might have to come to the rescue.

The first, most important rule of caving is *never* to go alone. The NSS recommends a minimum of three, and preferably four, people on any expedition. That way, if someone gets hurt and a person is needed to stay with the injured party, there will still be two left to go seek help.

In addition, caving parties should always have at least one experienced caver for every three or four amateurs, with the most experienced caver in front and the next-most-experienced holding up the rear. Regardless of the size and experience of your group, be sure to let a reliable friend or relative know what cave you'll be in, and when (with a couple of hours leeway) you are due to come out.

Getting lost is a common worry, but experienced cavers rarely lose their way. A simple method for staying found is to turn around regularly on the way into a cave, especially at passage junctions, to see what the trail will look like heading out.

By far the most common obstacle inside a cave is darkness. Most people don't realize that the typical flashlight has a life of only two hours. Even the simplest cave can become a trap without light, so it's important to bring at least three sources of light per person, plus fuel, spare parts, and batteries to last twice the expected duration of your visit. The usual light sources are an electric or carbide lamp (attached to a hard hat), a flashlight, and a chemical lightstick or candle and matches in a waterproof container.

This orange salamander in Kentucky's White Cave is one of the few organisms that can be found in the harsh cave environment.

Because caves are generally wet and cool (in the northern part of the United States they are typically in the low 50s year round), hypothermia is a very real danger. If one gets wet, temperatures of 30° to 50° Fahrenheit are sufficient to cause hypothermia, which can lead to death if untreated. Eating a nourishing meal before going caving, choosing the driest route through a cave, and wearing proper clothing (see "Gearing Up for Going Under," page 50) can help prevent hypothermia. Carrying some high-carbohydrate foods is also a good idea. (For a more detailed treatment of hypothermia and other environmental stresses, see "Blood, Sweat, and Chill," January/February 1985.)

Falling rocks and earthquakes, also common fears of beginners, are not real threats. Most caves have been thousands of years in the making and are very stable. Abandoned mines are relatively new, however, and those who venture inside them risk collapse of the entrance or walls. Mines may also contain bad air.

Flooding is a genuine hazard in many caves. In some areas the limestone beds provide nearly all the drainage for surface water. In these regions, called karstlands after a section of Yugoslavia, a single cave system can provide the drainage for hundreds of square miles. During a rainstorm such a cave may flood to the roof: The land above acts as a sieve, and water and debris flow in from miles around. It's not uncommon to see a log jammed 50 feet above the floor in a karst cave. Flooding is obviously a danger in these caves, and drowning is one of the leading causes of cave deaths.

For the experienced caver, however, flooding is not generally a threat. "It's the high-school student who goes in, not realizing the cave floods, who gets caught," says Stevens. "He doesn't notice the telltale signs that the cave is subject to floods. He doesn't see the little twigs wedged into the ceiling, and doesn't know enough to stay out of the cave when it might rain."

The best seasons for caving are generally late summer or early fall, when water levels are low. Caving should be avoided on warm winter days, during the spring runoff season, or any time you think it will rain.

Water has frustrated many a caver, for expeditions often end when a deep pool or stream disappears into a wall. Caves are sometimes extended by divers, but cave diving remains one of the most dangerous of all sports. More than 200 cavers have been killed diving in Florida alone. Even expert divers can become lost instantly when a foot brushes against a wall in a water-filled passage, stirring up silt and clouding the previously clear water. Getting stuck can be deadly, for air supplies are quickly depleted. There is also the fear that a passage might end in a giant underground cascade that would send a diver tumbling into a virtually bottomless pit.

But the unknown is caving's lure. Few places above the earth remain unexplored, but many caves have passages that no one has ever squeezed into.

Far underground in a rarely visited Virginia cave, 30-year caving veteran Dick Burns accidentally kicked a wall, and his foot went right through it. Beyond the wall Burns found a quarter mile of previously unknown cavern. Inside the passage lay the remains of a prehistoric cave bear that had died there during the last Ice Age. Even the animal's tracks had remained undisturbed for thousands of years. One kick had led Burns into another era, and revealed an unknown world. □

FOR THOSE WHO HAVE NEVER been inside a cave, a visit to one of the 50 or more commercial caves around the country might serve as a good introduction. Commercial caves contain some of the country's most beautiful underground formations, which visitors can admire and appreciate without worrying about equipment or training. The National Caves Association distributes a pamphlet with the names and addresses of commercial caves around the country; write to the National Speleological Society (NSS) for a copy.

The best way to start caving on your own is to contact the NSS (Cave Avenue, Huntsville, AL 35801; phone 205-852-1300). They'll put you in touch with one of more than 150 chapters (grottoes) in 40 states. For a $20 annual membership you can learn caving techniques, caving tips, and meet other cavers. Members also receive a monthly magazine and can buy caving guides and books from the society.

ALAN DARLING *is a caver and freelance writer. His work has appeared in many publications, including* Omni, Woman's World, McCall's, *and* Discovery.

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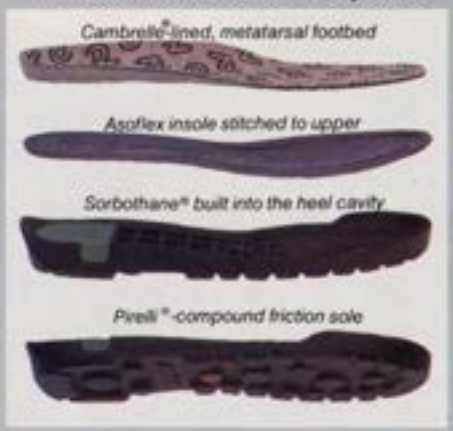

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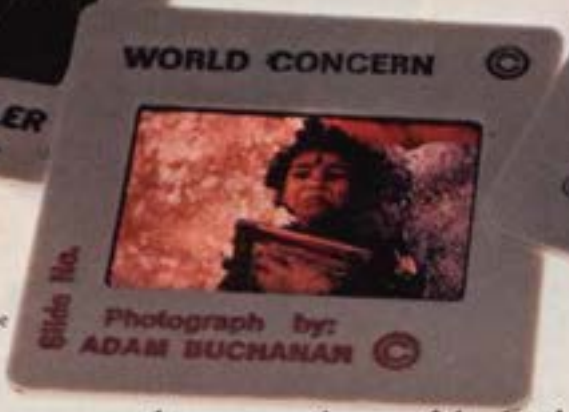

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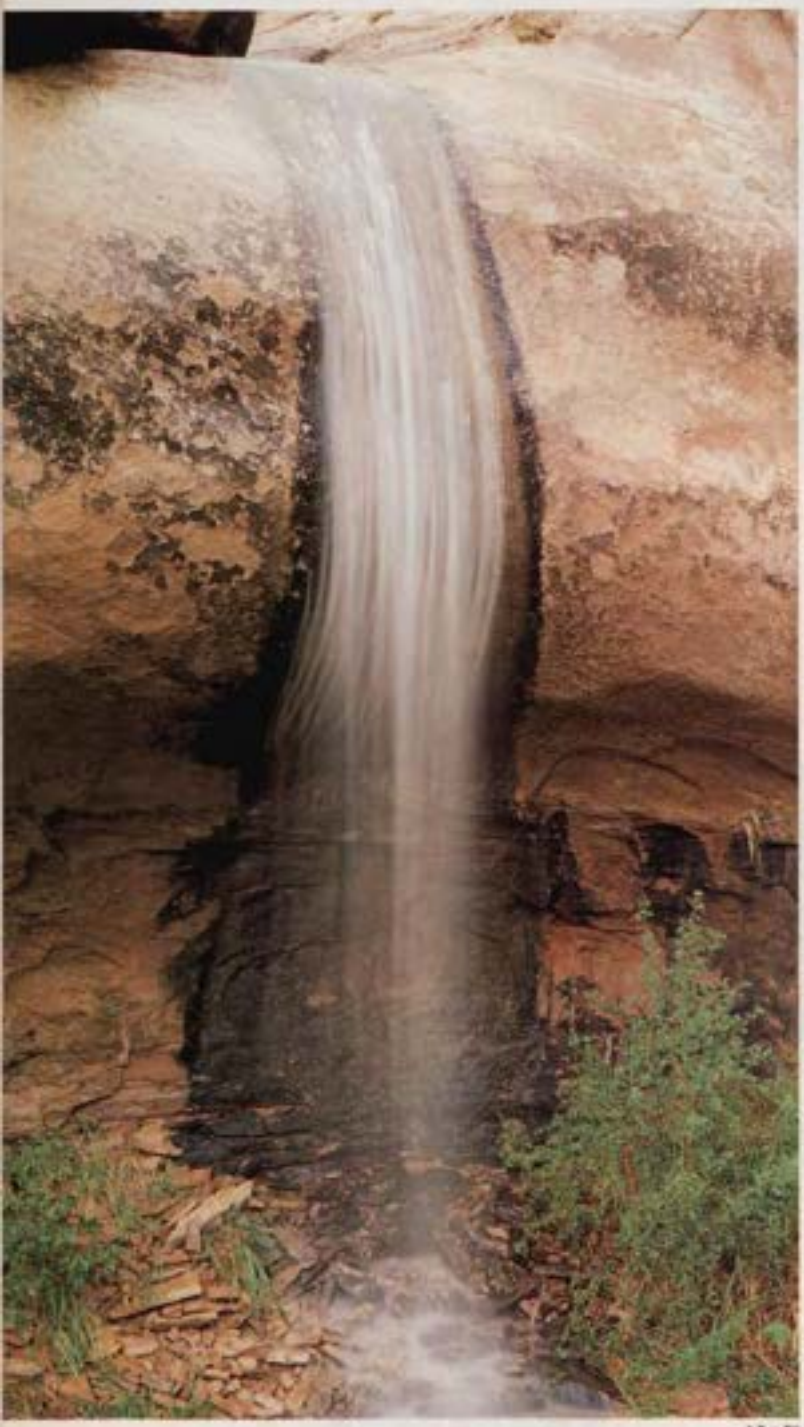
The perplexing saga of the Bureau of Land M



© Tom Till

JAMES BAKER

How Negro Bill Canyon got its name is a story right out of the old Wild West. Legend has it that one night in 1881 the outlaw William "Nigger Bill" Granstaff ducked into the canyon, successfully eluding an angry posse from the nearby frontier town of Moab, Utah Territory. While Bill made his getaway, the posse shot his partner dead.

This little canyon, a short tributary of the Colorado River in eastern Utah, bore Granstaff's nickname until another era deemed the modern rendering—Negro Bill—less offensive. But aside from its name, Negro Bill Canyon today remains much as it was in Granstaff's time. The canyon walls still rise scores of feet straight toward the sky. Draperies of black streaks ("desert varnish") hang down the walls of smooth pinkish Navajo sandstone, or slickrock, as it is called.

Fed by aquifers under the high La Sal Mountains to the southeast, an unnamed stream flows through Negro Bill Canyon year round. A rarity in this arid region, the reliable water supply nourishes a narrow band of life beneath the barren slickrock cliffs. Stately cottonwoods and gambel oaks line the streambed, and springtime brings carpets of primrose blossoms. In the heart of the desert, beavers have built ponds and homes, and the downward-spiraling scream of the canyon wren and the faint trill of the hummingbird occasionally punctuate the vast silence.

An almost ideal medium for elegant erosion, the Navajo sandstone has been molded into huge, long, narrow lumps called fins. Erosion has produced openings in the fins, such as the sweeping Morning Glory

Both Negro Bill Canyon in Utah (left) and the Missouri River Breaks in Montana have been the target of destructive antiwilderness campaigns. At Negro Bill the county commissioners illegally bulldozed a road. In Montana radio advertisements encouraged people to drive off-road vehicles in the wildlands of the Breaks.

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anagement's wilderness review

Arch, one of the widest natural bridges discovered on Earth. To stand beneath such a massive sculpture is to know the ultimate insignificance of human beings.

Negro Bill Canyon is today owned by the American people and administered by the Bureau of Land Management (BLM), the federal government's largest public-land agency. In 1976 Congress directed the BLM to review its holdings, some 172 million acres in the West, to select the lands it would like to see included in the National Wilderness Preservation System. Presumably Congress was seeking to shield the Negro Bill Canyons of the West from development pressures when it mandated the BLM review. But events have turned out quite differently in Utah and elsewhere.

On July 7, 1979, the Grand County Commissioners sent out equipment to bulldoze a road into the mouth of Negro Bill Canyon with the avowed purpose of ruining its chances for wilderness consideration. (By law wilderness areas must be roadless and substantially free of other signs of civilization.) After the BLM closed off the road several days later, the commissioners once more dispatched their bulldozer to the area.

David Muench

This time the BLM filed suit against the county for trespass. The case languished in federal court until November 1980, when the BLM and the county announced an out-of-court settlement. Within hours the BLM also released the final results of its statewide wilderness inventory. Not surprisingly, the agency had decided not to designate Negro Bill Canyon a wilderness study area (WSA), which meant it would be dropped from further consideration. The BLM alleged that a road ran several miles up the canyon, that visitors could not enjoy solitude there because vegetation was not sufficiently dense, and that mining operations had compromised the area's naturalness.

"Completely untrue," says Jim Catlin, conservation chair of the Sierra Club's Utah Chapter. "Volunteers did field work in Negro Bill Canyon and proved that the agency's conclusions were grossly inaccurate." One volunteer even discovered a memo in which the Moab BLM district manager had stated his wilderness review policy: "When in doubt, throw it out."

Catlin learned that an agency field report favorable to wilderness designation had been removed from the area's public file by Moab District Wilderness Coordinator Diana Webb, whose husband worked for Cotter Corporation, which holds numerous mining claims on BLM lands throughout southeastern Utah. Webb's husband, George Schultz, is also president of the Red Rock Four-Wheelers Club, which is promoting a dirtbike trail that runs south of Negro Bill Canyon. Despite the obvious conflict of interest, Webb had not disqualified herself from deciding the fate of Negro Bill Canyon and many more units in the BLM wilderness review.

Without the help of an attorney, Catlin and the Utah Chapter appealed to the Interior Board of Land Appeals (IBLA), the administrative court of the Interior Department. On March 15, 1982, IBLA Judge Bruce R. Harris ruled in favor of conservationists and told the BLM to reconsider Negro Bill Canyon. The unit was eventually designated a WSA despite a counter-

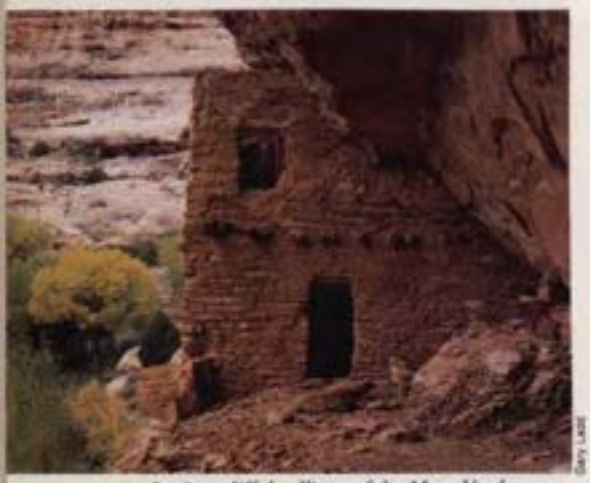
Tom Till

The Little Rockies wilderness study area includes both desert canyons and the snowcapped peaks of the Henry Mountains.

appeal from the Red Rock Four-Wheelers.

Negro Bill was the first successful appeal by conservationists in the wilderness review, but because of the amount of land the BLM rejected, it was hardly the last. When the agency completed its wilderness inventory (the first phase of the review process) in November 1980, it had found only 24 million of its 172 million acres deserving of further consideration as wilderness.

In eastern Montana the BLM disqualified all but a handful of splintered units in the open grasslands of the scenic Missouri River Breaks. Here, too, wilderness foes engaged in heavy-handed tactics. According to Jerry Berner of the Missouri Breaks Protection Association, one local group purchased radio spots encouraging people to drive off-road vehicles over wildlands in the Breaks—"an abuse it or lose it campaign," he calls it. Although Montana conservationists successfully appealed four BLM decisions to the IBLA, most of the Missouri Breaks has been dropped from any further consideration. Conservationists estimate that 400,000 acres of the area remain free from the marks of civilization.



Gary Ladd

Ancient cliff dwellings of the Mesa Verde Anasazi Indians still stand in Grand Gulch, a wilderness study area in Utah.

In New Mexico conservationists were able to recover three WSAs through appeal to the IBLA. These units showcase the diversity of desert terrains: the rugged Florida Mountains, dry as toast; stabilized sand dunes in Antelope; and the twisting arroyo country of Prescilla.

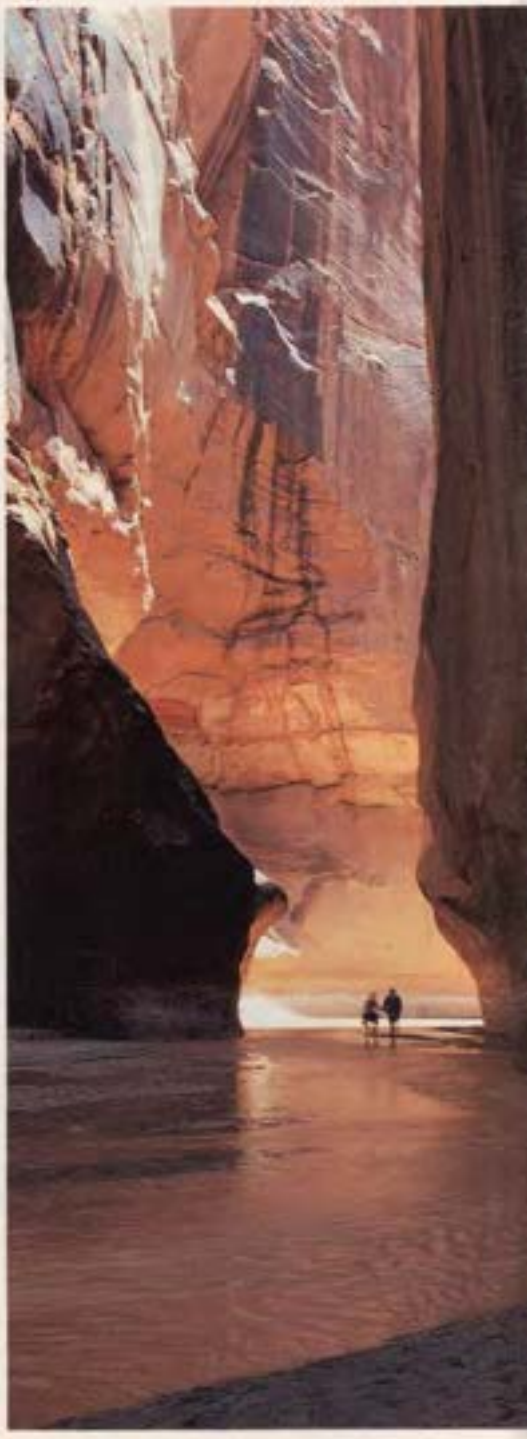
But the biggest victory for conservationists was in Utah. Ruling on a statewide wilderness coalition's appeal of nearly a million acres that did not gain WSA status, the IBLA asked the BLM to reconsider 21 units (or portions thereof) comprising 825,000 acres. The apparent victory turned to dust, however, when the BLM later refused to designate nine of the affected areas as WSAs—including big chunks of the Kaiparowits Plateau, the western flank of the Henry Mountains (home of the nation's last free-roaming herd of buffalo), and mountain ranges in Utah's west desert country—250,000 acres in all. The BLM persisted in dropping hundreds of acres from the Fiddler Butte area because of "a road."

