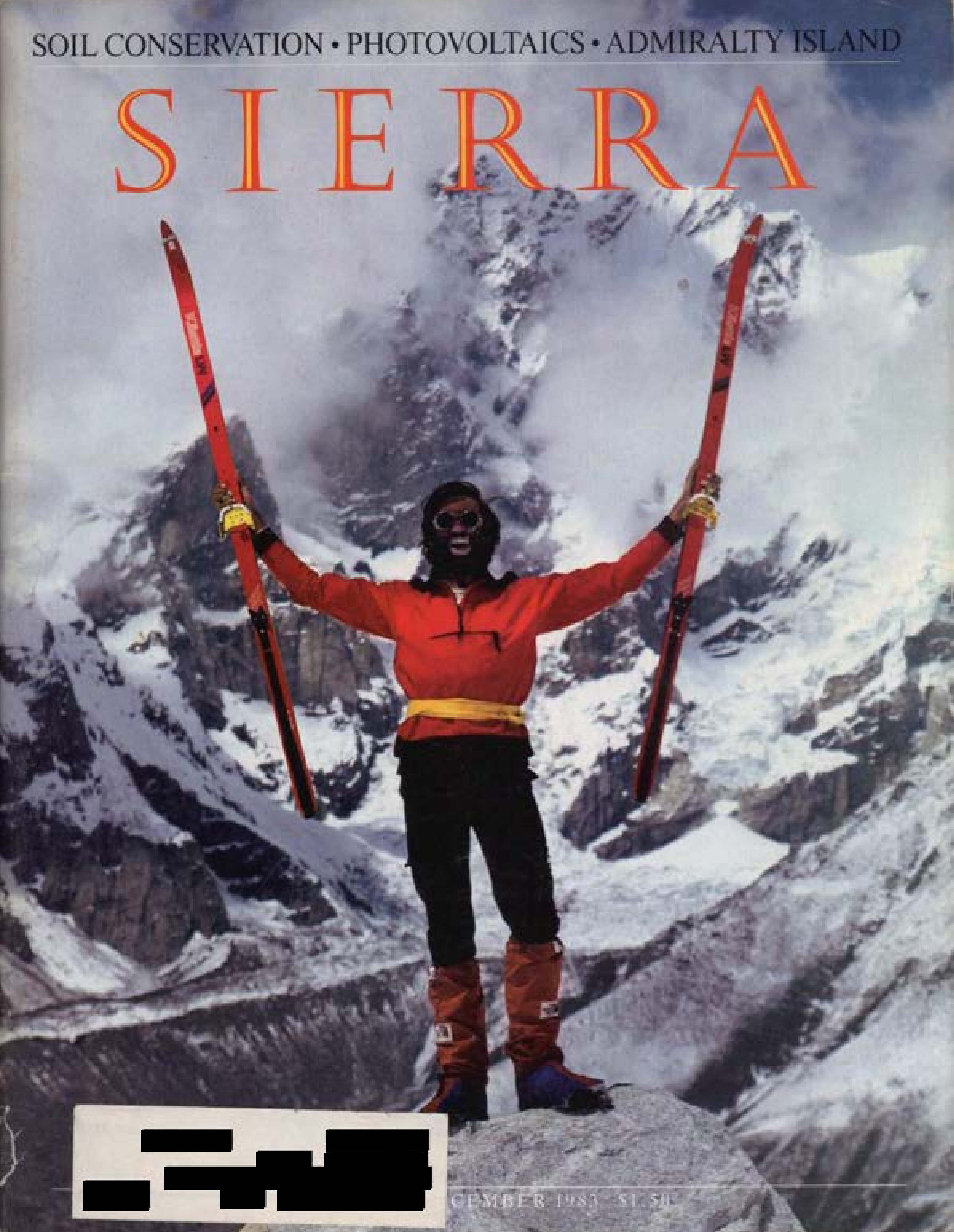
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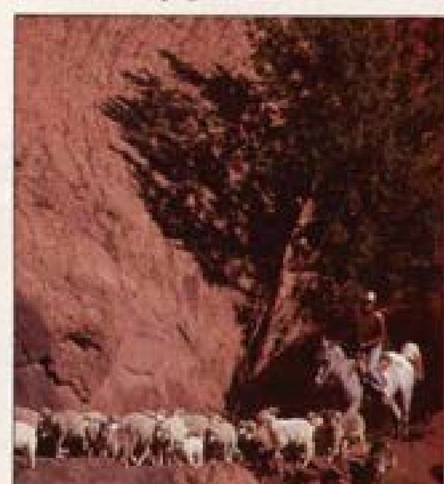

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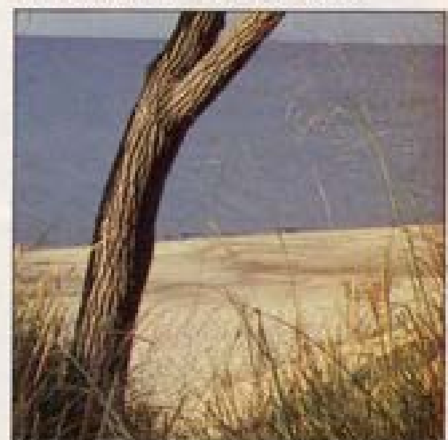

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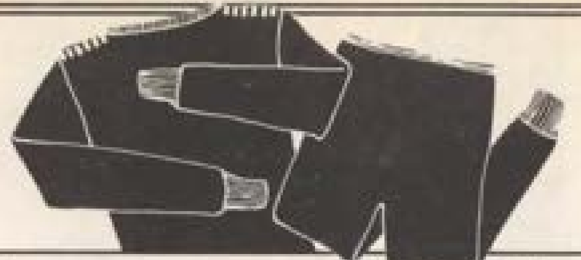

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Call for Urban Priorities

It appears to me that the Sierra Club has given up on urban areas. Your activities are centered on wilderness areas and land preservation. You have done considerable work in support of the present Clean Air Act, but nonurban problems such as acid rain were your greatest concerns in this regard.

These issues are of great importance to urban dwellers, but we must also deal with traffic, crowding, and carbon monoxide. Acid rain's destruction of forests, crops, and lakes is an important problem, but there also exists a clear and present danger to the residents of cities like New York, Gary, and my own Chicago who live, work, and sleep in the midst of a blanket of sulfur dioxide, nitrogen oxides, suspended particulates, carbon monoxide, and ozone.

I would also encourage the Club to become more active in lobbying efforts, not only with state and national officials but also with local representatives. Much more federal money is entering city coffers without strings attached than ever before; this increased local discretion should be accompanied by increased local lobbying.

Bernard J. Hansen
Alderman, 44th Ward
Chicago, Ill.