"For that road to exist as marked on BLM maps," says Catlin, "it would have to go straight up a 300-foot cliff!" The Utah conservationist coalition has returned to the IBLA with a new appeal for the discarded units.

Back in Negro Bill Canyon, visitors might wonder whether WSA status really means much. Under federal law and the BLM's interim management policy, the agency is required to maintain wilderness values until it has completed intensive studies of the areas, and until Congress has decided whether to designate them as wilderness. The goal of this policy is to put the final decisions about wildlands in the hands of Congress. But a road and a passive microwave reflector have been built above Negro Bill Canyon, and off-road vehicles roar along the rim and bottom. In fact, the BLM's interim management policy has been violated repeatedly throughout the West:

- In what has been called the worst violation of interim management policy in the nation, Exxon assembled and operated a drilling rig inside the Mt. Ellen WSA in southern Utah. Although Exxon had stated from the beginning that the project would require bulldozing a new road and a drill pad the size of two football fields, the BLM approved the company's application to explore for oil and gas in what turned out to be a dry hole. In Utah alone, conservationists have counted more than 75 violations of the BLM's policy for managing WSAs.
- In a draft environmental assessment of an alunite strip mine in the Red Cloud Peak WSA, the BLM District Office in Montrose, Colo., asserted that removing the top 2,000 feet of Red Mountain for the strip mine would not constitute a "significant adverse environmental impact." (The project is currently on hold, however, for legal and political reasons.)
- Before it was appealed by the Sierra Club and the Colorado Open Space Council, another BLM environmental assessment would have permitted up to 14 oil and gas wells in the Little Book Cliffs WSA in western Colorado. In 1982 Coors Energy bulldozed a road and constructed an oil well and settling pond in the area.
- Seismic testing in New Mexico's West Potrillo Mountains WSA left permanent scars on the area's volcanic cinder fields. "It's not surprising that the BLM underesti-

Hikers amble down stately Paria Canyon Narrows, which Congress designated as wilderness last year along with Vermilion Cliffs and parts of Kanab Creek and the Grand Wash Cliffs in Arizona.



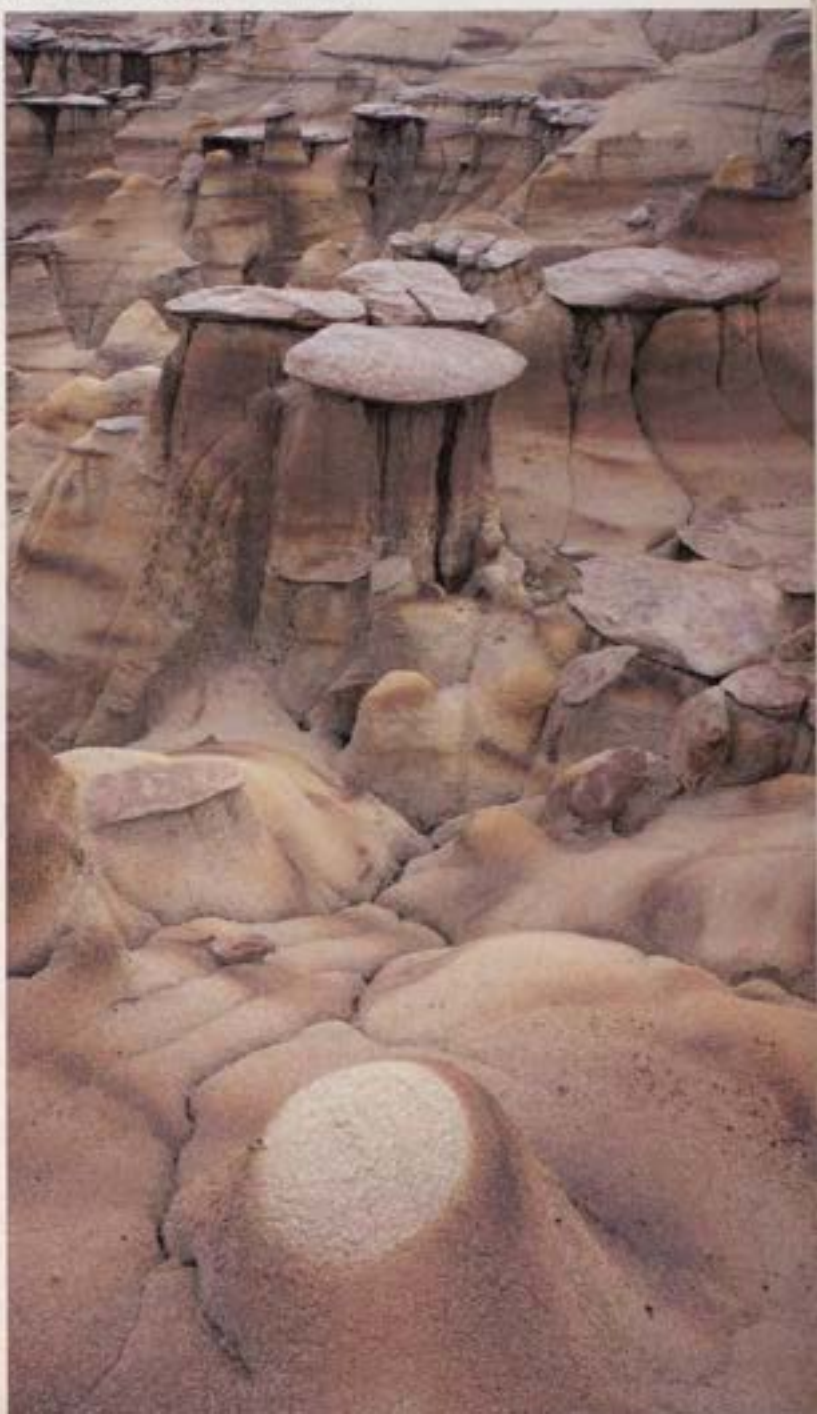
mated the impacts," Judy Bishop, former chair of the New Mexico Wilderness Study Committee, said in congressional testimony. "They were never analyzed."

- The BLM has approved construction of a water pipeline adjacent to the Big and Little Jacks Creek WSAs in southwestern Idaho. The bone-arid volcanic steppes could support cattle grazing if water were piped in. But according to Bruce Boccard of the Committee for Idaho's High Desert, this would "seriously diminish or destroy" the region's chief wilderness values—a herd of rare California bighorn sheep and the virgin grasslands. An IBLA appeal by the group was denied on a technicality.
- The Vale District of southeastern Oregon has released a draft environmental assessment that authorizes new grazing within 14 WSAs, including parts of the incomparable Owyhee River Canyonlands. The agency recommends allocating what it calls "excess forage" to domestic livestock rather than wildlife.
- The BLM recently came up with a plan that would allow off-road vehicles onto the unique star-shaped Panamint Dunes in Southern California. The agency argued that by restricting ORV play to specified routes, the WSA's wilderness values would be protected. Several groups, including the Sierra Club and the Tim-ba-sha Indians, forced the Bureau to put its idea on hold until the IBLA rules on their appeal.
- In 1983 and 1984 more than a thousand dirtbikes blasted across 120 miles of prime Southern California desert when the infamous Barstow-to-Las Vegas race staged a comeback after being suspended in 1975. The BLM approved a permit for the event even though the route crosses the Soda Mountains WSA. A suit to ban the race again has reached a federal appeals court.

BY THE CLOSE of 1985 the BLM hopes to complete the second round of its wilderness review, the phase where each WSA undergoes intense analysis in an environmental impact statement (EIS). Based on this study, the agency decides whether to recommend the WSA for designation as wilderness.

Given its history of controversy, Negro Bill Canyon's nonwilderness recommendation in a report preceding its EIS was no

John Marshall



David Muench

Whitehorse Creek Canyon (above), a wilderness study area in Oregon where the Bureau of Land Management will make wilderness recommendations this year.
Bisti Badlands (below), saved from strip mining by the passage of a San Juan Basin, N.M., wilderness bill last year.

TO HELP with the Club's BLM wilderness effort or any of the Club's seven other national campaigns, write to Campaign Desk, Sierra Club, 530 Bush St., San Francisco, CA 94108. Please include your membership number (from the address label on your copy of *Sierra*).

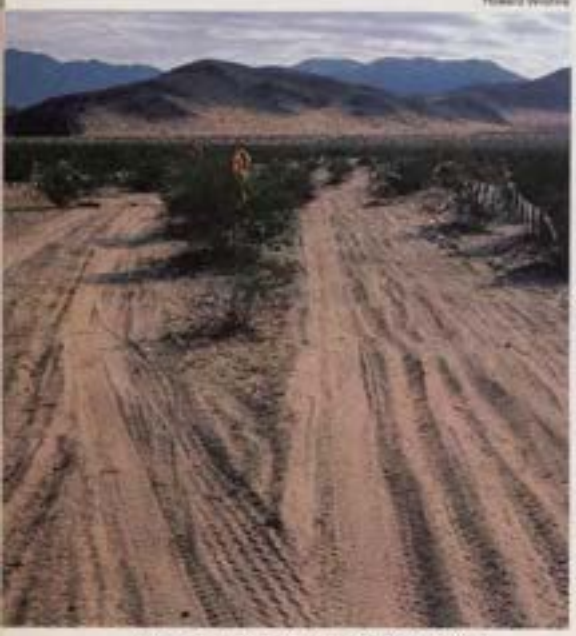
Gordon Anderson

surprise. A narrow corridor of the canyon would be given some administrative protection as an "outstanding natural area," while the remainder of the WSA would be opened up to uranium and petroleum exploration. The Sierra Club's Catlin claims that the preliminary report and recommendation are "flawed."

Whether those flaws will be corrected remains to be seen. Some time this summer the Utah state office of the BLM will release a draft of its statewide EIS. Oregon and New Mexico will also undergo statewide wilderness EISs during 1985, but of the three states, Utah has the best preliminary recommendation: just over half of its WSA acreage.

John F. Sieberling

Howard Wilshire



Despite a mandate to protect potential wilderness, the Bureau of Land Management approved Exxon's applications to drill for oil and gas in the Mt. Ellen wilderness study area (WSA) in southern Utah (at top). The bureau also allowed a once-banned dirtbike race to mar 120 miles of the fragile California desert with tracks like those shown above. The official race route crossed the Soda Mountains WSA.

The Red Desert in southwestern Wyoming was dealt one of the worst defeats in the study phase of the process. Its badlands and shifting sand dunes are rich with wildlife, including an unusual herd of desert elk whose critical calving grounds lie within some of the nine tiny WSAs here. The Red Desert is also rich in history; pioneers traveling on the old Oregon Trail, for example, used the Oregon Buttes as a natural landmark. But in its wilderness EIS for the Rock Springs District, the BLM consigned all but one and a half WSAs (57,000 acres) to oil and gas development.

Debbie Sease, a Sierra Club representative in Washington, D.C., who has been examining the results of the study phase, reports that the various wilderness EISs are giving the nod to about a third of all WSA acreage. At this rate the BLM will recommend only 8 million acres to Congress for wilderness designation—less than 5 percent of the 172 million acres originally under review. "The studies are so biased against wilderness that Congress should expect to receive citizens' proposals that are substantially larger than the Bureau's recommendations," says Sease. Utah conservationists' 9,000-acre Negro Bill Canyon wilderness proposal is one example.

Under the Wilderness Act of 1964, Congress alone can designate a wilderness area, which means that senators and representatives—not the BLM—will ultimately resolve the agency's wilderness issue. Already Congress is taking a look. In June 1984 the House Interior Subcommittee on Public Lands, chaired by Rep. John Seiberling (D-Ohio), held an oversight hearing on the BLM wilderness review. Some 18 conservationists lined up to criticize the program: the stingy recommendation for the Red Desert, the agency's disgraceful record on its interim management policy, and the Negro Bill Canyon case, including the dubious role of Diana Webb, who still works at the Moab office as wilderness coordinator. Former Interior Secretary William Clark took (and needed) almost 200 pages to respond to questions about the management violations. Significantly, not one wilderness opponent showed up to testify at the hearing.

Although the President's final administrative proposal for BLM wilderness may not be delivered until 1991 or later, Congress is already taking action. The 98th Congress designated the first BLM-administered wilderness, Bear Trap Canyon in Montana, as well as small areas in California, Oregon, and Washington. The bill for WSAs in the San Juan Basin of northwestern New Mexico, the first wilderness bill exclusively for BLM lands, also passed Congress last year. It saves the core of the eerie Bisti Badlands from strip mining.

In a statewide Arizona wilderness bill, Congress also set aside Aravaipa Canyon and nearly 300,000 acres of the Arizona Strip (the part of the state north of the Colorado River) as wilderness. This includes Paria Canyon, the Vermilion Cliffs, and parts of Kanab Creek and the Grand Wash Cliffs. These designations, the largest so far for BLM lands, resulted from a unique compromise between conservationists and Energy Fuels Nuclear, the chief mining company in the uranium-rich Arizona Strip.

"We are settling in for a good, long, and eventually winning battle for BLM wilderness," declares the Sierra Club's Sease. Conservationists' victories for BLM wilderness—from the Negro Bill Canyon administrative appeal to the Arizona Strip compromise—have come about through the efforts of grassroots volunteers. Some of them are new leaders; others participated in fights for wilderness in national forest, national park, and national wildife refuge lands. All toil through the maze of the BLM wilderness review for no more reward than having saved a few fragments of the old Wild West. □

James Baker, a freelance writer in Seattle, Wash., serves as associate director of the Washington Wilderness Coalition and chair of the Sierra Club's National BLM Wilderness Subcommittee.

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CASS PETERSON

HOW MUCH RISK IS TOO MUCH

IT WASN'T SCIENCE. Raymond Hayducka did his risk-benefit calculations over a beer in a smoke-filled Newark, N.J., taproom while a dispirited-looking stripper cracked her gum in time to the bump and grind.

Outside, moon-suited technicians from the EPA were carefully scraping up soil samples at the site of an abandoned chemical plant, looking for traces of dioxin, a chemical so toxic that health officials consider it unwise for humans to be exposed to any amount.

But Hayducka, taking an exaggerated breath and thumping his chest, said confidently, "I worked in the chemical plant for 16 years and I've never been sick. I won't waste my time worrying about it." It was a swift and simple mental calculation: The certainty of a weekly paycheck weighed against an unproved physical threat.

As an analytical technique, however, it was not much cruder than the ones government officials use daily in weighing the highly visible benefits of the chemical revolution against its pervasive—and little understood—risks.

Risk-benefit analysis has been around for years, the tool of stockbrokers, insurance companies, and speculators. But more recently it has become an increasingly important handmaiden of government regulators, applied to sensitive questions involving health and safety.

The new emphasis has opened a Pandora's box of questions, many of them revolving around the imponderables of morality, the value of human life, and the right of free men and women to accept risk versus the government's obligation to protect citizens from risks thrust upon them involuntarily.

Such risk-benefit questions have been an issue, for example, at the National Institute for Occupational Safety and Health (NIOSH), which conducted a 15-year study of workers and work places. NIOSH had the names of as many as 250,000 people who may face increased risk of life-threatening diseases because of exposure to toxic substances at work. But the government refused to notify the people, citing substantial cost, confusion about whether the medical dangers justify a government warning, and fear of alarming some communities. This January the Public Citizen Health Research Group disclosed the names of the 249 work places involved, information obtained through a Freedom of Information Act request.

At its most extreme, the chemical risk was starkly evident in Bhopal, India, where a poison-gas leak from a pesticide plant killed more than 2,000 people and injured 100,000 more in a matter of hours.

Investigators have not determined whether the catastrophe in Bhopal was preventable or whether it was the kind of industrial accident that will happen under the most restrictive safety practices. But the tragedy served to sharpen debate on a broader question: How well does society understand the risks of chemicals that do not come as a suffocating cloud in the dark of night but as an invisible and inescapable part of our daily lives?

The debate is most intense inside the EPA, which has taken the lead in promoting risk-benefit analysis. Former EPA Administrator William Ruckelshaus addressed the issue squarely in one of his first speeches after returning to the agency in 1983.

"We must assume that life now takes place in a mine field of risks from hundreds, perhaps thousands, of substances," Ruckelshaus told the National Academy of Sciences. "No more can we tell the public: 'You are home free with an adequate margin of safety.'"

Against the staggering size of the regulatory task, the argument has undeniable intellectual force. More than 60,000 chemicals are in commercial use in the United States, and the industry produces a thousand new ones every year. There are 35,000 or more pesticides, 8,600 food additives, and 3,400 cosmetic ingredients.

Before World War II, U.S. industry produced less than 10 billion pounds of synthetic organic chemicals each year. By 1980 the figure was 350 billion pounds and still climbing.

To grapple with a problem of that magnitude, Ruckelshaus argues, the government needs a uniform way of measuring risks and a statutory formula for balancing them against the economic value of a substance and the costs of controlling it.

"If the government gets better at both assessing and managing risk, and we do it accurately, people will have a better sense of the risks and will act sensibly," he says.

But even within the EPA, opinions are sharply divided over whether the agency can provide the kind of accuracy Ruckelshaus envisions.

"It's not a scientific process," one EPA scientist says. "Nobody faults it directly. It's really the best we can do. But when you go out for a beer after the meeting, they talk about how uncomfortable they are."

Inside the EPA, the overseer of risk is Elizabeth L. Anderson, director of the EPA's Office of Health and Environmental Assessment. Anderson is in charge of the team that does the calculations, assessing the risks of perhaps a hundred chemicals a year by selecting information, or "data points," from laboratory results and plugging them into a complex mathematical formula.