See this issue's "Observer" (page 92) for an account of some of the lobbying efforts engaged in on the state level by Sierra Club chapters and groups around the country.

Strategy for Peace

The growing realization that nuclear war represents the ultimate environmental threat provides special urgency to the movement for a nuclear freeze, to be followed (it is hoped) by nuclear disarmament. Yet we must not ignore that all disarmament negotiations have been, and still are, carried on in the context of maintaining the institution of war as an integral element in international relationships. As long as war remains the final arbiter of disputes between nations, disarmament negotiations will continue to be conducted under a fatal handicap.

Replacing the war system will be a slow and often frustrating process. A peace system, to be successful, must be the product of discussion and debate among the world's peoples and their governments, so that the system finally adopted will command widespread support in the world community. While difficult, the task is not hopeless, for humankind has the greatest incentive of all time: survival not only of our civilization but of our species.

A strategy of action to initiate a peace process would include the following unique suggestions: a Declaration of Independence

From War by the U.S. government, stating that henceforth the primary goal of our foreign and defense policies will be to work with all nations toward the replacement of the war system with a peace system; and the establishment of a Peace Planning Board as a permanent organ of the federal machinery, to provide continuity and freedom from political pressures in developing long-range policies and plans for guiding our country's relationships with other nations.

Allan M. Chambliss
Kenwood, Calif.

Going to the Source

There is an error in the caption that appeared beneath the photograph of Tulloch Dam and powerhouse in "What Price 'Free' Energy?" (July/August, 1983). I was the resident engineer responsible for construction of both the dam and the powerhouse, and I can assure you and your readers that they were built simultaneously and that the hydroelectric facility was *not* a retrofit.

The dam, financed by the sale of power, was topped out in late 1957 in time to impound the 1958 spring runoff. The powerhouse was completed in the spring of 1958. The dam was named after the original Tulloch Dam, which was built in the 1850s to divert water to a flour mill at Knights Ferry. Portions of the original structure, which was a run-of-the-river weir, still exist.

Neville S. Long, A.S.C.E.
Saudi Arabia

More on Purifying Water

David Knotts's article, "Purifying Water in the Wild" (July/August, 1983), was very informative and well written. I tried using iodine crystals on a recent camping trip, and would like to add some guidelines of a practical nature regarding their use.

First, most drugstores do not stock iodine crystals. The chemical company I patronized would sell it in large quantities only (one ounce for $17.75). Two or three people might want to buy one ounce together and then divide it.

Campers should not purchase crystals unless they have a metric scale to measure grams as well as small *glass* containers (not plastic) for storing and carrying the crystals.

Finally, campers need to carry a container in which they can measure a pint (or quart) of water in order to use the measurement table provided by Professor Knotts.

Bob Jolly
Oakland, Calif.

Potential Geothermal Dangers

Bruce Hamilton's article, "Geothermal Energy: Trouble Brews for the National Parks" (July/August, 1983), by implication argues that Yellowstone Park must be maintained under all conditions undisturbed as nature has created it, and that development of geothermal resources on lands adjacent to Yellowstone must be stopped, or at least carefully monitored.

However, Hamilton fails to discuss some basic facts concerning Yellowstone Park: that geothermal sources in Yellowstone release annually more than 100 tons of arsenic (which end up in the Mississippi River system) and that other toxic materials are also released. These facts have a bearing on public health and welfare. Where geothermal is developed for commercial purposes, strict regulations are imposed preventing the release of toxic gases or minerals to the atmosphere or rivers. This is as it should be. Thus, in most cases only commercially developed geothermal resources are safe for our environment and for the public welfare.

Joseph Barnea
United Nations Institute
for Training and Research
New York, N.Y.

Notes on a Review

Peter Cummings's review of my book, *Outdoor Pursuits for Disabled People* (January/February, 1983), contains several misleading statements. First, he chides me for failing to discuss "the inverse relationship between exercise and insulin dose for diabetics." Even though he admits that I "designed the book as a reference work," he fails to grasp that the book was to be a *source* reference that would direct readers to specialist literature or to organizations that could provide in-depth advice. Hence, the source of a leaflet on exercise and sport for diabetics is listed.

Similarly, Cummings says the book "gives good coverage to paralysis or loss of limb, epilepsy, mental handicap and sensory loss," disorders he calls "obvious . . . handicaps," but that it "neglects disorders such as hemophilia [and] cardiorespiratory problems." This is a strange view, since there are

at least four references to hemophilia and several to heart disease and cardiorespiratory problems. In fact, *Outdoor Pursuits* makes more than 160 references to "less obvious" handicaps.

Finally, the source of my funding dictated that this book should be a guide for the British market. However, the British slant of the guide is less a drawback for people in North America than Cummings suggests. My hope is that many of the examples given (quite a few from the United States) will be informative to people throughout the world, regardless of where they occurred.

Norman Croucher
London, England

BY AND FOR THE HANDICAPPED

Thank you for the wonderful article by Debbie Lynne Simmons on her raft trip through Hells Gate on the Rogue River ("My Side of the River," July/August, 1983). Her descriptions of her nervousness ("samba in my stomach") were absolutely wonderful!

I hope to see more articles like hers on (and especially by) handicapped campers in future issues of *Sierra*.

Wendy King
New Orleans, La.

UNSAFE AT ANY AGE?

Shirley Blumberg's "Tips for the Older Backpacker" (July/August, 1983) contains nutritional "advice" that could endanger oldsters who want to continue to hike and backpack.

My husband and I, in our mid-60s, require and pack as many calories as we did at a younger age. Five hundred seventy-five calories are required per hour of hiking (more if one is hiking uphill). Three thousand-plus calories should be eaten throughout the day (three meals and two snacks), with attention paid to protein, fat, and carbohydrate content. Finally, drinking 3,000 cc of liquid throughout the day is necessary for efficient bodily functioning.

Deliberate fasting (skipping breakfast) and limiting water intake when in the wilderness is unnecessary. It's asking for dangerous physical and mental problems for people of any age.

Mary Ann Henry, B.S.N.
Ridgecrest, Calif.

If it's not too late, let me come to the defense of Shirley Blumberg. Although I don't consider myself an "older backpacker" quite yet (I'm 51), I tried her hiking advice this past summer. Each year I have the problem of making an adjustment from the flatlands of Texas to the Colorado Rockies (8,000–12,000 feet), and each year the

It used to be you could drink directly from those fast moving, sparkling mountain streams—but no more! What people haven't contaminated the animals have. Giardia cysts, for example, are now found everywhere . . . from Alaska through the Rockies to the Great Eastern Smokies, and in towns where normal chlorination hasn't even been enough.