The agency considers the assessments only a tool to help regulators do their job. But risk assessment has become an increasingly important tool, one used as often to justify a decision not to regulate a pollutant as to justify regulating one. Not surprisingly, the assessments are often viewed with skepticism outside the agency.

"It's an inexact science at best, and all too often it's used as a rationale for not regulating," says Nicholas Freudenberg, a professor of public health at the City University of New York. "The fact is that there is a tremendous amount of uncertainty, and if you need certainty, even from animal tests, you're not going to have it for decades."

Like others at the EPA, Anderson harbors no illusions about the certainty of her office's product. Between the raw laboratory data and the finished product are dozens of assumptions, mathematical manipulations, and educated guesses.

"It's almost like a circumstantial murder trial," she says.

Another EPA official puts it more bluntly: "We have been accused of drawing numbers out of thin air—and that may not be a bad analogy."

Consider the variables: A hypothetical chemical is tested in a laboratory on rats and mice of strains carefully bred to be extraordinarily sensitive to cancer-causing agents.

Male mice develop tumors at a high rate, female mice at a far lower rate. Rats develop no tumors at all.

Is a rat a better forecaster of human response than a mouse? Should the chemical be regarded as a human carcinogen? And if so, how powerful?

"We don't know which laboratory animals are closest to humans, so we have to take seriously the most sensitive animal model," Anderson says.

But human exposure to any chemical rarely comes close to the deliberately high doses administered to a laboratory animal. To complete the risk assessment, the EPA's mathematical model must have some estimate of real human exposure.

In most cases, hard numbers do not exist.

"We found out at Love Canal that we could spend $10 million at one shot and still not know what people are exposed to," Anderson says.

So the agency gobbles up whatever information it can find, often subjecting the raw figures to still more mathematical conversions.

If an agricultural chemical is used on apples, how much residue will remain on each apple? How many apples will a person eat each year? Will the residue remain if the apple is turned into juice, sauce, or pastry? If so, how much juice will be drunk, how many pastries consumed?

What eventually emerges from the estimates and calculations is nothing more than mathematics masquerading as science.

What eventually emerges from the estimates and calculations is nothing more than mathematics masquerading as science; even the most devout adherents of the art acknowledge that the risk figure suggests a mathematical certainty that does not exist. If a risk assessment shows a 1-in-10,000 risk of cancer from a chemical to which 500,000 people are assumed to be exposed at certain assumed levels, for example, does that mean 50 cancers will result?

Maybe. But maybe not. Because of the conservative assumptions at each step of the process, the EPA says risk assessment produces an "upper bound" value. The presumed incidence of cancer will be no higher than 50, according to the EPA, but it could be considerably lower.

"I think that we're overstating the risks very substantially," one EPA scientist says. "I still think it's appropriate. I just don't think we should kid ourselves that this is an attack on cancer."

But other EPA officials privately worry that the assessments also may offer a false sense of security. The agency knows almost nothing about the possibility of synergistic or combined effects of exposures to many chemicals, for instance, and frequently is hampered by inadequate laboratory data, which forces still more assumptions, more manipulations, more guesswork.

"The answer eventually comes back that we don't know what to make of these models," Anderson says. "Given all of this, so much gets lost. You just see these numbers, and so many bodies."

Throughout the day and night, the average American is exposed to hundreds of chemicals.

The Food and Drug Administration estimates that three fourths of all foods contain minute residues of agricultural chemicals; processing may add others, in the form of preservatives, flavorings, and colorings.

In the house there are household cleaners, insect sprays, formaldehyde fumes. Freshly dry-cleaned clothes give off the faint aroma of perchlorethylene. A trip to the self-service gasoline station means breathing a little benzene, perhaps some ethylene dichloride, a few molecules of lead.

There's saccharin in the soda pop, chloroform in the air, trihalomethanes in the water.

By statistical standards, none of those chemicals pre-

sents the risk that the average American assumes willingly by using the automobile. The risks of dying in an automobile accident in any given year are one in 5,000. Over a lifetime, the risk is far higher—about two in 100, half that if seat belts are worn.

For some other self-imposed risks, the figures are even higher. For pack-a-day cigarette smokers, the risk of cancer is one in ten.

What, by contrast, are the risks from exposure to chemicals? Individual figures are hard to come by. According to the National Academy of Sciences, for example, fewer than 10 percent of this country's agricultural chemicals and 5 percent of its food additives have been fully tested for their ability to cause chronic health problems.

But consider the case of saccharin, one of the most exhaustively studied chemical compounds. According to a 1982 Harvard University study, drinking 40 diet sodas carries with it a one-in-a-million chance of cancer.

Someone who drank a diet soda each day for 70 years, then, would face a cancer risk of 6.4 in 10,000.

By one of the most commonly cited estimates, a 1981 study by two Oxford University scientists, about 8,000 Americans may die each year of cancer linked to exposure to environmental pollutants. The EPA has estimated that the annual number of cancer deaths linked to toxic air pollutants alone could be as high as 2,000.

The Oxford study estimated another 8,000 or so cancer deaths from food additives and "industrial products," and perhaps 16,000 more from occupational exposures. By contrast, the same study estimated more than 120,000 annual cancer deaths associated with tobacco and 140,000 associated with diet.

Because a far higher proportion of deaths are attributable to tobacco and food habits, some health officials argue that the regulatory efforts on chemicals are entirely misplaced.

"If I ran the zoo," an EPA official says, "I'd outlaw smoking. You'd certainly save more lives."

But others worry that the impact of chemical exposures has yet to show up in the cancer statistics.

"When lung cancer became epidemic, it was a small proportion of total deaths," said epidemiologist Devra Lee Davis of the National Academy of Sciences. "We have no way of knowing until 40 years from now."

As Ruckelshaus tells it, the manager of a rubber-products plant had determined to level with his workers about the hazards of cancer-causing vinyl chloride and the new rules designed to limit their exposure to it.

"He went on at some length," Ruckelshaus said, "explaining the risks, and how safety rules would change, and health monitoring. At the end of the presentation, he asked if there were any questions, and there was a long silence. And I thought, boy, are they going to storm the stage or what?

"Finally, one worker piped up. He said, 'When are you gonna get this damn cigarette machine fixed?'"

Ruckelshaus tells the story to illustrate what some regulators see as the great paradox in risk regulation: The public will accept some very high and unquestionable risks, but will vehemently reject others of lesser consequence.

The public will accept some very high and unquestionable risks, but will vehemently reject others of lesser consequence.

In truth, neither the agency nor industry has had much success in relating risk to the public through comparisons—the documented hazards of a high-fat diet, for instance, versus the less certain and presumably smaller risks of food preservatives.

"I used to think that had a lot of potential," says Ruckelshaus. "I'm not so sure anymore. They don't believe you, for one thing. . . . And it's been misused. People tend to compare everything to cigarettes, figuring that if the public accepts cigarettes as okay, then Lord, anything's okay."

Critics of risk assessment, however, find no paradox in the public reaction. Reducing all risks to a set of finite and comparative figures, they argue, tends to obscure the fundamental difference between a voluntary risk and an involuntary one, and ignores a person's right to conduct his or her own risk-benefit analysis.

A person who drives to work daily, for example, voluntarily accepts the hazards of the automobile in return for the obvious benefit: The car transports the person to work and back.

The same person may be unwilling to accept even the smallest amount of a chemical carcinogen that makes its way into drinking water from a nearby hazardous-waste dump. Whatever the statistical risks involved, they far outweigh the nonexistent personal benefits.

A person in that position is not likely to be comforted by a regulatory calculation that finds the potential damage to human health is too low to justify the high cost of removing the chemical.

EPA officials confronted a similar reaction last year in Tacoma, Wash., where the agency conducted an unusual experiment in public education on the risks of arsenic from a copper smelter. The smelter provided a benefit to the community—several hundred jobs—but also a broadly shared risk of lung cancer from arsenic emissions that could not be totally stopped, short of closing the facility.

The EPA held extensive hearings and trotted out its "upper bound" risk assessments. The smelter hired a public relations company to help explain the economic benefits of the plant. But by the end of the arduous experiment, dozens of Tacomans were sporting buttons that said, simply, "Both."

Some scientists and public policy experts rated the effort a failure, and have suggested privately that such official candor might not be the wisest course for the EPA to pursue.

Ruckelshaus flatly rejected that notion. "We've embarked on a process in which we will involve the public in this, and we can't back away," he said. "The more they know, the more comfortable they become with the concept." □

CASS PETERSON *is a staff writer for* The Washington Post.

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PRESENT PERFECT

JIM GORDON

Photography by Ed Caldwell

FEW BACKPACKERS are willing to experience the wilderness à la John Muir—with a few crusts of bread to eat, a bit of tea to drink, and an old blanket to provide warmth and shelter. No matter how dedicated we are to traveling lightly, we can all do with a little more creature comfort than that. A major source of such comfort is a good sturdy tent.

Before buying a tent, you should evaluate your camping needs. How often and in what kinds of weather are you going to use a tent? If you plan only a couple of weekend jaunts during the summer in, say, the Midwest, you will need far less protection than if you're determined to hike the John Muir Trail in one season.

The reason for doing this type of homework is simple. Tents can vary tremendously in price, and there's really no sense in buying more tent than you're ever going to need. An expedition tent that can handle Mt. Everest or Denali won't be out of place in Stokes State Forest, N.J., in June. On the contrary, it will provide excellent shelter. It will, however, be a clearcut case of overkill—more a statement about the level of your bank account than your camping prowess.

Thinking about where and how often you go camping will also help determine how much weight you'll be willing to carry. If you and the family go car camping, a full-feature 20-pound tent might be quite acceptable. If you're a devoted bicycle tourer, however, a tent much heavier than three pounds will be an unbearable load. And price is always a factor: As with bicycles and soufflés, the lighter a tent gets, the more expensive it generally is.

The key question to ask yourself is, "Will I ever go snowcamping?" If you answer yes—even (ahem) tentatively—you should be looking for a tent that can stand up to the worst winter storm imaginable. Equally important, you need a tent that can be pitched securely in a gale. Your life can quite literally depend on these two points. In tent parlance, what you're looking for is a four-season tent. It is designed with poles that cross over the top to support a load of snow (or with sharper roof lines to shed snow loads), and with heavier webbing and reinforcements at stress points to improve performance in high winds. Even the stake loops will often be larger to allow a ski to be used as a stake in a real blow. As a result, a four-season tent will be somewhat heavier and more expensive than its three-season cousins. But, again, a warm, dry shelter is critical in winter.

Having thought over your requirements for a tent, your next decision will involve the shape of your prospective purchase. Basically, there are four from which to choose: the A-frame, the tunnel or hoop tent, the dome, and the bivy shelter or tube tent. All have qualities that make them appropriate

Two tunnel- or hoop-style tents, the Dragonfly by The North Face (left) and the Taku by Marmot Mountain Works (right), are examples of a three-season and a four-season tent respectively. Note the generous use of no-see-um netting in the Dragonfly; a separate waterproof flysheet keeps the elements at bay. The fly also adds a vestibule to the tent, in which gear can be stored without sacrificing floorspace. The Taku is made with a single layer of Gore-Tex laminate. The Taku has an internal-frame design and integral vestibule entrance with separate doorways to facilitate use. The "eyebrows" over the doors allow them to be left "ajar" to improve ventilation.

TENTS

for various camping needs. What follows is a quick rundown of their basic features.

♦ A-FRAME. Still an old standby in the general recreation category, the A-frame has lost much of its appeal as a backpacking or expedition tent. The development of freestanding tents, or tents that did not need as much staking as a typical A-frame, was one reason for the A-frame's drop in popularity. The newer tents were simply easier to set up, and they were often lighter in the bargain. In response, a number of manufacturers have devised a modified A-frame that is self-supporting and can withstand high winds and heavy snows. A second problem, however, is inherent in the basic design. Domes, tunnel tents, and other geometric configurations have greater living space per pound than an A-frame and are able to withstand nature's bombardment with fewer stakes, shivers, and shakes. Still, if you plan only moderate out-

Corner detail on a Eureka! Timberline A-frame illustrates what's called a ring-and-pin system for connecting the tent poles to the tent. (On the dome tent below, each pole slides into a grommet in the stake-loop webbing.) The separate rainfly hooks onto the bottom of the pole. When shopping for a tent, be sure the fly is held tightly to the frame and that it comes down low enough to protect the sides of the tent from wind-driven rain. All tents need periodic sealing with seam sealer.

The new breed of dome tent, represented here by the four-season Stretched Domicile by Sierra Designs, is longer, narrower, and squatter than older geodesic designs, which means there is more usable floorspace, more continuous headroom, and less surface area to resist the wind. Domes are freestanding, but stake loops are provided for the occasional big blow. The new modified domes use fewer poles; in this case the four poles are all the same length, simplifying set-up. Note too that this tent has abandoned the use of pole sleeves in favor of a system called Swiftclips, again to cut pitching time. The absence of pole sleeves greatly increases air movement between the tent body and flysheet; it also means that condensation can run off the fly without trickling down the pole sleeves and finding its way into the tent.

ings in good weather, an inexpensive A-frame might be the tent to choose. Spend a little more money, and you can get a quite serviceable A-frame that will be relatively light and easy to set up and yet sturdy enough to weather an occasional mountain storm.

♦ TUNNEL TENTS. Because of their headroom and living space, tunnel tents have gained popularity in recent years. They also have fewer poles than other designs—most notably domes—and require fewer stakes than A-frames. They are easy to pitch, and, according to Robyn Millett of Marmot Mountain Works, Ltd., in Grand Junction, Colo., the parabolic shape is highly stable: "When pitched with the low end into the wind, a hoop tent tunnels wind off to the side, reducing resistance."

The hoop/tunnel design is not new by any means. When the pioneers crossed the sprawling prairies, they used a similar construction on their Conestoga wagons. Some 25 years ago, tent designers such as Jack Stephenson and Bill Moss applied the design to tents. They replaced the wooden wagon poles with aluminum and exchanged the wagon canvas for high-tech nylon.

Tunnel designs require fewer poles—and therefore take up less weight and space—than an A-frame. The design also distributes the tent material more evenly. As a result, an occupant gets a lot more living space for the same square footage of floor space. But there are some drawbacks to the design. For one, tunnel tents are not freestanding, which means they can be difficult to pitch on cramped sites or rock-hard surfaces. Many of the earlier designs used but two poles or hoops, which saved weight but meant that a large expanse of tent got scant support. That was fine under normal conditions—but come a heavy snowfall tremendous pressure was placed on the poles, tent fabric, and stakes. Many of today's tunnel tents—especially those designed for four-season use—have remedied that problem by adding a third pole. A final problem can be with headroom. Admittedly, there's more headroom throughout the tent than in most A-frame designs, but if you plan to use a lightweight tunnel tent for a base camp on extended outings, be prepared for fits of claustrophobia. (In summer or when you're on the move every day, weight and ease of set-up are generally more important.)

♦ DOMES. The geodesic dome tent was truly a revolution in tent design. It offered more headroom and usable space than other designs, and it was exceptionally strong. It was also self-supporting, a quality by which other tents were soon to be measured. The strength and interior space of the

dome quickly made it popular for expeditions and for hikers who are forced to spend long hours in their tents because of bad weather.

There were two drawbacks to the original dome design, however. One was weight. The design called for as many as eight tent poles—a cumbersome bundle even when shock-corded. The second was the irregular floor plan. The dome floor is more or less a circle, while people in sleeping bags are more or less rectangular. True, you can stash equipment in some of the odd recesses of a dome, but you can't fit in as many people as you could if the same square footage were laid out in a rectangle.

Bunched together, shock-corded tent poles resemble the high-tech arrow shafts they're patterned after. According to tent aficionados, the best poles are made from 7075 aluminum alloy by the Easton Co. A light coat of silicone lubricant protects poles from corrosion.

Tent designers solved these problems by modifying the dome construction: They were able to reduce the number of poles to as few as two, and at the same time come much closer to a rectangular floor plan. As a result, the modified domes are lighter per square foot of living space.

There are still a number of classic dome tents on the market, and although many of them are designed for four-season use, some are light enough to be considered lightweight tents. In addition, a number of companies are designing domes specifically for three-season use. These models are a pound or so lighter and therefore easier to carry than the four-season models, and the price has been lowered a notch or two to make them more affordable. This trend is all to the good, except that some of the less-expensive domes don't have an adequate rain fly, so the edges of the tent can get wet if you are blasted by a summer thunderstorm. Also, the poles are not always made of top-grade aluminum, which means they tend to break more easily, weigh more, or pack into much longer bundles than poles on top-of-the-line models.

♦ BIVY SHELTERS. In areas of the country where heavy storms are not a problem, backpackers, climbers, and cyclists who want to travel light can get the protection they need with a minimal amount of tent. Most bivy shelters weigh between one and two pounds. With two hoops and a couple of stakes, these ultralight tents can be pitched in a few minutes. At least one manufacturer has married the Gore-Tex bivy sack to a solo tent to produce a shelter that can weather all four seasons, albeit in a somewhat spartan manner. You couldn't, for instance, cook inside the tent—a decided drawback in a storm.

The compactness and light weight of these tents have their down side, of course—bivies provide extremely tight quarters. In fact, in most of them all you can do is lie down. If a rainstorm does come up and you are trapped in your tent for a long period of time, you're likely to go slightly bonkers, unless you're mighty fond of your own company or the book you happened to bring along. For some people it takes only a few minutes for claustrophobia to close in. And although most of these tents are made of waterproof fabric and have what's called a tub floor, they are not designed to withstand long stretches of inclement weather. If you're jammed into a bivy during an extended storm, you're likely to get at least damp around the edges.

An alternative to the bivy is the one-person tent that provides enough headroom for the occupant to sit up and read while waiting out a storm, while providing enough floorspace to store gear as well. They weigh more than a bivy shelter, but to some people the extra room more than justifies the extra weight. These solo tents can be made of a simple layer of Gore-Tex for those who are extremely weight-conscious, or they can be constructed mostly of no-see-um netting (and a waterproof fly) for the individual who wants only bug-free sleep on warm, dry summer nights.

Deciding on the shape you want will not be a truly scientific exercise. Even the experts do not agree on which design works best. What one mountaineer swears by, another swears at. So how are you to decide? In part by matching your needs to the features of individual designs, in part by talking to experienced tent users, and in part by taking your time and trying out as many designs as you can.

The ideal way to do this, of course, is in the field with a tent borrowed from a friend or rented from a mountain shop. In the likely event that you can neither borrow nor rent the top-of-the-line models, you'll have to make do with pitching the tent in the shop. Don't be reticent; put it up and take it down a few times. Does the shock cord pull the pole sections together without prompting? Do the poles slide easily into their sleeves? Does the fly fit snugly and protect the sides of the tent? Get inside and move around. Is there enough headroom? Can two people move around at the same time? Can all six feet of you stretch out comfortably? How about the color? Will it put you in a funk if you have to spend several days inside, or does it have a pleasant, even cheery feel to it? Work all the zippers and check out the placement of such things as pockets and lantern loops. The tent you buy will be your home in the wilderness, and it will likely represent a serious investment. You owe it to yourself to put it through its paces before you plunk your money down.

In addition to getting a general feel for the design that best suits your needs, you should also pay attention to specific aspects of tent construction. Bear in mind that most of the higher-priced tents will have similar quality at specific points. The trick is recognizing these high-quality elements in a moderately priced tent.

According to Ted Dishner of Moss Tents in Cambridge, Maine, "The first thing to look for in a tent is the manufacturer's warranty. If they back it 100 percent, *then* you look at the tent."

The second thing is the frame. Shock-corded poles are a must. They are easy to set up in the dark or when you're cold and half frozen; simply grab one end and "throw" the folded pole away from you, and presto, a tent pole. Without shock-cording, it's difficult to work the poles through the sleeves, and in tents that don't use sleeves it would be nearly impossible to keep the poles in place during setup. Aluminum poles are by far the most popular, although some manufacturers are now offering a pole made of a fiberglass/graphite/epoxy composite at a slightly lower cost.

Fiberglass poles have long been regarded as inferior, even though they flex more readily and don't require prebending—all the pole sections can be straight, a slight advantage in packing. Ted Dishner claims that fiberglass has gotten a bad rap because "it's been used in cheap tents, and like the tents it doesn't hold up." Bad rap or not, most manufacturers are reluctant to use fiberglass poles—even the new generation of composite ones.

It's a toss-up whether the tent fabric or the way that fabric is stitched together is the next most important quality in judging tent construction. Quality tents use a polyurethane-coated nylon to provide a waterproof floor. A combination of breathable nylon and no-see-um netting (avoid coarser mosquito netting) is often used for the sides and top of three-season tents. Unless the sides and top of the tent are made of Gore-Tex, a waterproof flysheet is a necessity.

The use of Gore-Tex for the sides and top of a tent eliminates the need for a second protective layer. This cuts down on weight, but generally increases a tent's cost. The single layer has its advocates and its critics. Set-up is undoubtedly easier and less time-consuming, and there are fewer "parts" to worry about. There is also less fabric to flap in the wind. Gore-Tex tents are typically designed for four-season use under the most exacting conditions. And yet advocates of two-layer tents claim the second layer keeps the tent much warmer. They also point out that Gore-Tex does not eliminate condensation. In fact, that is why better Gore-Tex tents have a porous inner laminate that acts as a frost liner. Still, some manufacturers who specialize in expedition-type tents use only Gore-Tex. For them, weight is critical, and the single layer of Gore-Tex provides the level of protection needed in extreme conditions.

As critical as the fabric is, the stitching is what holds the tent together. Look for lapfelled seams on the fly and body of the tent. In this type of seam, two pieces of fabric are folded in such a way that the double row of stitches joins four layers of interlocking fabric. Also look for extra material, either tent fabric or vinyl, used as reinforcement at corners and other critical stress points. Webbing used for stake loops and pullouts should be bar tacked through several layers of fabric for added strength. Tent stitching may seem an arcane subject, but you can judge some aspects of the stitching yourself. Marmot's Robyn Millett suggests you inspect the seams carefully: "The stitching should be flat and even on both sides. Any extra loops or knubbiness indicates that the tension is off-balance, and is a sign of a weak seam." Anita Iaconangelo of the Bibler Tent Co. in Boulder, Colo., advises

tent buyers to look for straight, flat seams that have 8–12 stitches per inch—any more and the fabric will have been perforated too much. Avoid single-needle construction at all costs, says Doug Brown of The North Face in Berkeley, Calif. "The weakest link is the thread, so that should at least be doubled," he notes. Finally, look for finished edges. Coated material will take years to ravel, but uncoated nylon ravels quickly. Better tents have finished edges on all fabric. Says Brown, "It's almost an aesthetic thing with some manufacturers."

Other features that bear looking into are such things as lantern and accessory loops and stash pockets. As you explore the inside of the tent, ask yourself if they are strategically located. The same question should be asked about ventilation openings. Condensation is one of the most annoying realities of all tents; without proper ventilation, there's no way to avoid it. Any tent you are serious about must have more than one opening to get air flowing through the tent. In a four-season tent, a weatherproof cooking vent is a tremendous plus. It is also important in double-wall tents—those with fly sheets—to have as much unobstructed space as possible between the flysheet and the tent walls. One way to enhance air circulation in this space is to have mesh pole sleeves; another is to eliminate the sleeves altogether and to "hang" the tent from the frame. The fly, of course, is stretched tightly over the frame; be sure to check that the snap cords that attach the fly to the base of the tent poles will keep the fly taut in high winds or heavy rains. Pullouts on the fly are also important for staking the fly in severe weather. Nylon tends to stretch when it gets wet, so pullouts let you adjust the tension on a sagging fly to keep it from touching the tent body.

Zippers are another critical element in tent construction. For the most part you need only verify that the tent you're considering has YKK nylon coil zippers. They are the standard for better-quality tents because of their durability and the fact that they are self-repairing. Look for heavier zippers on doors, and chrome zipper pulls—they outlast painted ones.

As you can see, buying a tent can involve considerable homework. One way to get started is to write tent manufacturers for their catalogs. Another is to shop at a reputable mountaineering, backpacking, or outdoor shop. Knowledgeable sales staff can answer questions and suggest models that might be appropriate for your needs. But the work can be fun, especially when the payoff is finding the perfect tent for you. □

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The OBSERVER

THEODORE SEIXAS SOLOMONS

Answering the Summons of the Sierra

SHIRLEY SARGENT

Theodore Solomons was among the very first to explore the Grand Canyon of the Tuolumne, and in 1894 became undoubtedly the first to photograph it. He called it a "handsome canyon"—certainly an understatement—and noted this peak's resemblance to Yosemite Valley's famed El Capitan.

THE MAN WHO FIRST envisioned the Sierra Nevada crest route between Yosemite and Mt. Whitney, and who did much of the mapping, photography, and documentation of that route, was an intrepid and indefatigable mountaineer. Theodore Seixas Solomons (1870–1947) was only 14 when he was inspired by the idea, 22 when he began the rugged surveys, and 62 when he realized his dream by hiking a long section of the completed trail, by then named after John Muir.

Theodore Solomons' life embodied accomplishment and high adventure in such varied fields as mountaineering, mapmaking, newspaper and court reporting, mining, business, homesteading, sawmill operation, research, and writing. His early written work appeared in specialized publications—*Overland Monthly*, *The Traveler*, and *The Sierra Club Bulletin*—whereas his later bread-and-butter stories were published in such popular magazines as *Adventure* and *Collier's*.

Solomons bestowed at least 150 place names (28 of which still survive) on peaks, passes, and lakes of the Sierra Nevada. He made a number of first ascents and took scores of photographs, the first ever in some remote regions. Today he is memorialized by a 13,000-foot peak near Muir Pass and by the Theodore Solomons Trail. (The latter was formed by combining several trails between Yosemite's Glacier Point and Cottonwood Basin southwest of Mt. Whitney, and was designed as an alternative to the now overused John Muir Trail.)

This belated recognition notwithstanding, Solomons' achievements have received scant attention. Although Francis Farquhar gave him credit in *Place Names in the High Sierra* (1926) and Hal Roth quoted him in a

fine history of the John Muir Trail, *Pathway in the Sky* (1965), virtually no biographical material about him has appeared in print. As a writer, historian, and present owner of Solomons' beloved Flying Spur homestead 12 miles west of Yosemite Valley, I have for years been doing research to rescue this extraordinary mountaineer from obscurity. My work has been eased by the memories shared with me by Solomons' widow, his daughter, a son, and two nieces.

During the Revolutionary War, Theodore Solomons' great-grandfather Gresh-om Mendes Seixas was known as "the patriot rabbi" for his defiance of the British. The Seixas-Solomons family later counted among its relations the poets Emma Lazarus and Robert Nathan, along with Supreme Court Justice Benjamin Cardoza. Theodore Solomons' father, Seixas Solomons, was a certified public accountant in San Francisco, a member of the controversial Vigilantes, and a leader of the city's Jewish community.

In 1862 Seixas married Hannah Marks, a schoolteacher and native of Poland. Hannah Solomons' strong character helped her survive the deaths of two of her seven children, and after divorcing Seixas Solomons (who had become addicted to drugs) she resumed teaching in order to support her highly individualistic offspring. Lucius, the oldest son, became an accountant and attorney in San Francisco, while Leon, the youngest, received a Ph.D. in psychology from Harvard. Selina was a writer and ardent suffragette; sister Adele, a physician and psychiatrist.

Middle brother Theodore had as lively and literate an intellect as his brothers and sisters, but "while herding my uncle's cattle in an immense unfenced alfalfa field near Fresno" on a crystal-clear day in May 1884, his life was altered by the sight of "snowy peaks topping the long, thin, blue line of mountains." He felt not only awe and reverence at this exposure to the Sierra Nevada, but fascination and purpose; and "[t]he idea of a crest-parallel trail through the High Sierra came to be." He was only 14 years old, slight of build but already tenacious of will. "I could see myself in the immensity of that uplifted world," he wrote later, "an atom moving along just below the white, crawling from one end to the other of that horizon of high enchantment. It seemed a very heaven on earth for a wanderer. . . . I made up my mind that somehow soon I would make that journey."

It was four years before Solomons could put his feet where his dreams were. During the interim he made ready by studying maps, questioning mountaineers, and preparing himself physically. Accompanied by his cousin Frank Marks, Solomons swam, fished, pedaled a high-wheeled bicycle long distances, and climbed Mt. Tamalpais and Mt. Diablo (the "giants" of the San Francisco Bay Area). In 1888 Solomons was 18 and "a scant five feet five" when he got his "first feel of the Sierra under foot" on a prolonged hike in the mountains north of Yosemite.

Although he had devoured the classics at San Francisco's Lowell High School, Solomons trained to be a court stenographer instead of attending college. Each fall his brother Lucius helped him to get a job, which he would perform with speed and accuracy until spring, when he'd quit to answer the summons of the Sierra. His family began to regard him as a black sheep. Not only did he disdain higher education; he called himself an atheist and expressed eccentric ideas. Marriage was an institution designed solely to protect property rights, he felt, and religious education was unnecessary. Trail-marking was his passion.

When the Sierra Club was founded in June 1892, Solomons was among the charter members. Accompanied by Sidney Peixotto, a young social worker, Solomons was in the mountains at the time, planning "no less than a complete subjugation in a single season of the entire High Sierra," as he put it. Having scrutinized the maps that existed, he found "a paucity of place names." Plats abounded in "such vague legends as 'High Rocky Ridge!', 'Deep Valley,' 'Confluents of San Joaquin River!'" He was to find that "these gorgeous specimens of the draughtsman's art were pure fabrication, the products of an imagination unsullied with the slightest acquaintance with the Sierra Nevada. . . ." Solomons was dismayed about this yet jubilant, for there was still "scenery to be described, peaks and streams and lakes to be named!"

Their expedition was hindered from the start by snow near Donner Lake. These conditions so impeded him, Peixotto, and their mules Shasta and Whitney that it was late June before the pair reached Yosemite Valley, where they learned that snow still blocked the way south. "So," Solomons recalled, "we took a month of pure joy in Yosemite before we met young Joe LeConte [a Berkeley professor, mountaineer, and Sierra Club leader] and made a kind of practice trip with him to Mt. Ritter and a plunge over the incredibly rough escarpment to Mono Lake."

"Subjugation" of the southern Sierra began late but auspiciously on August 9. State-appointed Yosemite Guardian and veteran mountaineer Galen Clark wished them godspeed, and pioneer photographer Carleton Watkins lent them an 8 × 10 camera and boxes of glass plates.

Before long, Solomons recalled, "Peixot-

to quite sensibly urged our return, but my foolish pride was unequal to a retreat." In pursuit of his dream Solomons plodded on alone. To locate a practical route he had to fight brush, ford creeks, climb and reclimb mountains and passes, take elevations, and make copious notes and drawings. It was rugged, intensive labor, but the environment was sublime and his goal undimmed.

When Solomons returned to Yosemite Valley a month later, lean, weary, and low on shoe leather, he arrived just in time to forestall Guardian Clark's organization of a search party. His mule came burdened with boxes of overexposed glass plates, which Watkins later doctored, and his notebook was full of descriptions, diagrams, and elevations that would serve to fill in many blank spaces on maps. The triumph of Solomons' investigation of myriad passes, canyons, and animal trails was the mapping of a useful high-mountain route, a partial fulfillment of his youthful vision.

When he wasn't vigorously pursuing his summer explorations, Solomons compiled notes, maps, memories, and research into a series of important articles on the High Sierra. These were published in the *Sierra Club Bulletin* and other journals. He consulted John Muir, who "was exceedingly generous in his encouragement of us younger mountaineers. . . . A truly great moun-

Theodore Solomons' 1897 map of Tehipite Valley was possibly the first accurate rendering of an area described six years earlier by John Muir (detail).

taineer was Muir, in the best and broadest sense," Solomons wrote, "but by the standards of the geographic world a very poor sort of explorer. He could aptly describe every place he had seen, but you could seldom tell where it was, for he seldom oriented himself in his excursions, as he modestly termed his great journeys."

To finance mules, camera, flour and bacon, Solomons worked as a reporter for the *San Francisco Examiner*, which sent him to Chicago to cover the 1893 World's Columbian Exposition. "I sacrificed the Sierra for that professional opportunity," he said, "but the following year I organized a new onslaught," together with Leigh Bierce, son of the caustic journalist Ambrose. As was the case two years earlier, in 1894 Solomons made the "blunder" of starting too far north, and late in the season. Electing to photograph the Grand Canyon of the Tuolumne before proceeding south, he took the first pictures of the Muir Gorge and of the canyon's many splendid cascades —but the time consumed was precious.

After developing the plates "feverishly" in an old butcher shop in Yosemite Valley, then reprovisioning and acquiring three pack animals, Solomons and Bierce took the shortest way to the place on the South Fork of the San Joaquin where Solomons had left off two years before.

It was on this trip that he was able to prove that "it was entirely feasible to lead a pack animal as close to the [Sierra] crest as one would ordinarily care to camp," as far south as Seven Gables. (Another highlight of the trip was the first ascent and naming of that 13,000-foot peak.)

Misadventures predominated, however. One pack animal had to be shot after it fell and broke a leg, and a falling tree almost smashed Solomons and Bierce in their sleeping bags. Solomons awoke just in time to shout a warning, and both men moved aside quickly enough to avoid death.

On September 30 a heavy snowstorm "scared us half to death, so that we shot our animals to save them from a worse fate, abandoned our outfits, including the precious exposed plates, and went floundering out of the mountains." Their miserable five-day flight later earned them censure from master mountaineer Muir. "If [Solomons] had been a mountain man," Muir blazed, "he would have had sense enough to hole up in some sheltered spot, pull in all the wood he could get hold of, and keep a fire going instead of trying to make his way out in a storm." In retrospect Solomons himself "wondered why I had not had the sense to wait out the storm. . . ."

But undaunted by snow or censure, he set off again in 1895 (earlier in the season this time) with Ernest Bonner, and brought with him a new, smaller camera. During July they mapped and photographed the rough terrain between Selden and Granite passes, and climbed several peaks. The climax of the trip was a thorough exploration of a beautiful spot Solomons named Evolution Valley. It was encircled by landmark peaks—a "fraternity of Titans," he wrote, "whose names should bear in common an august significance. And I could think of none more fitting to confer upon it than [those of] the great evolutionists, so at one in their devotion of the sublime in Nature." Accordingly he named the peaks Darwin, Wallace, Huxley, Haeckel, Spencer, and Fiske, and then proceeded to climb far up Mt. Darwin and on to the summit of Mt. Wallace. (One neighboring giant remained nameless for 75 years before receiving its appropriate title—Mt. Solomons.)

By February 1896 Solomons had prepared a map, a 123-page narrative, and 139 photographs, all describing and illustrating his "continuous route through the High Sierra from Yosemite to Kings River Canyon over which [pack] animals may be led. . . ." On another trip made that year, a wide-ranging excursion that included the forbidding Tuolumne Canyon, he was accompanied by four women, three of them undergraduates at the University of Cal-

ifornia. At trip's end Solomons wrote, "I think our experiment proved the ability of the average young woman, in good health, to endure without great hardship many of the most difficult feats of mountaineering in the High Sierra. . . . [I found] their capacity of endurance of cold water, loss of sleep, snow, and certain forms of muscular fatigue, somewhat greater, perhaps, than that of the average young mountaineer of the other sex."

The year 1897 marked the last of his five years of exploration. "The series of expeditions," he wrote many years later, "opened the way for travel parallel to the crest; and by roughly orienting the drainage systems and establishing a series of landmarks they furnished a considerable body of data which facilitated the subsequent and more extensive work of continuing and perfecting the route. The John Muir Trail of today was the final result."

Solomons' original "preposterous scheme" of complete exploration of the High Sierra ended with the summer of 1897. Soon after that the siren call of adventure and gold lured him to the even more precipitous mountains of the Klondike and of Alaska. He carried far more weight, hiked farther, and climbed higher in those vast, roadless regions than he had in the Sierra. He worked as a miner and storekeeper, and acquainted himself with Eskimo life, having many dramatic adventures. Meanwhile, other stalwart visionaries—notably Bolton Coit Brown, Joe LeConte, and the members of a U.S. Geological Survey party—explored and mapped the Sierra route Solomons had begun, on south to Mt. Whitney. Trail construction begun in 1915 was finally finished in 1938, but mountaineers were traveling the John Muir Trail long before its completion.

It was 1910 before Theodore Solomons returned to the Sierra, although not to its crest. Now 40, the explorer's goals had changed. He wanted roots, home, family, and career. A large grubstake (from a stint managing a coal mine near Nome) freed him from city work. Although his old ambition to write was still strong, Solomons intended to fictionalize his Alaskan experiences instead of writing about his exploration of the Sierra. Katherine Solomons, his wife and eventually the mother of their three children, agreed with this plan, and the couple set up a homestead on 21 acres in Stanislaus National Forest west of Yosemite Valley. Flying Spur was Solomons' permanent home until 1916, and a part-time retreat until its destruction in a forest fire in 1936.