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struggle is greater—more gasping, more rest, and of course more pride that I made it after all (sort of). So from the first footstep this season I used the measured tread and breathing technique that Mrs. Blumberg recommends. Believe me, it works. I have never had such pleasurable hiking, even when much younger. I highly recommend this approach, even to young hikers.

Elizabeth Haaland, M.D.
Dallas, Texas

TAPPAAN: A CLUB RESOURCE

I'd like to share a note with those Club members who may never have spent time at the Clair Tappaan Lodge, located near Donner Summit in the Sierra. The lodge operates cooperatively, with all "residents" (who pay $18 a day for room and board) sharing the chores. A small staff, headed by the intrepid Michael Jeneid, leads the amateurs through their paces. On our recent visit, one of the volunteer chefs had had a year of training at the Cordon Bleu in London, so the food was spectacular and abundant.

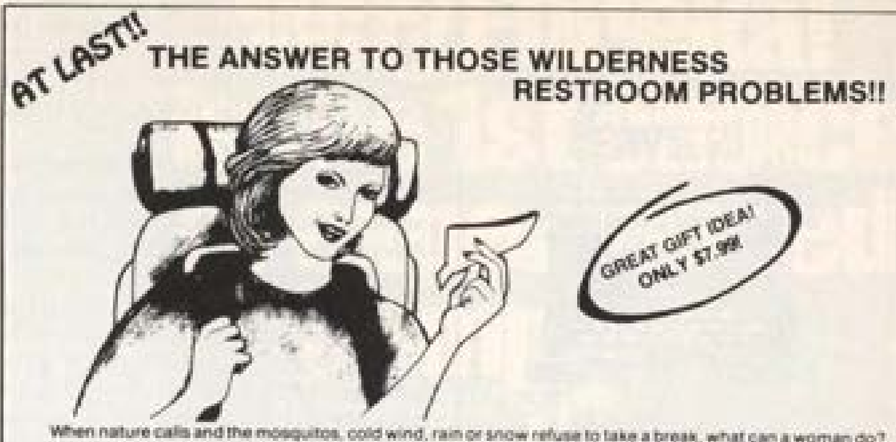
I understand that Clair Tappaan is in a bit of a financial bind for lack of year-round use. I'd like to encourage people to take advantage of this delightful and inexpensive spot for vacations any time of year. The scenery is "run-of-the-mill spectacular," and in winter the cross-country skiing is absolutely limitless. And one of the greatest joys, apart from the beauty of the spot, is the quality of the people you find there. Sierra Club members in the wild are just about the most congenial people I know!

Donald Gibbon
Pittsburgh, Penn.

CONSERVATION AND RELIGION

I appreciated both David Douglas's article ("The Spirit of Wilderness & the Religious Community") and Ann Ronald's review of Stephen Fox's book *John Muir and His Legacy* (May/June, 1983). Douglas was correct in noting that the major environmental-protection groups seem somehow to have lost much of the spiritual drive that, initially, inspired conservationists such as Thoreau, Muir, and Rachel Carson. It's unfortunate, though, that he didn't spend some time talking with American Buddhists, Taoists, neo-Pagans, and other religious minorities (including Native Americans) who still participate in so-called "pagan" systems of religious belief. Douglas would have discovered that, yes, there are many religious-minded Americans who, in the tradition of John Muir, still blend a love of wilderness into their theological consciousness.

Saundra Gismondi
Boston, Mass.



When nature calls and the mosquitos, cold wind, rain or snow refuse to take a break, what can a woman do? It's hard to ignore the weather and mosquitos, the poison oak and unfriendly stickers, the wobbly positions and the times one got caught with one's pants down! There has to be a better way — **Sani-fem®**!

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Watt Resigns, Club Rejoices

On October 9, 1983, almost exactly two years after the Sierra Club presented 1.1 million signatures calling for his ouster, James Watt finally resigned as Secretary of the Interior. "With Watt's departure," said Sierra Club President Denny Shaffer, "the insults to the nation's intelligence will end, but not the assaults on the environment. . . . His policies are a disgrace and unacceptable to the American people. It would be tragic if the deplorable environmental policies of the Reagan administration were to go forward under a new secretary."

With Watt gone, attention has turned to the Reagan administration's policy itself. Conservationists have long been concerned about the administration's "giveaway" approach to public resources. Opening outer continental shelf areas to massive oil and gas leasing; the coal-leasing program; exploitation of proposed wilderness areas and wildlife refuges; attempts to reduce protection for national parks—all have been widely criticized and frequently repudiated by Congress and the courts. The Sierra Club Legal Defense Fund alone filed 28 separate suits against Watt, an all-time record for environmentalists suing any individual.

Changing the regime at Interior gives the Reagan administration an opportunity to change directions. *The Wall Street Journal*, for example, speculated that "the Reagan administration now will take a more conciliatory stand on many environmental issues. And it's expected to tone down or scale back some of Mr. Watt's ambitious plans."

In his letter of resignation, Watt commented that "a different type of leadership at the Department of Interior will best serve [President Reagan] and the nation." Most environmentalists would agree, but they are puzzled by William Clark's nomination as Interior secretary. Because Clark has virtually no record on environmental issues, his positions are innocently blank so far. As Michael McCloskey, Sierra Club Executive Director, said, "One can only hope that the President will get the policies back in line with public opinion."

Though Watt's abrasive offhand remarks received much media attention, serious opposition to him focused clearly on his record. Among his most notable actions and policies were the following.

• *National park lands.* Watt, believing that the national park system was largely complete, opposed both new parks in urban areas and the spending of money to acquire additional parklands, even when Congress had already authorized such purchases. During the Carter administration, the Interior department spent an average of $230 million a year for new national park lands. Under the Reagan administration, this amount fell to about $65 million a year, and most of these funds were required to settle court decisions about past park acquisitions.

• *Coal leasing.* The Reagan Interior department has already leased some 2.1 billion tons of publicly owned coal. Watt had planned to lease an additional 13 billion tons, a giveaway of public resources that might be worth as much as $94 billion. Conservationists' opposition to this coal policy stems from the fact that there is already a 25-year supply of coal reserves leased to private companies. Additional sales would only encourage speculation in leases without increasing energy supply.

• *Strip-mining.* The Interior department under Watt reorganized the offices that regulate strip-mining. The result was to give states more control over where strip-mining would be permitted and how operations would be regulated. The result of these policies, argue conservationists, is almost certain to be weaker regulation and more damage from strip-mining.

• *Public-lands leasing.* Watt opened millions of acres of public lands to oil and gas leasing, to grazing, and to other economic uses. Some of this land was in wildlife refuges, some in areas proposed for additions to federally designated wilderness areas, and some in other sensitive lands. These giveaways minimize protection for the resources themselves and also lessen the public's return on resources.

California activists were among the hundreds of Sierra Club members who brought Congress petitions bearing more than 1.1 million signatures calling for James Watt's ouster.

Environmentalists seek an end to such policies. Leasing publicly owned resources —offshore oil and gas, or coal, or grazing privileges—must provide for fair economic returns and for thorough review and environmental protection. Ensuring this would probably spell an end to the blind leasing of massive tracts; such wholesale operations preclude the kind of area-by-area consideration that is necessary for appropriate leasing, just as it is for wilderness designation.

National parks must be protected and even expanded. Nature may not be making any more Yellowstones in the near future, but America's need for recreation continues to grow. Similarly, the protection of wilderness is more than a once-in-history opportunity. It is also a duty we owe to future generations.

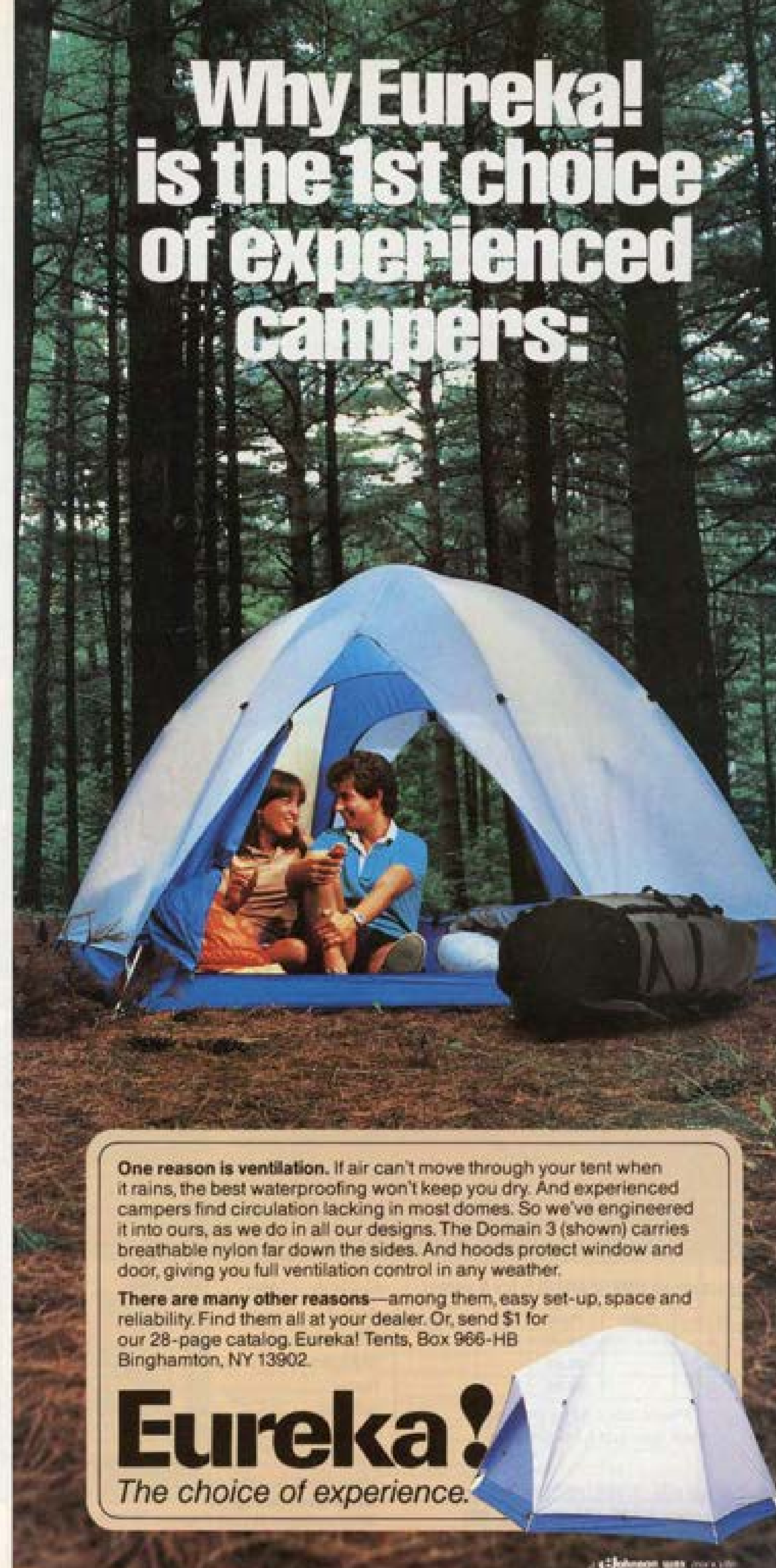
Watt's tenure involved more than the dereliction of the duties outlined above. He also had tremendous influence on the internal workings of the Interior department. In this area, his legacy will certainly outlast transitory policies and proposals that can be rejected or altered by Congress, the courts, or the hazards of politics.

Watt lost many policy battles, but he had better luck with the budget wars. As he commented in 1982: "When the votes come on the budget, we've won the issues. That's where I've put my attention in changing the policy. That's how I've changed the priorities of the Department of Interior, by shifting the allocation of manpower and dollars." Indeed, many aspects of Watt's legacy are implicit in personnel appointments, in operational procedures, and in other workings of the bureaucracy itself. "I will build an institutional memory that will be here for decades," he told *The New York Times*.

The 1984 Presidential election will involve a strong emphasis on Reagan's environmental record. This dramatic crossroads at the Interior department gives President Reagan the chance to take a new path. But will he choose it?

Senate Adopts Coal-Leasing Ban

In a stunning defeat for Interior Secretary James Watt, the Senate and the House have both agreed to restrict leasing actions on coal and offshore oil reserves. The Republican-controlled Senate voted 63 to 33 to prohibit coal-lease sales until late next spring. The prohibition, adopted as an amendment written by Sen. Dale Bumpers (D-Ark.), gives Congress 90 days to examine the recommendations of the recently established Commis-



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sion on Fair Market Value before allowing leasing to resume. (It was this same commission, incidentally, that was the target of ill-tempered jibes by James Watt, who characterized its members as "two Jews, a woman, a black, and a cripple.")

The Senate provision was reconciled with a House leasing ban included in the appropriations bill for the Interior Department. The conferees also agreed to limited restrictions on oil leases in the Gulf of Mexico, and the ban on leasing along Georges Bank, off the Massachusetts coast, was continued. Bans on leasing activities along the coasts of northern and central California were continued, and restrictions on leasing off Southern California were expanded.