During those years Solomons was busy with his family and a successful career writing for magazines and movies. Although he took his children camping, there was never time "to set foot in the High Sierra" for a lengthy examination of the John Muir Trail.

"But I had kept in touch," he wrote. "Something like my living wraith had accompanied the young men and women who, year after year, followed [Sierra Club leader William E.] Colby and the rest; and my mind's eye had traced the progress of an actual Muir Trail, just as in my youth a preconception of it had spurred my searching feet."

In 1932 he determined to tread the heights once again, although he was 62 years old and had gone from the 120 pounds of his backpacking years to 203 pounds. "Age if not girth pronounced this a downhill road into the valley of the shadows," he commented wryly, "not an up-hill trail into the mountains of light. There was nothing for it but to preface my trip by a week or two's training at 'Flying Spur,' my forest home which should now become a spur to climbing." Through exercise, strenuous hikes, and restraint with fork and spoon, Solomons reduced what he termed his "fleshly handcuff," so that "when my younger companion [his second wife] and I started from Mammoth Lakes as full-fledged high-trippers, a boy-scout knife had bored the first of several extra holes in [my] belt. . . ."

At first the mountains "seemed shrunk—by insensible comparison, it may be, with the immense high landscapes of Alaska," but later "the whole Sierra seemed to have assumed Himalayan proportions." Beauty, he discovered, "had enlarged her sovereignty, imprinting herself even on the bare ashen gray of the treeless basins, the peakless slopes. Of these landscapes the youthful impression had been that of 'awful desolation.' Now they were merely austere, with beauty implicit in their dignity."

Familiarity with pass, peak, and "every stick and stone" surprised and pleased Solomons. "All things seen and known, all things enjoyed and suffered, had turned to loveliness and waited for me. . . . I found myself frequently challenging the Muir Trail when it began an ascent or descent, but almost invariably agreeing with it before reaching the top—or bottom. It zigs and it zags, but what a boon for the pack animal whose heavy load secures those chief *desiderata*—more comfortable travel and the longer sojourn!"

His outing took five weeks, and featured only minor mishaps in contrast to the problems encountered nearly 40 years earlier. Toward the end, "fatigue came seldom. I could no longer run down a talus-slope or spring unerringly from fragment to fragment in the descent of a peak. But I climbed nearly as well as ever, though more slowly.

And with a satisfying degree of endurance. Crackling yellowed paper [in peak-top registers] recording ascents made *years after* my own gave my blood a queer anachronistic tingle.

"When I reached home I stepped blithely on the scales," he wrote, "and found I had lost thirty-five pounds. Mislaid, rather. Quite a few of them have turned up since."

Solomons' excess weight may have returned—but so did memories, time and again, to delight the man who matched the mountains with his vision, his arduous explorations and mapping, and his written descriptions of a trail long famed for its accessibility and "high enchantment."

SHIRLEY SARGENT *is working on a biography of Theodore Solomons. She is the author of* Pioneers in Petticoats *and* John Muir in Yosemite.

SIERRA CLUB SLIDE SHOW DEBUTS

Sierra Club leaders and members who attended Circus week last December saw a sneak preview of the new slide show, *We Are the Sierra Club*. Funded by the Sierra Club Council and the National Membership Committee, the show was produced by Victoria Wake, manager of Information Services.

Members from all over the country responded to the call for slide donations by sending in more than 1,500 for consideration. The final selection includes shots of everything from backpacking in Glacier National Park to delivering "Replace James Watt" petitions to Congress. The soundtrack features interviews with Club members set against a musical background by Windham Hill Records.

Designed primarily as a membership-building tool, the slide show is a way for local Sierra Club chapters to introduce new and prospective members to the Club. It will also be a useful resource for fundraising projects, fairs, conferences, and school and community groups.

The show emphasizes the wide range of opportunities available to members at every level of interest and skill, and stresses the satisfaction and fun of Club membership. Vintage photos of John Muir, the Sierra Nevada, and the early High Trip outings briefly trace the Club's history, while a short overview of Club structure and a summary of major conservation challenges and accomplishments round out the 14-minute show.

As a special feature, *We Are the Sierra Club* can be tailored to the chapter or group making the presentation. Twenty slides of local interest can be added to the end of the

national show, where an extension of the soundtrack provides uninterrupted background for a live narrator.

The complete package, a copy of which has been sent to each chapter, includes a 140-slot carousel slide tray with 120 slides, a cassette tape with audible and inaudible tone tracks, and a printed copy of the script. Additional copies are available for rental or purchase through Information Services, Sierra Club, 530 Bush St., San Francisco, CA 94108.

Sierra Peak Named for Ansel Adams

William J. Sumits, photo courtesy National Gallery of Art, Washington, D.C.

Virginia Adams (left), widow of the late Ansel Adams, shared happy memories of the photographer's life with David Brower at a commemorative ceremony held March 5 at the National Gallery in Washington, D.C.

EXACTLY ONE YEAR after the death of renowned photographer and conservationist Ansel Adams, a steep and craggy peak in his beloved Sierra Nevada was officially designated with his name. Long referred to by the Sierra Club as Mt. Ansel Adams, the peak had its name change approved by the federal Board on Geographic Names (BGN) last December. On April 22, 1985, the previously unnamed 11,750-foot mountain became Mt. Ansel Adams, and it will always be referred to as such by government maps and publications.

A ceremony honoring Adams and his namesake was held March 5 in Washington, D.C. Representing the Sierra Club at the gathering was Director David Brower, who recalled his long-time association with Adams as "the most rewarding half century of friendship I have yet experienced." About Adams' memorable photography Brower remarked: "Other people have guardian angels to keep them from harm. Ansel's angels were busier, concentrating constantly and unfailingly on perfecting the stage sets and the illumination. As a result, Ansel's prints have their own inner light." The ceremony featured a preview of a special exhibit of Adams' prints that will be on display at the National Gallery beginning in October.

On a late summer day in 1921, young Ansel Adams visited the Sierra Nevada peak that now bears his name. Ironically, he did not climb the future Mt. Ansel Adams that day, noting later in the *Sierra Club Bulletin* that "the great rock tower bears no name, and is undoubtedly inaccessible." Thirteen years later a three-man hiking party scaled the peak, which rises above the Lyell Fork of the Merced River on the southeast boundary of Yosemite National Park. They named it in honor of Ansel Adams, "in recognition of his services to the Sierra Club as an outing leader and as a photographer." Two days later Adams and his wife Virginia joined 13 other Sierra Club members in a mountaintop dedication ceremony.

It would be 51 years before the federal government officially recognized the mountain, for it is BGN policy not to name geographic features after people while they are still living. The National Park Service was instrumental in convincing the BGN to waive its one-year-after-death waiting period and to act on the naming. The Sierra Club first proposed that the peak be named

in honor of Adams, who was a Club activist and Director for many years. During those years Adams became one of the world's foremost photographers, and he has been called "the preeminent landscape photographer of the 20th century."

But Adams' work went beyond artistic achievement. His advocacy of parks and wilderness and outspoken concern for the country's inequalities made him a respected, almost mythical figure to many. In later years he worked for the protection of the Big Sur area and the rest of the California coastline, remaining involved long after he'd taken his last photographs. (Unlike his mountain, the coast still faces an uncertain future, with the prospects of oil exploration and drilling ever on the horizon.) Never afraid of controversy or of speaking his mind, in 1982 the 81-year-old Adams personally took President Reagan to task over his disastrous environmental policies.

Adams summed up much of the environmental philosophy he followed through life in *These We Inherit* (Sierra Club Books, 1962): "Our time is short and the future terrifyingly long. . . . With reverence for life and with restraint enough to leave some things as they are, we can continue approaching and perhaps can attain a new society at last—one which is proportionate to nature."

SIERRA NOTES

♦ Sierra Club Books has announced the publication of three new titles: *The Sierra Club Guide to the Natural Areas of Colorado and Utah*, by John and Jane Greverus Perry ($9.95, $8.06 for members); *Adventuring in the Andes*, by Charles Frazier and Donald Secreast ($10.95, $8.86); and *Intertidal Wilderness*, by Anne Wertheim ($25, $20 cloth; $14.95, $12.06 paper).

These books may be ordered through the Sierra Club Catalog mailed to all Club members. Nonmembers may order books *only* from Sierra Club Books, P.O. Box 3886, Rincon Annex, San Francisco, CA 94119. Please include $2.50 postage and handling per order.

♦ An exhibit featuring the work of nature photographer Eliot Porter and his son, sculptor Stephen Porter, will be showing at the Upstairs Gallery (215 N. Cayuga St., Ithaca, NY) from May 8 to June 7.

Porter, author of *In Wildness Is the Preservation of the World* (Sierra Club Books, 1962), is considered one of America's foremost color photographers. This exhibit, the first to present the work of Eliot and Stephen Porter as father and son, will offer visitors a rare opportunity to view and buy the works of both artists.

The nonprofit Upstairs Gallery is open from 11 to 3 Tuesday through Thursday and from 11 to 1 on Saturday. Admission is free.

♦ The Sierra Club will implement a new "retailer outreach" program this spring to put Club brochures in outdoor shops across the country. Interested businesses will receive an easel display to hold brochures and other promotional materials. The program will target bookstores, backpacking outfitters, sporting goods stores, and other retailers.

Club members who own a business, or who know of a business in their community that might be interested, should send the business address and name of the contact person to Matt Scoble, Office of Development, Sierra Club, 530 Bush St., San Francisco, CA; phone (415) 981-8634.

♦ Concept Film and Video has just completed a 30-minute TV program documenting a Sierra Club service trip in the John

Muir Wilderness. Produced with the help of the Sierra Club and the U.S. Forest Service, "High Sierra" follows 25 Club volunteers on a ten-day project to complete construction of a trail leading from Edison Lake to the Pacific Crest. The program is scheduled to be broadcast on public television stations nationwide in May.

♦ The Sierra Club Environmental Education Committee has purchased six ecology filmstrips for use by environmental educators and teachers. The films, which are targeted to grades K–7, cover conservation principles, endangered species, pollution, and John Muir. Rental fee is $10 each. A descriptive brochure is available from Sierra Club Information Services, 530 Bush St., San Francisco, CA 94108; phone (415) 981-8634.

♦ The Sierra Club departments of Conservation and Information Services have produced a set of eight fact sheets on the conservation priorities selected by the Club's Board of Directors for 1985–86. (See "News," March/April 1985.) Each fact sheet gives background information, the Club's campaign objectives, and suggestions for those who want to help. The set of eight is available for $1.25 from Sierra Club Information Services, 530 Bush St., San Francisco, CA 94108; phone (415) 981-8634.

Also new from the Conservation Department are a 16-page brochure on the National Park System and a 12-page brochure on the National Wilderness Preservation System. Both include a summary of history and management, maps, and comprehensive, up-to-date listings of park units or designated wilderness areas. The two brochures are available for $1.25 each or $2.25 for both ($1.75, $3.25 for nonmembers) from Sierra Club Information Services at the same address.

♦ The price of topographical maps published by the U.S. Geological Survey (USGS) has been increased by about 10 percent this year, the agency reported recently. A continuing rise in the cost of printing and distribution was cited as the reason for the increase.

The popular topo maps most often used by planners, engineers, scientists, and outdoor enthusiasts rose in price from $2.25 to $2.50; other, more-specialized maps also went up in price. The agency notes that these increases apply only to maps bought directly from the USGS; prices charged by independent map dealers may vary.

The USGS publishes and stocks more than 70,000 maps and sells more than 7.5 million copies of them each year. Indexes of

maps for all 50 states and U.S. possessions can be obtained from the Eastern Distribution Branch (1200 S. Eads St., Arlington, VA 22202) for states east of the Mississippi River, including Minnesota; and from the Western Distribution Branch (Box 25286, Federal Center, Denver, CO 80225) for states west of the Mississippi, including Louisiana. Mail orders for *maps* must be accompanied by check or money order made out to the Department of the Interior–USGS.

♦ The Northwest Trails Association has published a directory listing hundreds of outdoor volunteer opportunities in 28 states. Volunteers of all ages can participate in projects ranging from park maintenance and leading historic walks to planting trees in a national forest. Some positions offer housing and a small subsistence allowance. For a copy of the directory, send $3 (postpaid) to "Helping Out in the Outdoors," P.O. Box 2514-11, Lynwood, WA 98036.

♦ The nonprofit, nonadvocacy World Environment Center has announced that 3M will be the first recipient of its Award for International Corporate Environmental Achievement.

The center's board of directors selected 3M from a field of multinational corporations for its pioneering Pollution Prevention Pays (3P) program, which has cut back air pollution, water pollution, and sludge and solid-waste disposal while saving the company $200 million.

Originally funded by the U.N. Environment Programme, the World Environment Center helps Third World countries, international businesses, universities, and the news media increase understanding of conservation and development issues.

♦ Concern, Inc., a nonprofit environmental-education organization, has published a 22-page handbook on groundwater contamination. "Groundwater: A Community Action Guide" is available from Concern, Inc., 1794 Columbia Rd. N.W., Washington, DC 20009 for $3 (postpaid), or $6 for ten copies. Each copy after the tenth is $1. Nonprofit organizations can order 25 copies for $10, 50 for $16, and 100 for $20.

♦ The award-winning documentary *Mad River: Hard Times in Humboldt County* telecast nationwide by PBS is available for rental by schools and community groups.

By tracing a laid-off millworker's search for the reasons behind his region's economic troubles, *Mad River* examines the effects of conservation measures, resource-management policies, and business practices on the economic development of a community heavily dependent on natural resources for its survival.

The 55-minute film rents for $75 ($65 for videocassette) from the nonprofit California Newsreel, 630 Natoma St., San Francisco, CA 94103; phone (415) 621-6196. □

SIGHTINGS

© Rick Reinhard

Seventeen Sierra Club volunteer leaders from metropolitan areas traveled to Washington, D.C., for a week of training, media events, and lobbying to support the Club's 1985 farm bill campaign. Here Rose McCullough, the Club's Southern Plains Representative, and Gov. Robert Kerrey of Nebraska listen attentively to Center for Rural Affairs Co-director Marty Strange.

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   Learn a foreign language on your own. Full-length courses in 40 languages. Free catalogue.
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   Every summer/winter vacation activity imaginable . . . including year-round Mt. Bachelor skiing. Circle for free brochure.
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   There's "A World of Things to Explore" in our free catalogue of nature-related gifts.
6. **Colorado Outward Bound School**
   Explore the mountains, canyons, and rivers of Colorado and Utah. Send for free catalogue.
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   Free catalogue. Largest nonresident U.S. graduate university offers management, psychology, law, engineering, and other majors.
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    Exotic Africa. Safaris to Ethiopia, Zaire, Tanzania, Zambia, Botswana, Namibia, and a January 1986 Kilimanjaro climb.
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    The specialist in folding boats, rigid kayaks, sailing, sport, rowing, expeditions, sea kayaks for decades.
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    Treks, safaris, and expeditions in Nepal, India, Peru, and East Africa. Free 28-page adventure trip catalogue.
13. **Himalaya Trekking**
    Small-group treks focusing on cultures of Nepal, China/Tibet, Kashmir/Ladakh, Pakistan, Bhutan, Japan, and more.
14. **Holbrook Travel**
    Wildlife, ecology, hiking expeditions worldwide. Carefully arranged for small groups with expert naturalist.
15. **Hubbard**
    Hubbard Raised Relief Maps are described and illustrated in free full-color brochure.
16. **Kenko International**
    Catalogues available for hiking, backpacking, mountaineering, and ski touring boots.
17. **Kiron**
    Send for free brochure on Kiron optical products and lenses for 35 mm cameras.
18. **Lone Mountain Ranch**
    Family guest ranch and nordic-ski interpretive vacations in Yellowstone country. Free brochure.
19. **Long John Shirts**
    23 colors and eight different styles. Send for our free catalogue.
20. **Montelliana Boot**
    Catalogue with detailed descriptions of complete hiking, climbing, and skiing footwear.
21. **Mountain Travel**
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22. **National Audubon Society Expedition Institute**
    Send for free information packet describing B.S., M.S., or secondary/junior-high or summer degree programs.
23. **Overseas Adventure Travel**
    Safaris, treks, expeditions, walking, camping, and river safaris in Tanzania, Botswana, Rwanda. Treks in Nepal and Peru.
24. **Peter Storm**
    Write for free brochure and your nearest dealer.
25. **Planned Giving Program**
    Life-income trusts and bequests provide tax and income benefits and support Sierra Club conservation programs.
26. **R.E.I.**
    Free catalogue! REI offers one of the largest selections of outdoor equipment and clothing.
27. **Rogers Pacific Crest Trail Maps**
    Pacific Crest Trail chart traversing 31 national forests/parks and bus services to trail locations.
28. **Runique**
    No blisters ever. We guarantee it. These are the most comfortable socks you have ever worn.
29. **Save the Children**
    Share your love with a needy child. Your sponsorship provides better food, education, and medical care.
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    Steiner high-quality military binoculars, ideal for the outdoors. Many models available. Free catalogue.
31. **Therm-A-Rest**
    Therm-A-Rest self-inflating foam pads. Free brochure and dealer list.
32. **Treeline Tent**
    Treeline Tent's brochure details 50 square feet of usable space for less than four pounds.
33. **Trek Hawaii**
    Send for Trek Hawaii's brochure on guided outdoor adventures to the neighbor islands.
34. **WeePak**
    It's easy to enjoy gourmet dining even in the middle of nowhere. Free literature on WeePak lightweight foods.
35. **Western River Expeditions**
    Splash down with the West's best river trips, Grand Canyon to Salmon. Free brochure available.
36. **Wilderness Travel**
    Wildlife, trekking, adventure, cultural trips worldwide. Africa, Amazon, Andes, Arctic, Alps, Himalaya. Small groups, expert leaders.
37. **Working Assets Money Fund**
    Earn high interest on your environmental principles. Check-writing, too. No fees, $1,000 minimum. Free prospectus.
38. **World Language Course**
    Want to speak a new language? Speak using the Linguaphone home-study course. 29 different languages.
39. **World Wide Trekking**
    Trekking on 5 continents in 15 countries. Write for free color brochure.
40. **Yosemite Seminars**
    Send for catalogue describing 46 Yosemite field classes sponsored by Yosemite History Association.