Judge Rescues Wilderness Study Areas

In a major victory for wilderness protection, a federal judge has ordered a temporary halt to Interior Secretary James Watt's plans to open to development some 1.5 million acres of Bureau of Land Management wilderness-study areas. The wilderness characteristics of the lands must be preserved, the court ruled, until a final ruling is made on the legality of Watt's decision.

Last December, Watt deleted 800,000 acres from the BLM wilderness inventory, and he has dropped an additional 735,000 acres since then. He said he was making these deletions because the areas were smaller than 5,000 acres, because the government did not own the subsurface rights, or because the areas were initially included in the review solely because they are contiguous to existing wilderness areas or parks.

Although his actions opened these lands to oil and gas leasing, geothermal development, and other activities that could permanently impair their wilderness values, Watt prepared no environmental impact statement on the deletions, and there was no opportunity for public comment.

Represented by lawyers for the Sierra Club Legal Defense Fund, the Club and five other environmental groups filed suit in January, arguing that Watt's action violated the law. U.S. District Court Judge Lawrence Karlton agreed.

"This decision is one more step in the development of the law of due process for natural resources," said Larry Silver, SCLDF attorney in the case. "Congress said that no administration has a right to eliminate these wild places until the public and Congress have had an adequate chance to consider them for permanent preservation. It's unfortunate that it takes a court order to make the administration understand that." □

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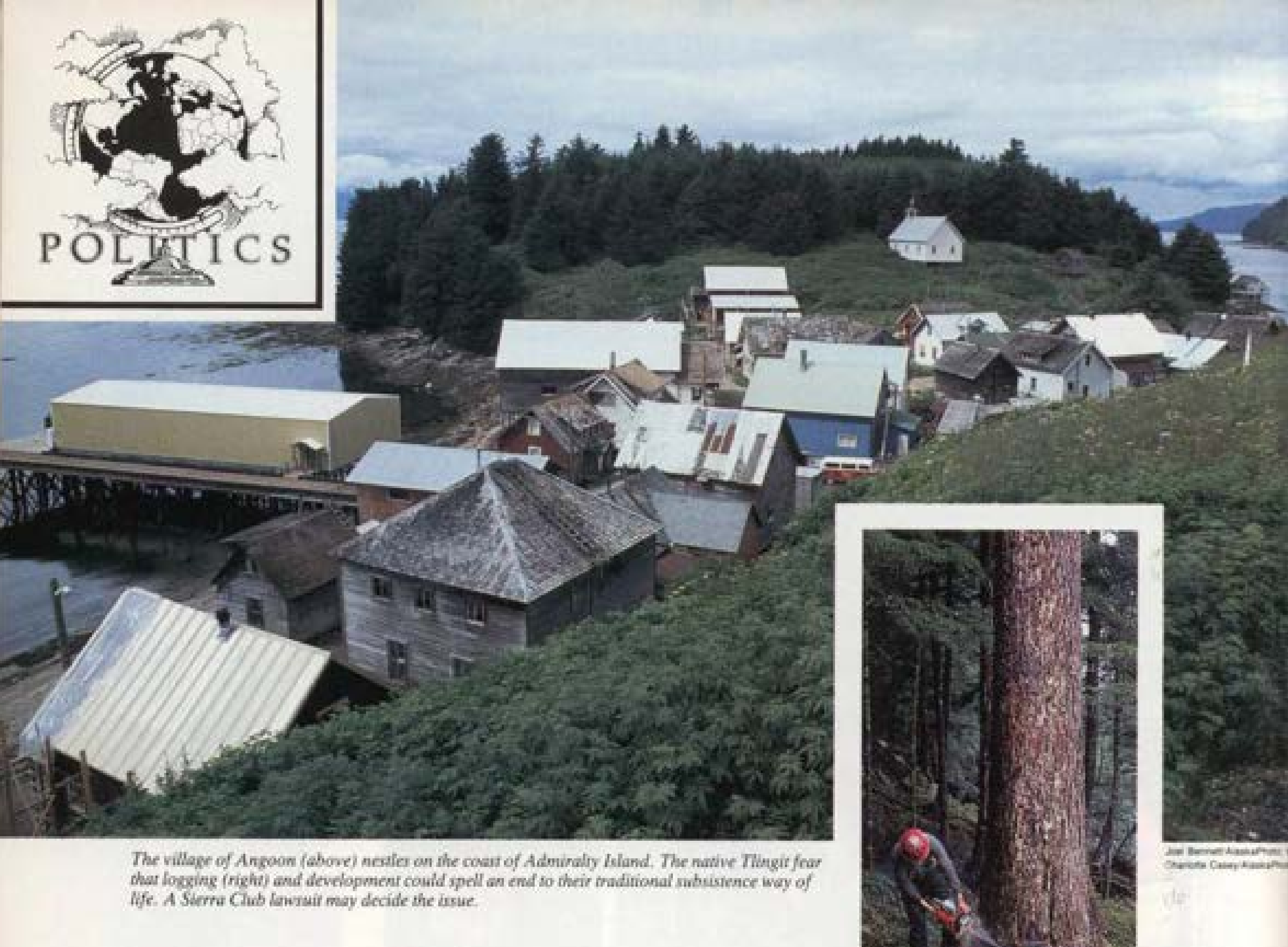

The village of Angoon (above) nestles on the coast of Admiralty Island. The native Tlingit fear that logging (right) and development could spell an end to their traditional subsistence way of life. A Sierra Club lawsuit may decide the issue.

ADMIRALTY ISLAND

The Club Sues Over Logging Plans

NANCY SIMEL and
TRACEY PYLES

"WE ENVY NO PEOPLE ON EARTH," says Wally Frank, mayor of the small Tlingit Indian village of Angoon on Admiralty Island in southeastern Alaska. After a visit to the island it is easy to understand his statement. It also is easy to understand why the Sierra Club is working so hard to help Angoon save Admiralty Island from planned clearcutting.

Admiralty is the nation's largest wilderness island—in the nation's only northern rain forest. It's also one of only two Alaskan national forest wilderness monuments; the other is Misty Fjords. The island's 921,000 acres shelter an estimated 1,000 Alaskan brown bears, the greatest concentration in the world. (The Tlingit call the island *Kootznoowoo*—"Fortress of the Bears.") There are more bald eagles per square mile on Admiralty than anywhere else in North America. More than 2,500 of these magnificent birds inhabit the island's 860-mile coast, feeding on the salmon that spawn in the island's streams. Large numbers of black-tailed deer depend upon the old-growth forest canopy of spruce, cedar, and hemlock, as do many of the fur-bearers, including beaver, mink, and marten. This diverse assembly of animal life, together with the old-growth forest, represents a self-contained ecosystem that is Admiralty's alone.

But now, having stood virtually undisturbed since the last Ice Age, Admiralty Island faces clearcutting of its virgin forest.

In early 1982, Interior Secretary James Watt conveyed 23,000 acres of Admiralty Island wilderness to Shee Atika, an urban Native corporation in Sitka, Alaska. Shee Atika intends to log this land and has made plans to begin clearcutting. The clearcutting would affect more than 100,000 acres and would devastate more than beauty and tranquility. The destruction of the areas intended for clearcutting and the road-building across three watersheds could "very well be the last straw that could destroy the Tlingit way of life," according to anthropologist Dr. Kenneth Tollefson.

The Tlingit Indians depend on subsistence hunting and fishing; until the future of Admiralty Island wilderness is secure, the future of the Tlingit culture remains uncertain. Dr. Tollefson concludes that "Tlingit subsistence and Tlingit culture . . . survive together or they become extinct."

The Tlingit of Angoon have depended on hunting, fishing, and gathering for their subsistence for more than 10,000 years, since the close of the Ice Age. They have adapted to

the natural cycle of life and subsist in balance with the island's ecology. The Tlingit call themselves "guardians of the island."

As early as 1881, two years after John Muir circumnavigated the island, the Tlingit asked the President and the Congress for title to Admiralty Island. By 1938, public concern over development caused President Franklin D. Roosevelt to propose the island as a national monument. Developers fought the proposal, and it was abandoned. Finally, 40 years later, President Carter made Admiralty Island a national monument by executive proclamation. Congress affirmed the designation in the Alaska National Interest Lands Conservation Act of 1980 (ANILCA).

Still, Admiralty is not protected from clearcutting. The Sierra Club Legal Defense Fund, on behalf of the Sierra Club and the Angoon villagers, is currently involved in ten lawsuits in an attempt to ensure that Admiralty Island remains wilderness and that the traditional Tlingit subsistence way of life is protected.

The 23,000-acre parcel conveyed by James Watt for clearcutting is located on the island's northwestern coast, near Angoon. It spans three watersheds: Lake Florence, Peanut Lake, and Lake Kathleen. Not only are these lakes popular recreation spots, with some of the best trout fishing in southeastern Alaska, but they are invaluable to the subsistence hunters and fishermen of Angoon.

Barely a mile north of these lakes, the logging company wants to build a log dump in Cube Cove, a shallow, pristine inlet on the island's west coast. The company plans to clear and level the cove's shoreline, to build roads and an artificial breakwater for which tens of thousands of tons of rock fill will be blasted from the cove's beach.

The cove plays a major role in the traditional lifestyle of the Tlingit. According to Dr. Tollefson, "The survival of their community, their children, and their culture depends upon the conservation of such areas as Cube Cove."

Charlie Jim, Sr., a 71-year-old Angoon Tlingit and chief of the Raven Tribe, says: "I have fished in Cube Cove since I was 12 years old. Going to Cube Cove is like opening a refrigerator. In the cove I catch crab, halibut, herring, and all kinds of salmon—pink, coho, chum, sockeye, and king. I have also hunted at Cube Cove, where I get deer, mink, and land otter."

Tracey Guest, an Angoon Tlingit youth, would like to continue the tradition: "I've been to Cube Cove with my Uncle Gabriel George. We were there hunting deer. We anchored the boat. Then we went up into the woods a bit and made deer calls. It was a nice place. . . . I want to continue to hunt and fish when I grow up, and to eat Indian foods. I want to be able to go up to Cube Cove."

It is the tradition of the Tlingit that the children are taught at an early age the skills of hunting and fishing. In this way they acquire the knowledge and experience necessary to continue their subsistence economy. When they are older, they provide for their parents and other elders who can no longer hunt and fish for themselves. These relationships, developed through subsistence living, make for a community intimately bound by sharing and supporting.

The Angoon villagers recognize the value of their hunting, fishing, and gathering. Lydia George, whose title is "Mother of the Raven Tribe," describes the care the Tlingit take with their subsistence lands: "To us, Admiralty is like a big dish; you are free to use it but not to break it. Our people are masters at keeping the land the way it is. Our people are the guardians of the land. There

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was an old man who lived at Cube Cove. He was the guardian of its streams. When someone went hunting in the woods surrounding Cube Cove, he would offer the old man a part of the catch. As a young child my husband saw this old man of Cube Cove. Now my grandson is named Cube Cove Jim. It is his land. My grandson will one day be head of the tribe that claims Cube Cove. Angoon has always fought for its land. I want Cube Cove Jim to have his land."

It does not seem that the logging company much cares whether Cube Cove Jim will ever see the place he was named after. The company has turned down numerous offers to trade for comparable timberlands off Admiralty; each proposal has been refused for reasons that seem to have more to do with the pride of those running the corporation than with its economic well-being.

After the Sierra Club Legal Defense Fund filed for a preliminary injunction in federal court, the logging company's federal permit for the log dump was suspended in March 1983 pending preparation of an environmental-impact statement on the log dump. Since no development in the cove can occur while the EIS is being prepared, the Angoon residents thought that for at least this fall's deer season they could breathe easily. But only a few weeks after the order for the EIS, the corporation began clearcutting 244 acres near Peanut Lake and Lake Kathleen, less than one mile south of Cube Cove.

Shee Atika's intent is to use helicopters to lift the cut timber, drop the logs into Chatham Strait (which borders the west coast of Admiralty), and load the logs onto a barge. Dropping logs from helicopters poses a danger to any small boats in Chatham Strait near the drop-off site. Many of the logs will escape, lost to tides and currents. They will absorb water and become "deadheads," submerged logs floating just below the surface of the water. Deadheads are nearly impossible to see and can easily sink the small boats used by Angoon villagers, as well as commercial fishing boats and other small craft.

The Sierra Club Legal Defense Fund won a preliminary injunction in federal court on July 18, 1983, halting the dropping of logs into Chatham Strait until a Clean Water Permit has been obtained. The injunction, however, was vacated on September 2, after the logging company complained it did not get to present all of its evidence. A new hearing was held on September 14, at which SCLDF argued for reinstatement of the injunction; this motion was denied, however. But with winter approaching, the weather may yet prevent Shee Atika from illegally dumping logs into Chatham Strait—at least for several months.

Together, the Angoon Tlingit, the Sierra Club, the Wilderness Society, and the Sierra Club Legal Defense Fund are working for a permanent solution to ensure that Admiralty Island remains the productive wilderness it has always been. As part of the EIS on the Cube Cove log dump, the Sierra Club is asking the Army Corps of Engineers to study the alternative of exchanging the Admiralty lands for timberlands elsewhere.