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49. **Banana Republic**
    Authentic, classic, and comfortable travel and safari clothing for men and women. Mostly natural fabrics. $1.
50. **Cerro Gordo Community**
    Prototyping a sustainable future. Introductory book and visitor's guide. $2.
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    Want high quality, great value backpacks, and duffles that look great, too? Send $2 for catalogue.
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    Brochure available: hiking, backpacking boots, trionic boots, action footwear, X-C touring. 50¢
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    Quiet, comfortable, easy to paddle. More stable than a canoe or kayak. Folding, Rigid, Kits. $1.
54. **Hi-Tec Sports**
    The company that re-invented the hiking boot. Send $1 for the latest full color catalogue.
55. **Lindal Cedar Homes**
    88-page book of custom home ideas featuring passive solar, energy efficient homes in cedar. $5.
56. **Sani-fem**
    Solve those wilderness restroom problems with Sani-fem® P/S™. Free information for cost of postage. 20¢.
57. **Saroca**
    The ultimate sailing, rowing, canoeing boat. Please send for complete informational kit. $2.
58. **Sevylor**
    Manufactures recreational inflatable products. Catalogues and consumer brochures available upon request. 35¢.
59. **Wintersilks**
    Luxurious, warm and affordable silk sportswear for men and women. 32-page catalogue. Many exclusive items. $1.

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Sierra Club Outings

It's not too late to sign up for a 1985 Outing

There is still space available on a large number of 1985 Sierra Club Outings. If you act promptly, you can probably find space on any of the trips listed below. If a trip is not listed below, check with the Outing Department—vacancies may have occurred. Please see the January/February issue of *Sierra* for reservation and cancellation information and an application form. Make sure you read the reservation and cancellation policy carefully before applying. To order supplemental information on any of our 1985 Outings, send in the coupon on page 85 of this issue. A listing of 1986 Foreign Trips will be published in the July/August issue of *Sierra*.

Trip Number	E = Educational Outing • = Leader approval required	Date	Rating	Trip Fee (including Deposit)	Deposit	Leader
ALASKA TRIPS						
60	•Southwest Alaska Bicycle Tour	June 16-26		600	70	Betty & Paul Tamm
62	•Romanzof Mountains, Arctic Wildlife Range, Alaska	June 24-July 10		820	70	Cal French
63	•Admiralty Island Canoe Traverse	June 25-July 6		1295	70	John Ricker
64	•Alaska Wildlife to Hawaii's Volcanoes	June 30-July 13		620	70	Pete Nelson
66	•Kenai Wildlife Refuge, Alaska	July 9-18		965	70	Dolph Amster
68	•Mt. Hayes, Eastern Alaska Range	July 26-Aug. 8		660	70	Harry Reeves
70	•Mt. Edziza Provincial Park, British Columbia	Aug. 5-16		495	35	S & B Hartman
380	•Dog Sled Ski Tour, Kenai Peninsula, Alaska	March 3-13, 1986		890	70	Beverly & Les Wilson
BACKPACK TRIPS						
77	•Pink Beds of Pisgah Forest, North Carolina	June 15-22	L	275	35	Martin Joyce
78	•Cruces Basin Wilderness, Carson Forest, New Mexico	June 19-26	L	240	35	John Colburn
80	•Crest of the Inyos, Inyo Mountains, California	June 23-29	M-S	185	35	Geoffrey Faraghan
89	•Hidden Lakes Leisure Loop, Bridger Wilderness, Wyoming	July 20-27	L	285	35	Jon Nichols
94	•Cranberry Rendezvous, Monongahela Forest, West Virginia	July 21-27	L	195	35	Chuck Cotter
97	•Miter Basin–Crabtree Lakes, Sequoia Park, Sierra	July 25-Aug. 1	M	190	35	Bill Engs
98	•Lakes of the LeConte and White Divides, Sierra	July 25-Aug. 3	M	200	35	Bill Lewis
100	•Sequoia Park, Sierra	July 27-Aug. 4	M-S	200	35	Carol Shapiro
103	•Bench Valley, Sierra Forest, Sierra	Aug. 2-11	M	215	35	Ken Maas
104	•Ritter Range, Minarets Wilderness, Sierra	Aug. 3-10	M	185	35	Mark Gordon
115	•Pacific Crest Trail, Sierra	Aug. 16-24	M-S	200	35	Jim Carson
116	•Ionian Basin Peakbagging, Kings Canyon Park, Sierra	Aug. 16-24	M	195	35	Vicky Hoover
123	•Blue Canyon, Kings Canyon Park, Sierra	Aug. 18-27	M	205	35	John Ingvoldstad
124	•Russell/Carillon Col, Sequoia Park, Sierra	Aug. 19-27	M-S	205	35	Patrick Colgan
125	•Cirque Crest, Kings Canyon Park, Sierra	Aug. 19-27	M-S	220	35	Ann Peterson
126	•Evolution Basin, Sierra	Aug. 22-Sept. 1	M-S	230	35	Gordon Peterson
127	•Kings-Kern Divide, Sequoia and Kings Canyon Parks, Sierra	Aug. 24-31	S	190	35	C & P Roeder
129	•Sequoia High Country, Sequoia Park, Sierra	Aug. 27-Sept. 4	M	195	35	Don Lackowski
131	•Mt. Pinchot, Kings Canyon Park, Sierra	Sept. 2-8	M-S	180	35	Pete Nelson
132	•Mineral King Loop, Sequoia Park, Sierra	Sept. 3-14	L-M	260	35	Mac Downing
133	•Tahoe Rim Trail–South Section, California	Sept. 4-8	M	130	35	Serge Puchert
135	•Land of Seven Gables, John Muir Wilderness, Sierra	Sept. 9-17	M	195	35	Frances French
136	•Alpine Col, Sierra	Sept. 14-22	M	195	35	Paul Cavagnolo
137	•Salt Creek and The Needles, Canyonlands Park, Utah	Sept. 14-22	L-M	375	35	Barry Morenz
381	•Blue Range Primitive Area, Apache Forest, Arizona	Oct. 5-13	S	200	35	Bob Moore
383	•Gila Wilderness, New Mexico	Oct. 6-12	M	210	35	George Mader
384	•Quehanna Trail, Black Moshannon Forest, Pennsylvania	Oct. 6-12	L-M	215	35	Connie Thomas
385	•Navajo Mountain–Rainbow Bridge, Arizona	Oct. 6-12	M	230	35	Nancy Wahl
386	•Clear Creek, Grand Canyon, Arizona	Dec. 15-20	M	225	35	Bob Madsen
JUNIOR BACKPACK TRIP						
141	•Gardiner Basin, Kings Canyon Park, Sierra	July 21-28	M	180	35	Jenny Dienger
BASE CAMP TRIPS						
145-E	John Day Monument Base Camp, Oregon	June 1-9		240	35	T & M Pistrang
146	Rogue River Trail Lodges Base Camp, Oregon	June 2-8		565	70	Mark Minnis

Trip Number	E = Educational Outing • = Leader approval required	Date	Trip Fee (including Deposit)	Deposit	Leader
148	Rogue River Wilderness Lodges, Oregon	June 16-21	495	35	M & B Gifford
149-E	Donner-Tahoe Exploration, Sierra	June 22-29	330	35	Bob Ruff
150-E	Natural History of Mono Basin, California	June 22-30	295	35	Bob Miller
154	Rock Creek, Sequoia Park, Sierra	July 21-30	345	35	Bill Davies
160	Rogue River Wilderness Lodges, Oregon	Sept. 15-19	435	35	Mark Minnis
387-E	Natural History of Mono Basin, California	Oct. 5-13	295	35	Bob Miller
388	Death Valley at Christmas, California	Dec. 18-28	335	35	Bob Miller
BICYCLE TRIPS					
166	•Delmarva Peninsula, Eastern Shore, Maryland	June 9-15	280	35	John Arthur
168	•Vermont's Country Inns	June 16-21	490	35	Dixon Lamborn
170	•Wisconsin Northwoods	Sept. 14-21	280	35	Alice Van Deburg
389	•White and Green Autumn Cycle Tour, VT/NH	Sept. 29-Oct. 6	265	35	J & P Von Normann
BURRO TRIPS					
175	•Big Margaret Lakes, John Muir Wilderness, Sierra	July 20-27	345*	35	Jack Holmes
178	•McGee Creek to Rock Creek, John Muir Wilderness, Sierra	Aug. 10-17	345	35	Don White
179	•Pioneer Basin, John Muir Wilderness, Sierra	Aug. 17-24	345	35	Don Bain
180	•Humphreys Basin, Sierra	Aug. 24-31	345	35	John McClure
*Children under 18 traveling with parents, $260.					
BUS TRIPS					
182	Canadian Rockies, Canada	Aug. 11-31	1200	70	Bob Marley
25	Aztec-Mayan Tour, Mexico	Oct. 27-Nov. 16	1300	70	Bob Marley
FAMILY TRIPS			Parents and one child / Each addl. child		
186	•Navajo Cultural Experience, Canyon de Chelly, Arizona	Aug. 2-9	935 / 235	35	Wanda & Tom Roy
189	•Midnight Lake, John Muir Wilderness, Sierra	Aug. 10-17	685 / 170	35	Mary & John Stanley
HIGHLIGHT TRIPS					
195	Kalmiopsis Wilderness Llama Trek, Siskiyou Forest, Oregon	June 16-21	475	35	Tom Landis
199	Western Slope of the Tetons, Targhee Forest, Idaho	Aug. 1-10	710	70	Len Lewis
202	Eagle Cap Wilderness Llama Trek, Oregon	Sept. 2-7	475	35	Tom Landis
203	Humphreys Basin, Sierra	Sept. 4-14	710	70	Bob Miller
SERVICE TRIPS					
206	•Bear Wallow Wilderness, Apache Forest, Arizona	June 8-16	85	35	Rod Ricker
209	•Kalmiopsis Wilderness Trail Construction, Oregon	June 19-29	85	35	Jerold Williams
212	•Elk Creek Trail Construction, Klamath Forest, California	July 3-13	85	35	Flint Ellsworth
213	•Hamilton Camp Trail Maintenance, California	July 9-19	85	35	Roy Bergstrom
214	•One-Mile Lake Trail Maintenance, California	July 10-20	85	35	Scott Larson
218	•Sierra Club's Own Trail Construction Project II, Sierra	July 24-Aug. 3	85	35	Flint Ellsworth
219	•Teton Wilderness Trail Project, Wyoming	July 28-Aug. 7	85	35	Jay Brooks
223	•Sierra Club's Own Trail Construction Project III, Sierra	Aug. 7-17	85	35	Connie Spangler
224	•Cloud Peak Primitive Area, Big Horn Forest, Wyoming	Aug. 13-23	85	35	Bob Hayes
226	•Lost Creek Wilderness, Pike Forest, Colorado	Aug. 17-27	85	35	Jim Bock
227	•Washakie Wilderness Trail Construction, Wyoming	Aug. 20-30	85	35	Conrad Smith
228	•Steelhead Lake Women's Trail Maintenance Project, Sierra	Aug. 21-31	85	35	Laura Shaw
229	•Long Mountain Lake Trail Maintenance Project, Idaho	Aug. 24-Sept. 3	85	35	Anne Bade
391	•Wild and Scenic River, Missouri	Oct. 20-26	85	35	Rick Rice
234	•Big Pine Creek, Inyo Forest, Sierra	Aug. 6-16	85	35	Karen Johnson
235	•Lower Minam Cleanup, Eagle Cap Wilderness, Oregon	Aug. 24-Sept. 3	85	35	Bill Weinberg
241	•Salmon River Work and Raft, Klamath Forest, California	June 3-13	115	35	Bill Weinberg
243	•Rogue River "Row-It-Yourself" Cleanup Trip, Oregon	Sept. 22-26	200	35	Mark Minnis
WATER TRIPS					
Raft Trips					
245	Rogue River Raft Trip, Oregon	June 10-14	385	35	Ruth Dyche
246	North Fork John Day River, Oregon	June 12-15	365	35	John Griffiths
247-E	John Day River "Row-It-Yourself" Raft Trip, Oregon	June 16-20	435	35	c/o Bill Gifford
248	Green River Dory Trip, Utah	June 16-21	580	70	Sallie Menning
249	Trinity River Paddle Trip, California	June 17-20	260	35	Wheaton Smith
250	Yampa/Dinosaur Paddle Raft Trip, Utah	June 19-23	405	35	Mary O'Connor

Trip Number	E = Educational Outing • = Leader approval required	Date	Trip Fee (including Deposit)	Deposit	Leader
251	Canyonlands Rafting-Hiking-Jeeping, Utah	June 21-July 1	1190	70	Chuck Fisk
252	Grand Canyon Oar, Arizona	June 21-July 2	1295	70	Harry Neal
253	Rogue River Raft Trip for the Hearing Impaired, Oregon	June 24-28	225	35	Meg Levine
254	Kongakut River Expedition, Arctic Wildlife Refuge, Alaska	June 24-July 5	2020	70	Ruth Dyche
255	Grand Ronde Rafting and Horseback Trip, Oregon	June 26-30	720	70	Tony Strano
256	Rogue River Raft Trip, Oregon	July 8-12	385	35	John DeCock
257	•Grand Canyon Alumni Trip, Arizona	July 16-27	1295	70	Gary Larsen
260	Salmon Paddle and Raft Trip, Idaho	Aug. 11-15	510	70	Karen Short
261	Klamath River Paddle and Raft Trip, California	Aug. 12-16	460	35	Bruce Macpherson
262	Trinity River Paddle Trip, California	Aug. 19-22	260	35	Harry Neal
263	Chilcotin River Raft Trip, British Columbia, Canada	Aug. 26-30	685	70	Tris Coffin
264	Grand Canyon Oar, Arizona	Sept. 6-17	1295	70	Victor Monke
Sailing Trips					
266-E	Inside Passage Sailing Trip, British Columbia, Canada	June 25-July 3	1110	70	Linda Macpherson
267-E	Sails, Whales, and Indians, British Columbia, Canada	July 17-26	1275	70	Mark Larson
268	Nova Scotia Sailing Adventure II	Aug. 31-Sept. 7	835	70	Len Frank
392	Baja Base Camp Sailing Adventure, Mexico	Nov. 23-Dec. 1	745	70	Hunter Owens
Canoe Trips					
276	•John Day Whitewater, Oregon	June 9-14	365	35	Ila & Chuck Wild
277	•Southern Appalachian Whitewater, GA/NC/SC	June 16-22	305	35	A & B Timpone
278	•Vancouver Island Ocean Canoe, British Columbia, Canada	July 9-19	775	70	Mary Gale
280	•Trinity River Whitewater, California	July 22-27	275	35	Molly & Bill Bricca
283	•Bighole and Jefferson Rivers Canoe, Montana	Aug. 11-17	290	35	Chuck Schultz
284	•Rogue River, Oregon	Aug. 12-17	310	35	Winnie Hepler
394	•Southern Winter on the Suwannee, Florida	Jan. 4-11, 1986	220	35	Rick Egedi
FOREIGN TRIPS					
555	•Gorilla and Wildlife Safari, Tanzania/Rwanda	July 1-16	2800	100	Patrick Colgan
560	•Tour du Mont Blanc, France	June 30-July 14	1065	100	Dick Williams
565	Pyrenees Trails, Spain	July 3-17	995	100	Rosemary Stevens
575	•Inner Mongolia Bike Trek	July 13-Aug. 6	2600	100	Brad Hogue
580	•Land of the Basques, France/Spain	July 15-28	950	100	John Doering
585	•Backpacking in Southern Corsica	July 31-Aug. 11	780	100	Michele Ferrand
632	Mediterranean Adventure	Sept. 20-Oct. 2	1650	100	John Garcia
635	•Lamjung Himal Trek, Nepal	Oct. 7-26	750	100	Serge Puchert
640	Tonga Sailing Adventure and Exploration of Fiji by Boat	Oct. 24-Nov. 13	1990	100	Ruth Dyche
645	•Annapurna Sanctuary, Nepal	Nov. 2-23	800	100	Dolph Amster
650	Helembu Trek, Nepal	Dec. 2-20	750	100	Phil Gowing
655	•Arun Valley Christmas Trek, Nepal	Dec. 21, 1985-Jan. 11, 1986	1150	100	Ginger Harmon
665	Australia, Land of the Sun	Dec. 30, 1985-Jan. 19, 1986	TBA	100	Kent Erskine
670	Bio-Bio River Run, Chile	Dec. 21, 1985-Jan. 3, 1986	2280	100	Blaine LeCheminant
675	Cross-Country Skiing in the Austrian Alps	Jan. 5-19, 1986	1000	100	Anneliese Lass-Roth
680	•New Zealand Featuring Fiordland	March 7-30,1986	TBA	100	Vicky Hoover
685	•Langtang Trek, Nepal	March 17-April 12, 1986	1235	100	John Garcia
690	Manaslu Circle Trek, Nepal	April 21-May 24, 1986	TBA	100	Kern Hildebrand
695	•Annapurna Circle Trek, Nepal	June 9-July 9, 1986	1100	100	Peter Owens

FOR MORE DETAILS ON OUTINGS

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

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Along Came a Spider

If you wish to live and thrive,
Let a spider run alive.

© Tom A. Schneider/ORK Photo

A female wolf spider carries her newly hatched young on her back. As many as 40 babies cling to her until their second molt, when they are big enough to take care of themselves. If one should fall off, it quickly climbs back on using the lifeline it has attached to her abdomen.

A female jumping spider (right) sits on her egg sac. She will guard the sac until her young hatch (left). Jumping spiders are easily identified by their habit of staring intently at you. They will follow your moving finger, and may even climb aboard for a closer look. Most jumping spiders are less than 5/8 of a inch long.

© N.H. (Dan) Cheatham/ORK Photo

© Jeff Foott

The Bolas spider (below) catches its dinner using a two-inch piece of silk with a glob of sticky gum at the end. The Bolas hangs from a single strand of silk, and when a moth flies too close, the spider "throws" out its line. If its aim is true, the spider then reels in its prey.

© B.G. Murray Jr./Animals Animals

A huge female golden silk spider weighs 100 times more than her tiny mate (arrow). In fact, he's so small that she doesn't consider him worth eating. Male spiders are usually smaller than females, but the difference in size is seldom this great.

The orange-kneed tarantula of Mexico may look scary, but it is actually quite shy. Tarantulas are often kept as pets, which has caused the natural population to decline. Some tarantulas are small and harmless, but the bite of a large one can be painful.

Stephen J. Krasemann/ORK Photo

SARAH W. CLARK

WHAT'S A SPIDER to you? A creepy-hairy bug? A long-legged beastie? When you see a spider, do you want to squish it?

Wait. Hold your foot. Bend down and take a closer look. If you watch long enough, you might just change your mind.