In ANILCA, Congress set aside Admiralty Island "for the benefit, use, education, and inspiration of present and future generations." Readers can help by sending comments to Col. Neil E. Saling, District Engineer, Army Corps of Engineers, Pouch 898, Anchorage, AK 99506 and requesting that the land-exchange alternative be part of the EIS on the log dump in Cube Cove. Admiralty Island National Monument is a treasure; it must be protected from clearcutting and allowed to remain as it has for more than 10,000 years—*Kootznoowoo*, Fortress of the Bears.

Nancy Simel is a third-year law student at the University of California, Davis. She has worked as an intern at Sierra Club Legal Defense Fund offices in Juneau and Washington, D.C. Tracey Pyles, a law student at Middlebury College, Vt., was a 1983 summer intern at the SCLDF office in Washington.

THE EVERGLADES
Turning Back the Clock

STAFF REPORT

On August 9, 1983, Florida Gov. Bob Graham described an ambitious "Save Our Everglades" program: "Our goal is [to make] the Everglades of the year 2000 . . . look more like the Everglades of the year 1900 than the Everglades of today. We will attempt in the next 17 years to heal the damage inflicted over the past century."

That damage began in the early 1880s when Hamilton Disston, a Philadelphia businessman, linked several of the upper Kissimmee chain of lakes and connected the Caloosahatchee River to Lake Okeechobee. Disston had the blessings of then-Gov. William D. Bloxham, who wanted the state's swamps "ditched, diked, and drained," and subsequent despoilers of the Everglades have enjoyed similar government support.

All that has changed with Graham's new program, which includes the following:

- Reestablishing the natural characteristics of the Kissimmee River. Once a gently meandering river that covered 90 miles, it is now a 48-mile canal more commonly called "Kissimmee Ditch."
- Restoring the Holey Land and Rotenberger tracts. Before drainage, this 95-square mile area was part of the Everglades. The state plans to acquire the few private holdings and reflood the land to re-create an Everglades environment.
- Modifying the highways that cross the Glades so that water can flow through the marsh more easily.
- Restoring Everglades National Park by increasing the amount of water in the park and by acquiring adjacent lands, such as the 50,000-acre Aerojet properties in the East Everglades.
- Managing deer herds to avoid "mercy killings" and the drowning

Wetlands such as this pool at Royal Palm in Everglades National Park will benefit from Florida Gov. Bob Graham's (inset) program to restore and preserve drained and damaged marshlands.

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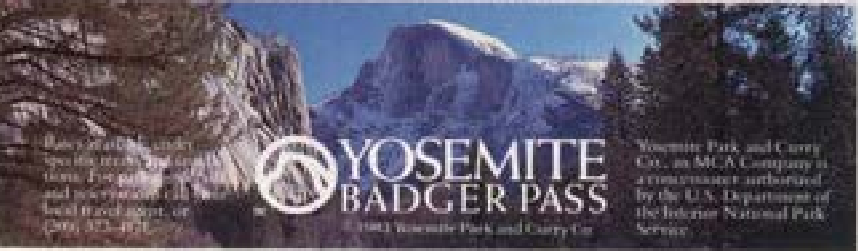

of deer during periods of high water; and seeking ways to ensure the survival of the endangered Florida panther.

In establishing the program, parts of which are already under way, Graham called on federal, state, and local agencies for help. The governor acknowledges that the program will be costly: "The mistakes of a hundred years will be expensive to correct, [but] whatever the price, the price of inaction is higher still. . . . Ultimately, our ability to support human life on the South Coast of the Florida Peninsula depends on the health and well-being of the Everglades."

FLORIDA BARGE CANAL
Can Congress Finally Kill It?

ROSEMARY CAREY

THIS JUST MAY BE THE YEAR the Cross Florida Barge Canal runs out of luck. Halted by presidential order in 1971 and sniped at by environmentalists, local and state governments, and congressional deauthorization attempts, the 110-mile-long public-works project has led a charmed existence since it was first authorized by Congress, in 1942. At every turn it has been nudged along by pork-barrel politicians in concert with businessmen and developers. But this year there is a good chance Congress will pass deauthorizing legislation that will put an end to the project once and for all.

The Cross Florida Barge Canal (CFBC), if completed, would cut through north-central Florida to link the port of Jacksonville with the Gulf Coast. It was designed to provide a protected inland waterway for barge traffic, which would run, through a series of locks, from the Atlantic Ocean (by way of the St. Johns and Oklawaha rivers) to the Gulf of Mexico at Yankeetown, on Florida's west coast. Work on the CFBC began in the mid-1960s, but was halted by President Nixon in January 1971 because of environmental objections to the canal as well as the lack of a strong economic justification for it in the face of skyrocketing construction costs. At the time the project was stopped, 2 of 3 proposed dams, 3 of 5 locks, and 4 of 11 highway bridges had been completed, at a cost of $73 million.

In 1974 federal Judge Harvey Johnsen

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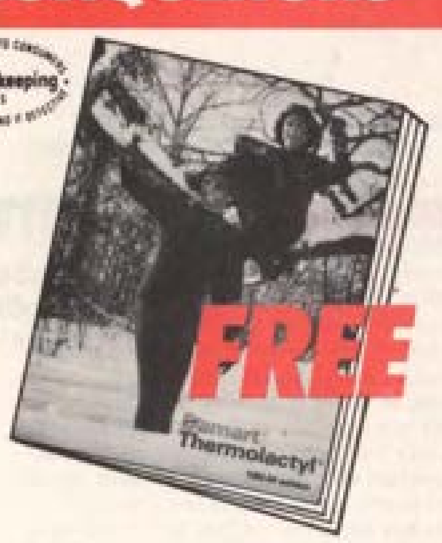

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ruled that because Congress had authorized the project, only Congress could permanently halt it. This year the CFBC could finally be deauthorized under legislation introduced by two Florida lawmakers, Sen. Lawton Chiles (D) and Rep. Kenneth "Buddy" MacKay (D-Ocala). MacKay represents the district in north-central Florida that includes all of the sections of the CFBC left uncompleted when the project was halted in 1971.

This is not the first time deauthorizing legislation for the Cross Florida Barge Canal has been introduced in Congress. Previous bills that would have terminated construction of the CFBC and adjusted the boundary of the Ocala National Forest to include the lands north and west of the Oklawaha River have twice passed the Senate, but were not approved by the House because of the strenuous opposition of two powerful Florida representatives, Bill Chappell, Jr. (D-Daytona Beach Shores) and Charles Bennett (D-Jacksonville). Both Chappell and Bennett have powerful constituents with financial interests in the canal's completion, although Chappell, who has the worst environmental record in the Florida delegation, now has little if any canal area in his recently redrawn district.