Purposeful and intent, spiders move unerringly from task to task. Watch a spider drop on a strand of silk to fix a hole in its web. See how another races to a trapped insect and wraps it in bands of silk. Spiders seem to know exactly what they are doing.

Of course, spiders don't really think. They act on instinct, using small openings in their legs to "smell" their prey and hollow hairs on their legs to "taste" it. Spiders also use the hairs on their bodies to feel their way around. They can even detect nearby flying insects using a few very sensitive hairs on their legs. Most spiders can't see very far—even though they have four to six eyes.

In addition to these special qualities, there's a very practical reason to leave spiders undisturbed—they are a natural pesticide. Each spider catches and eats about one insect a day. If you figure there may be as many as 2 million spiders in an acre of meadow, that adds up to a lot of insect dinners over the course of a summer.

C.A. Morgan/T. Peter Arnold, Inc.

The hourglass mark is the telltale sign of the black widow, the most dangerous spider in the U.S. Its poison can be 15 times stronger than rattlesnake venom. Luckily, black widows hardly ever bite.

Background photo: © John Gerlach/DRK Photo

There are more than 30,000 known species of spiders in the world. They live on mountain peaks and under water, on desert sands and in saltwater tide pools. Many spiders have adapted to their habitats in unique ways. Most, like Charlotte, spin intricate webs; some even make "fishing" nets or other devices from their silk to capture prey. Ground spiders often construct traps in the earth, or hide in flowers waiting for unwary insects to alight. And jumping spiders—the only ones that can see worth a darn—pounce on bugs that get too close.

Spiders generally live alone. Male and female spiders get together only at mating time—and even then it's but a brief encounter, and a risky one for the male. Since a female is larger, often nearsighted, and almost always hungry, she would just as soon eat a male as mate with him.

Most female spiders die before their eggs hatch. They devote the last of their energies to laying eggs, spinning a thick, fluffy sac around them, and in many cases guarding it until the first frost comes. A few spiders live long enough to care for their young until they can fend for themselves.

Next time you see a spider, sit down beside it—don't let it scare you away. You'll find that there's little to be frightened of, and a whole lot more to learn. □

Rod Planck/Dembinsky Photo Assoc.

Fresh from fishing, a water spider prepares for dinner. Water spiders generally eat insects, but some of them have jaws and poison strong enough to catch tadpoles and small fish. While they can walk on water, these spiders often sit on a floating leaf and dangle a leg in the water to attract their prey.

SARAH W. CLARK *is a freelance writer living in Garrett Park, Md. She has written for* World *magazine, and has recently completed a book on spiders for the very young.*

Big Bend to Piney Woods

A Roundup of Guides for the Texas Traveler

JONATHAN F. KING

Those who know Texas only as a place to get through on the way to somewhere else have almost surely missed much of the state's diversity of land and life forms. By no means does the stretch of Panhandle highway that most drivers race across typify the geography of this half-million-square-mile area. Nor is Texas wildlife limited to the armadillo and buckin' bronco, its flora to cactus and sagebrush.

In fact, as its inhabitants will readily tell you, Texas offers a little bit of everything: deserts, forests, seashore, mountains, plains and prairie, lakes and rivers. While it's true that a car is necessary to get from point to point (which can take hours, if not days, when the points in question lie near the state's borders), there are many opportunities for walks, bike rides, backpacks, and boat trips once you've reached your destination. Several of the state's larger cities also have attractive outdoor recreation areas within or near municipal limits. The

In an emergency, a traveler in west Texas can suck juice from the seeds of the prickly pear (Opuntia phaeacantha *var.* discata).

boosterism that seems so typical of Texans—that has, in fact, become a key element in their national image—has led to the publication of numerous guidebooks to the state's parklands and other natural areas, including trail guides, regional and local handbooks, and field guides. Quite a few have been published or updated over the last few years; a handful of the best are highlighted below.

Beauty is often subtle in Texas: the glint of morning sun on a low line of desert hills or the froth of wavelets breaking on a Gulf Coast shoreline. But occasionally the aesthetics are sharp, even brilliant, as anyone who's contemplated a few square yards of bird's-foot violet or crimson clover will happily tell you. That's why either (or both) of two wildflower field guides published last year should be in every Texas traveler's knapsack or glove box. The first of these, *A Field Guide to Southwestern and Texas Wildflowers* (Houghton Mifflin, 1984; $18.95, cloth), sponsored by the National Audubon Society, the National Wildlife Federation, and the Texas Parks and Wildlife Department, illustrates more than 1,500 species. Because this book is based on the Peterson Identification System, which organizes species according to color and visual similarities, the beginner can quickly identify a flower by comparing it to easily located, color-keyed illustrations.

Texas Wildflowers, by Campbell and Lynn Loughmiller (University of Texas Press, 1984; $19.95, cloth; $10.95, paper) is more spectacular to look at, but less comprehensive and potentially less useful to the amateur. Some 300 species are listed under 73 family headings and illustrated with (usually) sharply focused photographs instead of drawings. Part of the proceeds from sales of this book go to the National Wildflower Research Center. Del Winiger's *Cacti of Texas and Neighboring States* ($24.95, cloth; $14.95, paper), another UT Press field guide published last year, is similarly structured. Also new from UT Press is Robert A. Vines' *Trees of Central Texas* ($10.95, paper), which features 206 line drawings of 186 species; the book is a portable abridgement of the author's magnum opus, *Trees, Shrubs, and Woody Vines of the Southwest*.

The Roadside Geology series from Mountain Press Publishing (279 W. Front St., Missoula, MT 59801) has surveyed many of the Far West and Rocky Mountain states over the past few years. In *Roadside Geology of Texas* ($6.95, paper), Robert A. Sheldon follows the state, interstate, and U.S. highways through seven major regions in the Lone Star State: west, central, north-central, southwest, and east, plus the high plains and Gulf Coast. A profusion of black-and-white photos, schematic cross sections, and area maps accompany the easy-to-understand descriptions of the state's varied land forms.

Another natural-history handbook for the out-and-about, Alan Tenant's *A Field Guide to Texas Snakes* (Texas Monthly Press, 1985; $12.95, paper), features color plates and detailed descriptions of 110 species of serpent—an invaluable guide for anyone who needs to distinguish (quickly!) between the harmless Mexican milk snake and the deadly Texas coral snake. The question-and-answer format of the illustrated identification key is particularly helpful to the amateur herpetologist.

At 189,451 acres, the Sabine National Forest is the largest natural area in Texas; the smallest might be the two-acre park established by the town of Graham. These and more than a hundred other sites are described in Mildred J. Little's *Camper's Guide to Texas Parks, Lakes, and Forests*, published by Lone Star Books (P.O. Box 2608, Houston, TX 77001; 1983; $8.95, paper). Many of the areas Little covers feature trails of varying lengths, but for detailed information on the topic walkers should consult the author's *Hiking and Backpacking Trails of Texas* (1979; $6.95) from the same publisher. Within the state's parks, wildlife refuges, and recreation areas are hundreds of trails that vary in length from a quarter mile (a nature trail in Silsbee) to 140 miles (the Lone Star Hiking Trail in the Sam Houston National Forest, which was planned, initiated, and is still partially maintained by Houston-area Sierra Clubbers). Together, Little's two guidebooks provide current information about numerous parks, lakes, forests, and trails in Texas, their facilities (or lack thereof), fees, and natural characteristics.

The two *Texas Parks and Campgrounds* guides issued last year by Texas Monthly Press (Austin; $7.95 each, paper) are less comprehensive in the number of sites listed, but more detailed in their treatment of the areas they do cover. George Oxford Miller and Delena Tull visted every national park, national forest, and state park in Texas while researching these books, so their descriptions are both detailed and authoritative. The volume covering north, east, and coastal Texas embraces Padre Island National Seashore, Caddo Lake and Galveston Island state parks, all four of the state's national forests, the Alabama-Coushatta Indian Reservation in the Big Thicket, and more than 60 other sites. Its companion volume covering central, south, and west Texas visits the Big Bend, the Guadalupe Mountains, the Davis Mountains, Seminole Canyon, and other sites for a total of 77 outdoor opportunities. Maps and

black-and-white photos in both books complete the package.

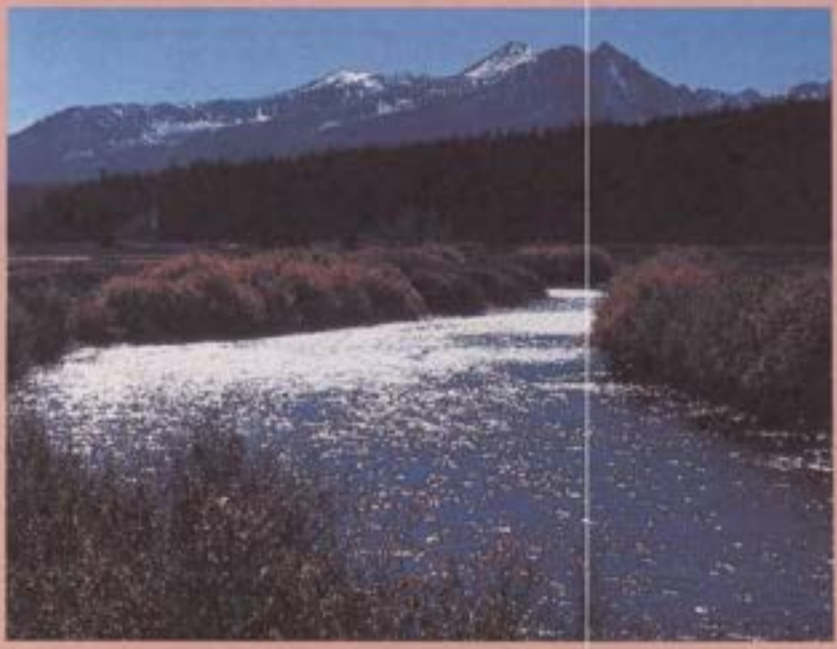
The rugged desert/mountain country of west Texas is beautifully depicted in *Desert Southwest*, one in a series of Sierra Club Guides to the National Parks (Stewart, Tabori & Chang, 1984; $12.95, cloth). Stunning color photos convey much of the grandeur of the Big Bend and the Guadalupes, while trail descriptions give you a peek into the nooks and crannies of this impressive terrain. The same territory is covered in greater detail by Dave Ganci in his field and trail guide to Arizona, New Mexico, and west Texas, *Hiking the Southwest*, a Sierra Club Totebook (Sierra Club Books, 1983; $9.95, paper). Ganci describes 31 hikes in the Big Bend and 13 in the Guadalupes.

The Big Bend, that dramatic park on the Rio Grande, is the sole subject of National Park Handbook 119, published by the National Park Service (Superintendent of Documents, U.S. Government Printing Office; 1983, $6.50, paper). This 126-page handbook features superb historical and topographical photography; descriptions, photos, and sketches of the park's animal and plant life (including some colorful cacti and desert flowers); and useful travelers' information. Also of interest is the December 1984 issue of *The Walker's World* (P.O. Box 13038, Charlotte, NC 28226; $34/year, $3/single issue), "an international guide for recreational walkers." This special edition on the Big Bend describes a number of trails in the mountain and desert areas of the park, and provides information about lodging, maps, and river outfitters.

Numerous books have been written about the geology, flora, and fauna of the Big Bend region. Two particularly worthwhile titles are *Naturalists' Big Bend*, by Roland H. Wauer (Texas A&M Press, 1980; $9.50, paper) and Frank Deckert's *Big Bend: Three Steps to the Sky* (Big Bend Natural History Assoc., Texas 79834; 1981). Finally, Mary E. Humphrey's *Running the Rio Grande* (AAR/Tantalus, P.O. Box 893, Austin TX 78767; 1981; $5.50, paper) is a floater's guide to the Big Bend section of the Rio Grande, with a mile-by-mile guide to the river plus a pull-out map by the author. The emphasis is on running the river in an open canoe, with portages described around the rougher rapids.

A first-rate natural history of the entire U.S.–Mexican border area is Frederick R. Gehlbach's *Mountain Islands and Desert Seas* (Texas A&M, 1982; $19.95, cloth). From the Gulf of Mexico the Rio Grande runs west, past Laredo, Del Rio, and the Balcones Escarpment, below the Chisos Mountains and within sight of the Davis Mountains at Presidio. There the Rio Conchos flows south toward Chihuahua while the Rio Grande turns northwestward, finally leaving Texas beyond El Paso. Gehlbach does not follow the Rio Grande mile by mile; instead his narrative is thematic, as suggested by the book's chapter titles: "The Landscape Maze," "The Devil's Waters," "Valley Jungles," "And Canyon Trails." Though the specialist may elect to follow Gehlbach along the torturous Path of the Footnote ("The correlation [Pearson *r*] is -0.53 for mean niche overlap and 0.15 for mean niche width versus number of species"), the general reader may safely ignore the small type and still profit greatly from the author's readable style and his sense of what is environmentally appropriate. His essay on the human carrying capacity of a region, "Poison, Poison," is particularly worthwhile in this regard.

The coastal seascape of the state's eastern shore is dramatically different from the desert mountains of west Texas. An attractive introduction to the water, land, and wildlife of the Gulf Coast is John L. Tveten's *Coastal Texas* (Texas A&M 1982; $29.95, cloth). A lecturer, journalist, ardent birdwatcher, and first-rate photographer, Tveten has picked a selection of color pho-



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tos that perfectly complement his discussion of the beach, dune, and marsh environments between the Sabine estuary and the Rio Grande. This handsome book is one of eight published to date in the Louise Lindsey Merrick Texas Environment Series from Texas A&M; each features between 100 and 200 color plates. Prompted by Tveten's attention to plant life along the shore, readers with an interest in coastal flora will want to carry a copy of *Plants of the Texas Shore* (Texas A&M, 1985; $5.95, paper) along on their excursions.

The hill country surrounding Austin is one of the most picturesque areas in Texas, and without doubt one of the most popular. While Richard Zalade's *Hill Country* (Texas Monthly Press, 1983; $9.95, paper) is not exclusively or even primarily a guidebook to natural areas, it is nonetheless useful to auto travelers who want to know which lake or recreation area is nearest to their present location—whether that be the Kent Turkey Hatchery (less than an hour's drive from Enchanted Rock State Park), the HuffStuff junque shoppe in Luling (a ten-minute drive from the lushness of Palmetto State Park), or the German-flavored settlement of New Braunfels (a quarter mile from the rapids of the lower Guadalupe—which, as the author points out, can get awfully crowded on a warm day). This volume and the Miller/Tull guides to parks and campgrounds are part of Texas Monthly's series of guidebooks. Other titles in the series treat Houston, San Antonio, and Texas as a whole.

The Alamo Group of the Sierra Club's Lone Star Chapter has published *Outdoor San Antonio and Vicinity*, a directory of outdoor recreation opportunities in and around that historic city. Walking, hiking, biking, riding, swimming, tubing, rafting, canoeing, scuba diving, hang gliding, caving, birdwatching . . . every out-of-doors activity that doesn't require skis or a surfboard can be pursued in this part of south Texas, it seems. A copy of the 75-page booklet can be had for $6 (plus $1.34 to cover tax, postage, and handling) from P.O. Box 6443, San Antonio, TX 78209.

Sierra Club volunteers from the San Antonio area also did much of the preliminary research for Del Weniger's *The Explorers' Texas: The Lands and Waters* (Eakin Press, P.O. Box 23066, Austin, TX 78735; 1984; $24.95, cloth). Weniger, a botanist, spent 14 years reconstructing the state's natural history from the time of the earliest explorers to 1860. His purpose: to make Texans and others aware of how drastically the human hand has changed the natural landscape. "An ever-increasing proportion of our people," he says, "cannot . . . conceive of the original, natural Texas. . . . With no knowledge of what was originally in Texas, we doubt that these environmental orphans can be in any position, no matter how much ecology they study, to make valid decisions about the fate of what forests, prairies and rivers we have left. . . ." This book from a publisher specializing in Texana is a must for Lone Star conservationists and historians alike.

Leaping at Optimism

MICHELE STERNER

Peaceable Nature, by Stephen Lackner. Harper and Row, 1984. $13.95, cloth.

People have been debating the role of aggression in nature and human nature since Darwin published *On the Origin of Species* in 1859. The topic has aroused particular interest in the last two decades. In a natural world governed by the

laws of survival (the question runs) does evolution inevitably favor the most aggressive creatures? And has human evolutionary history thereby left our species inherently aggressive?

In entering the fray with this book, Stephan Lackner's primary concern is not biological fact but the way humans use their perception of nature to justify their actions. Lackner argues that neo-Darwinism, like the social Darwinism used as a scientific rationale for experiments in eugenics, is now being used to misshape society's aims. The belief that the striving for peace runs counter to our deepest nature condemns us to a pessimism that undermines our attempts to end war.

With *Peaceable Nature* Lackner sets out to show where Darwinism has gone wrong. He offers as an alternative "biosophy," a hybrid of biology and philsophy founded on the principle of "life for life's sake." Lackner argues that traditional Darwinism places too much stress on the role of competition in nature, ignoring the equal or greater importance of cooperation. In fact, he says, violence causes only 5 percent of deaths in nature. For all the documentary footage of lions on the attack, careful observation indicates that fewer than 10 percent of the grazing animals of the Serengeti die by violence. The weeding out of excess or unfit specimens by predators is not necessary or even beneficial, as some claim. In fact, species without predators tend to produce fewer offspring rather than more, and whole ecosystems free of predators have developed satisfactorily. Life forms tend to become not more frightful and ugly but more beautiful, a trend Lackner traces to two evolutionary pressures he says modern Darwinists have neglected: sexual and "aesthetic" selection. More fundamentally, Lackner questions the modern tendency to define phenomena in terms of their causes rather than their aims.

The author draws an optimistic view of humans from his observations. We have not inherited an inevitably aggressive temperament. The changes with which humans adapted to life as hunters—"pseudopredators"—were not physiological but behavioral. As they are no longer needed, those behaviors can now be discarded.

The author supports his arguments with examples drawn from a variety of scientific studies as well as from his own experiences. Most of his observations are not new, but brought together here in a clear, thought-provoking manner, they serve as a useful reminder of common misconceptions about nature. Lackner's discourse is full of references to literature, philosophy, and science, and it is studded with clever word play (although a quotation from Plato is taken

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completely out of context). His style is pleasant and easy to read, and the well-written opening chapters convey a rhapsodic love of nature.

More a meditation than a rigorous argument, however, *Peaceable Nature* fails both as a cogent refutation of Darwinism and as the foundation of a new philosophy. By the author's own admission, his evidence is fragmentary. Some scientific observations are documented, but many are not. Lackner tends to leap to unsupported conclusions, as when he uses an example of symbiosis in the evolution of the eukaryotic cell to conclude that "symbiosis was and is the central phenomenon of all life."

Valid arguments against the perspectives of modern Darwinists are undercut by several weaknesses in this book. Lackner repeatedly interprets competition to mean predation, which is only one of many forms of ecological competition addressed by Darwinism. He erroneously equates symbiosis (mutually advantageous relationship) with altruism in the sense of selfless devotion. He calls the force that governs all mating behaviors "love." Would that this were true even among humans! Not all readers will embrace the author's consciously anthropomorphic stance.

Even if Lackner's premise of altruism is accepted, other forms of anthropocentrism raise problems. The author asserts, for instance, that the peacock's display, which we find beautiful, can serve no aggressive or defensive purpose. He points to the peacock's feathers as an example of a beautifying trend of evolution that cannot be explained by "survival of the fittest" but must be the result of peahens' innate aesthetic sense operating through the ages. In some cases the author fails to consider that because of differing eye morphology, other animals may not see things as we do.

Finally, Lackner seems unaware that some of the points he makes have been clearly made by the very biologists he is criticizing. In citing the failure of Darwinists to consider what appears to be altruistic behavior in nature, he overlooks the neo-Darwinian concept of "kin selection," which addresses precisely this question.

Peaceable Nature encounters further difficulties when it turns to what Lackner sees as the three greatest barriers to human enjoyment of life: tedium, fatalism, and the anticipation of death. Elsewhere, a discussion of free will seems to be based on misuse of the term.

For these and other reasons, *Peaceable Nature* is a frustrating book. Although it introduces important and intriguing ideas, it consistently offers rosy speculation as scientific argument, and its use of terminology is slippery.

Lackner's readers may be interested in two recent studies on Darwinism and aggression: Robert Axelrod's *The Evolution of Cooperation* (Basic Books) and Daniel Simberloff's "The Great God of Competition" in *The Sciences* (July/August 1984).

MICHELE STERNER *recently completed a doctoral disseration on the influence of 19th-century theories of biology and anthropology on the novels of Thomas Hardy, E. M. Forster, and D. H. Lawrence.*

UNBEARABLE PROGRESS

AL BUCHANAN

The Grizzly Bear, by Thomas McNamee. Alfred A. Knopf, Inc., 1984. $18.95, cloth.

PUBLIC PERCEPTION of the grizzly bear usually takes the form of one of two polarized, aprocryphal visions. Conditioned throughout life by stuffed teddy bears, Yogi Bear cartoons, and the sight of langorous, morose bears at the zoo, some people would attempt to pet and feed a grizzly if given the opportunity. Others see the creature as a monstrous apparition, an image fleshed out by the occasional lurid headlines of summer: "Bear mauls hiker!" or "Grizzly eats camper!" Theirs is a fascination connected with our unsettling kinship to these huge mammals: We are both highly individualistic, flexible, and unpredictable climax carnivores with little to fear but each other.

But the grizzly cannot be described simply. They are complex animals currently embroiled in an equally complex struggle for survival with humans and commercialism. What is needed is a way to educate the public about the true nature of the grizzly and its worth to society, stripped of sensationalism and media hype.

In *The Grizzly Bear* Thomas McNamee provides the reader with the best compendium of grizzly bear information available. Most of the book is devoted to an analysis of bear research and researchers, drawing largely on the work of biologists Frank and John Craighead, Charles Jonkel of the Border Grizzly Project, and the Yellowstone Interagency Grizzly Bear Study Team.

McNamee presents a balanced view of the conflicts surrounding management of grizzly habitats in and around Yellowstone National Park, including the first detailed account of the infamous decade-long battle

between the National Park Service and the Craighead brothers. This conflict curtailed what had been the most extensive, authoritative study of grizzly bear behavior to date (a study that resulted in Frank Craighead's excellent *Track of the Grizzly*), and it created an even greater rift between government agencies and researchers engaged in the debate over how to manage grizzly habitats.

Woven around the factual information in *The Grizzly Bear* is McNamee's lyrical story of a female grizzly and her two cubs. The protagonist is fictional, but her story is based on a composite of typical grizzly behavior patterns. We follow the bears as they emerge from their winter torpor in April through the summer season until they return to the den in October. We learn much about the animal along the way: eating habits, habitat requirements, mating, cub-rearing practices, hibernation, evolutionary history, and physiology. The female grizzly survives her season in Yellowstone—but what of her real-life counterparts?

According to McNamee, the total number of grizzlies in the Yellowstone ecosystem is open to debate—from an unrealistic high of 300 to a more-likely total of 150 or 200—but it is known that the population is declining. Illegal killing and habitat degradation pose the greatest threats. The history of our relationship with the grizzly, McNamee says, can be summed up in three words: "Bang! bang! bang!" From 1970 through 1982 an average of 18 Yellowstone grizzlies a year have been shot, poisoned, run over, or shipped to remote areas of Canada (the sentence for nuisance bears, still a loss to the ecosystem). Nine to eleven of these losses are females, and given that the park is gaining only three to five adult females a year, it does not take a mathematician to see the perilous state of the grizzly population.

Habitat degradation is also having a significant effect. Park boundaries may provide protection, but the grizzly does not recognize artificial human boundaries and so uses a much greater area as its habitat. Many of these less-protected areas are being destroyed or whittled away in the name of "progress": road-building, ranching, hunting, recreation, residential development, and resource exploitation. And whenever people and grizzlies come into conflict, people stay and the grizzlies go.

Even within park boundaries, development may take its toll. The Grant Village complex, now near completion on the shore of Lake Yellowstone, is supposed to lessen some of the environmental stress on other guest facilities such as Old Faithful. But Grant Village rests on top of one of the best spawning grounds for trout—a prime

grizzly food source—in Yellowstone Park.

The heart of the problem rests with humans. McNamee elucidates the personal rivalries and egoism that have impeded a rational grizzly management program—a point best illustrated by the Yellowstone Interagency Grizzly Bear Study Team. This group was established in 1973 as a means of eliminating bear-management conflicts among the National Park Service, the Fish and Wildlife Service, the Forest Service, and the states of Idaho, Wyoming, and Montana. Despite the team's fine work, it is depressing to note that only Wyoming's Larry Roop, the Park Service's Dick Knight, and Knight's associate Bonnie Blanchard remain active and contributing members, and funding comes only from the Park Service and Wyoming.

So much for cooperation.

Yet McNamee makes a strong case for the survival of the grizzly population, whose existence serves as a reliable indicator of the health or sickness of the whole ecosystem. Where the grizzly exists you will find clean water, solitude, and quiet. And in order for the bears to survive, according to McNamee, bear-management policy must be " . . . a guiding philosophy, straightforward and concise, nature first in grizzly country."

There is much confusion over the solutions, but when in doubt one maxim rings true: Hold out for the preservation of wilderness in the face of the unceasing demands of commercialism and development. Or as David Brower said more succinctly: "Whenever wilderness is compromised, wilderness loses."

Compromise, in reality, simply reduces the negatives. In the case of the grizzly bear, says McNamee, reducing the negatives may not be enough.

Making Tracks

PETER WILD

Trains of Discovery: Western Railroads and the National Parks, by Alfred Runte. Northland Press, 1984. $9.95, paper.

Despite their strenuous efforts and bright vision, John Muir and other turn-of-the-century activists fell short of two essentials in their campaigns to create and preserve national parks: They lacked both numbers and a power base of nationwide influence.

Consequently, during the famous battle waged by Muir and his followers to protect Hetch Hetchy Valley from development,

dam proponents argued successfully that a handful of hikers enjoying the valley during the short summers shouldn't stand in the way of water supply for half a million San Franciscans. Though the dam turned out to be the ecological disaster its opponents predicted, the public saw the "nature lovers" as obstructionists. Unfortunately, no institution stood ready to consolidate conservationists' efforts, publicize their cause, or lend an all-important persuading hand in the halls of Congress.

But help was on the way, and had been for some time. Like the cavalry in a horse opera, it came from an unexpected direction and didn't always arrive in the nick of time. Besides, it took a while for lovers of the outdoors to recognize their comrades in the crusade to preserve wild America.

Alfred Runte suggests that the railroads expanding westward provided both the political clout and financial wherewithal to generate massive public support for the parks movement. His thesis may come as a surprise to some students of environmental history, but it will surely please readers who possess a finely developed sense of irony. Unlike Muir, the railroads rooted for new preserves not out of a sense of beauty or altruism, but in hopes of selling train tickets to thousands of Americans rushing west to enjoy the scenery. As Muir himself put it a bit acidly after the creation of Yosemite National Park, "Even the soulless Southern Pacific R.R. Co., never counted on for anything good, helped nobly in pushing the bill for [the] park through Congress."

What Muir acknowledged, Runte elaborates in the first book on the subject. Beginning with the establishment of our first national park, Runte disagrees with the common wisdom that Yellowstone's beauty so overwhelmed a handful of public-spirited explorers in 1870 that they launched a move for its preservation. (Supposedly, their lobbying swayed Congress to protect Yellowstone's wonders under government aegis.) Rather, Runte claims that the powerful financier of the Northern Pacific Railroad, Jay Cooke, saw tourist gold glittering in the area and orchestrated the congressional campaign. This involved some farsighted publicity tricks, such as using his money and influence to promote painter Thomas Moran's trip to the region. The payoff? Moran's most famous painting, *The Grand Canyon of the Yellowstone*, an awesome canvas that played a major role in the park's inception.

After the Northern Pacific laid its track to the new park, it kept beating the drums, building hotels there and printing colorful advertising brochures. A similar pattern held true, says Runte, for the Great Northern Railway at Mt. Rainier National Park, for the Union Pacific at Zion, and for most other western national parks. Not for nothing does the railroad-financed El Tovar Hotel perch in its magnificence on the Grand Canyon's South Rim, where the Santa Fe's rusting tracks glide almost to its doors. The upshot for beleaguered conservationists was that the railroads, by selling

From Tens of Discovery, © 1984 by Alfred Runte. Photograph courtesy Union Pacific Railroad.

Railway-inspired tourism helped ensure protection for national parks.

train tickets, created a mass constituency of park lovers who joined preservationists in their causes.

But the scenario becomes more complicated and interesting still. The railroads may well have been delighted by the coins rattling into their coffers, but the billowing parks movement took on a life of its own in some executives' minds as they waxed philanthropic over their accomplishments. Louis W. Hill, son of railroad mogul James J., "swelled into unbridled enthusiasm" for park promotion. Going beyond building luxury accommodations for the public at Glacier National Park, he looked on the legacy of the park as his own personal gift to the nation. Train magnates began talking like conservationists.

"We do not want to see the Falls of the Yellowstone driving the looms of a cotton factory," thumped Charles S. Fee, general passenger agent of the Northern Pacific Railroad, "or the great geysers boiling pork for some gigantic packing-house, but in all the native majesty and grandeur in which they appear to-day, without, as yet, a single trace of that adornment which is desecration, that improvement which is equivalent to ruin, or that utilization which means utter destruction."

The cry for preservation emanating from executive suites rose higher and yet higher. Runte pursues his theme, showing how conservationists were not found sleeping at their switches, especially after the Hetch Hetchy defeat. They joined forces with the railroads to win a badly needed reform—creation of the National Park Service, which in 1916 brought uniform management to the vast but scattered park units.

Trains of Discovery does more than fill us in on a chapter of conservation history, however. Runte documents how in the 1960s America's love affair with the automobile brought pollution and traffic snarls to our parks, supplanting tranquility with a drive-in-movie atmosphere. Yet he notes the aftermath: the public's ready acceptance of shuttle buses in Yosemite and other parks. At the same time, the public is demanding a return to more "natural" experiences in its parks, which bodes well for "a renaissance for the passenger train."

At least that's how Runte sees it. He may be right. Hope is still alive for restoration of the Yosemite Valley Railroad, while even now plans are under way to open passenger service by rail to the Grand Canyon. It may be that in a few years we'll be able to journey to our parks with the ease and serenity that our grandparents enjoyed: the ultimate and happy irony to the story of discovering our parks.

PETER WILD *is a frequent contributor to* SIERRA.

BRIEF REVIEWS

The New Book of California Tomorrow: Reflections and Projections from the Golden State, edited by John Hart. William Kaufmann, Inc., 1984. $12.95, paper.

IT BEGAN in 1962 with the publication of a pamphlet called *California Going, Going. . .*, and ended in 1983 with the last issue of a magazine called *Cry California*. The organization that produced both these documents, California Tomorrow, sought to challenge the universal notion that "growth is good," and over two decades produced millions of words that helped drive that point home to a growing readership.

Among the issues California Tomorrow tackled ahead of everyone else were suburban sprawl (coining the word *slurb*), freeways, and the ruination of Lake Tahoe. In particular, the organization stressed the need to create regional, multicounty governments that would prioritize the ways federal dollars would be spent to solve local problems. *The California Tomorrow Plan* was undoubtedly CT's greatest achievement, an ambitious attempt to create a framework for planning on the statewide level. The plan was widely praised and, to an extent, imitated elsewhere.

John Hart has gathered together essays long and short from 20 years of California Tomorrow publications, providing an overview of the environmental issues that commanded the attention of the nation's largest state during a critical period in its development.—*Jonathan F. King*

Mountain Time, by Paul Schullery. Schocken Books, 1984; $17.95, cloth.

PAUL SCHULLERY AVOIDS the boring, unconnected vignettes that make up the typical park-service reminiscence in this poignant, sane, humorous (albeit loose) account of his experiences as a ranger/naturalist at Yellowstone National Park. The vignettes are here expanded into an undogmatic look at the greater issues affecting our parks, such as public attitudes toward the idea of wilderness and park management, and decisionmaking on wildlife, land use, and future expansion.—*Al Buchanan* □

The John Muir bibliography reviewed in *Sierra*'s March/April issue will not be published by Gibbs M. Smith, Inc. Rights to the manuscript have been retained by its compilers, William and Maymie Kimes, who will seek to have the project placed with an academic publisher.

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QUESTIONS ? ANSWERS

Q: While visiting several national parks in the Rocky Mountains last summer I noticed large stands of lodgepole pines that appeared to be dead or dying. What's causing this problem? (JIM WERNER, MADISON, WISC.)

A: The culprit is the pine bark beetle. For years the Park Service attempted to suppress insect infestation (and forest fires) in this region, but recently a "let it be" philosophy has prevailed. Consequently the beetle is allowed to proliferate, serving the woodlands by killing some trees and allowing younger, more diverse plant communities to develop.

Ironically, the suppression of forest fires has helped the pine bark beetle reach its current levels of proliferation. Biologists think that, in the past, fire served to smother the beetle's advance.

Q: I usually have quite a bit of trouble fording rivers and streams during backpacking trips. Could you provide some tips for safe crossings? (JOEL STEWARD, ST. AUGUSTINE, FLA.)

A: Most national and state parks can provide trail guides that list river and stream fords, the best times of year for their use, and proper techniques for crossing flowing water. If your trail isn't listed, or if you're attempting an off-trail hike, common sense will help you ford rivers and streams safely.

Always look for a spot where the water is calm and shallow. Before crossing, unhook the waist strap on your backpack for better balance if the pack's weight shifts, and so you can easily shed the pack if you fall in the water. A walking stick or long pole used on your downstream side can also help. Remember to take your time crossing, always planting the lead foot firmly before taking the next step.

If you are in doubt about the safety of a given ford, the best thing to do is turn around. A hasty decision to cross could prove fatal.

Q: In which geographic areas do the majority of Sierra Club members live? (BILL RINGER, CHICAGO, ILL.)

A: With 136,161 members, California is home to more than a third of the Sierra Club's 355,290 members (as of February 1985), reflecting the Club's continuing strength in its state of origin.

New York has the next highest number of members, with over 24,000 (6.8 percent of the total), followed by Illinois with 3.7 percent and Texas with 3.4 percent. Other states with significant numbers include Pennsylvania (2.8 percent), New Jersey and Ohio (2.7 percent each), Massachusetts and Florida (2.6 percent), and Washington state (2.3 percent). Canada is also represented, with 2,287 members.

There is an effective (if more modest) Sierra Club presence in every state in the union, as well as in nearly every U.S. territory. This includes one member in the Panama Canal Zone, two in American Samoa, 19 in Guam, 28 in the Virgin Islands, and 30 in Puerto Rico.

Q: Who (if anyone) was the first person to complete a solo trip to the North Pole? (BOB MCDIVOTT, ST. LOUIS, MO.)

A: Japanese adventurer Naomi Uemura completed the first solo trek to the North Pole by dog sled in 1978. His other feats include membership in the first Japanese team to climb Mt. Everest (he was the first to reach the summit) in 1970; solo climbs of Aconcagua, the highest peak in South America, and Mt. Kilimanjaro, the highest in Africa; floating the 3,700-mile Amazon in a handcrafted raft in 1978; and traveling 7,500 miles by dog sled from Greenland to Alaska in 1975—an incredible 18-month trip during which he kept from starving by eating several of his ailing sled dogs.

On February 1, 1984, Uemura began his attempt at the first winter solo climb of Mt. McKinley in Alaska. He reached the 20,320-foot summit on February 12, his 43rd birthday, and disappeared four days later on a ridge line at 16,000 feet. Rescue teams failed to find his body.

Q: Years ago only the John Birch Society worried about fluoride in our drinking water. With our growing awareness of environmental toxins and increased concern about supposedly safe chemicals, where does the fluoride debate stand today? (ROSLYN SOLOMON, SEATTLE, WASH.)

A: Americans are exposed to many sources of fluoride daily. More than 60 percent of us live in municipalities with fluoridated water supplies; in addition, the chemical is emitted as a byproduct of aluminum manufacturing; it is present in the flesh of animals contaminated by airborne fluoride; and it is contained in convenience foods processed with fluoridated water. Some experts feel that people are already "optimally fluoridated" without having to consume additional amounts of the chemical in their drinking water—particularly because, as a 1979 Canadian study noted, "fluorides are highly toxic for humans, and a narrow margin separates an 'acceptable' level from a toxic level."

There is nothing resembling a consensus of opinion between pro- and antifluoridation camps. On the one hand, proponents point to significant decreases in tooth decay since widespread fluoridation of American water supplies began after World War II. But antifluoridationists can call on scientific studies that clearly suggest a relationship between excessive consumption of fluoride and such problems as arthritis, cancer, birth defects, and chromosome damage.

The U.S. Public Health Service—which many antifluoridationists accuse of engaging in collusion with corporate poisoners—is currently conducting laboratory tests of fluoride's effects, but results will not be made public until 1988 at the earliest.

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