Their opposition to this session's deauthorization legislation poses a serious threat to its passage because of a curious custom of the House Committee on Public Works & Transportation. The committee has an "in-house" rule—a custom, not a regulation—whereby it will not schedule a hearing on any bill to deauthorize a public-works project if there is an objection by any member of the delegation from the state in which the project is located. This is the way similar legislation was blocked in the House in 1978, after Senators Lawton Chiles and Richard Stone had guided it through the upper house and in spite of the fact that the bill had the support of 11 of the 13 Florida representatives. This year Chappell and Bennett are again expected to attempt to block Rep. MacKay's bill, H.R. 2695, from reaching the House floor.

Representatives Chappell and Bennett both have long histories of involvement with the CFBC project, and they continue to support it even though the governor of Florida, his cabinet, and the state legislature have repeatedly called for its deauthorization. In response to some clandestine maneuvering by Rep. Chappell in July 1982 that authorized $450,000 for an updated economic analysis of the canal project by the Army Corps of Engineers, Florida Gov. Bob Graham wrote a strongly worded letter to Lt. General Joseph K. Bratton, chief of the Corps, opposing completion of the barge canal and any new appropriations for it:

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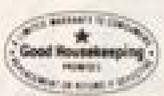

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"Florida's objections to the project continue. Our environmental concerns have strengthened, and the canal's economic feasibility is as dubious as ever. Some canal proponents recently have claimed that transportation of coal through the canal for electric-power production could result in a favorable benefit/cost ratio. The University of Florida's Bureau of Economic and Business Research has refuted this claim. The analysis also rejected several other claims by canal proponents, including increased recreational benefits, generation of hydropower, greater energy efficiency, and significant increases in employment. In short, no new information has surfaced to justify any expenditure of public funds on a new feasibility study for the Barge Canal."

As Gov. Graham indicated, opposition to the Cross Florida Barge Canal is based on environmental as well as economic concerns. The most potentially serious environmental impact of the CFBC is on the Floridan aquifer, a porous waterbearing system, composed of layers of limestone, that underlies much of Florida. The aquifer provides drinking water for millions of people and irrigation water for citrus and other crops. Twenty-eight miles of the barge canal would have to be dug directly into this aquifer, at a depth of 12 to 15 feet, across the so-called Summit Reach in Marion County. No one knows what the consequences would be of slicing through the aquifer and tying up vast quantities of surface water and groundwater to maintain the operational viability of the project. Because the Floridan aquifer provides nearly all of the usable subsurface water for north and central Florida, many believe the canal could have a disastrous impact on the region.

The effect of the canal on water quality is an area of critical concern. The limestone in the proposed 28-mile-long Summit Reach is honeycombed with solution channels of all sizes, from small tubes to great caverns. While the limestone in the region of the canal channel has been found to be quite dense, it has also been found to have innumerable vertical chimneys that extend down to more permeable layers of limestone. Here lateral solution channels develop that may enlarge into immense underground caverns in unpredictable places and numbers. Because of this bedrock structure, pollutants introduced into the canal at times of low water flow (most typically during Florida's drought season, December through May) would move quickly and with relatively little dilution, possibly reaching nearby springs and wells, whenever sizable solution channels are encountered.

The Army Corps of Engineers proposes to fill these channels with cement, a process called "grouting." Hydrologists familiar

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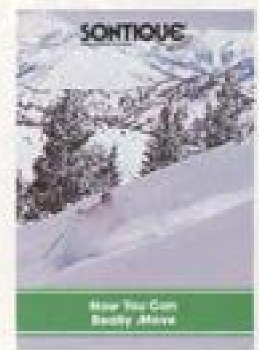

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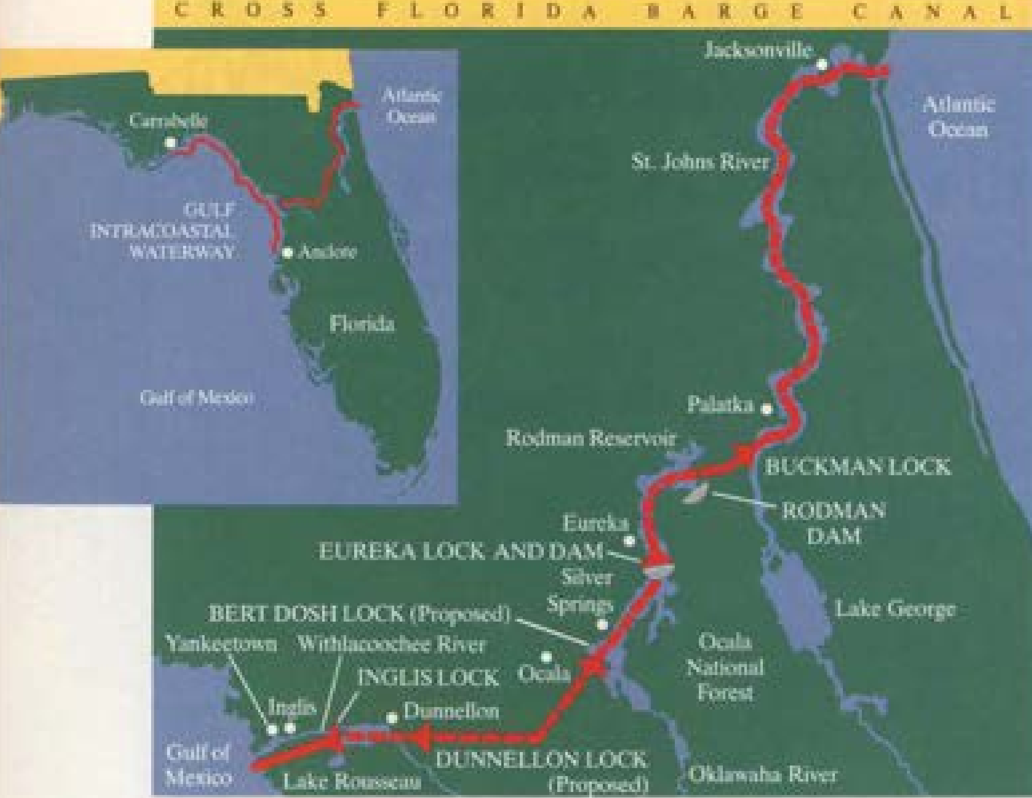

Finishing the Cross Florida Barge Canal—its proposed route from Jacksonville to Yankeetown is shown here—would encourage completion of the Gulf Intracoastal Waterway's "missing link" (inset), another economically and environmentally unsound proposal.

with the area claim the Corps has grossly underestimated both the size and the number of channels in the area, and estimate that grouting costs could run into the hundreds of millions of dollars.

Saltwater intrusion in the coastal areas on the west end of the canal has been observed since the six-mile segment that parallels the Withlacoochee River from Inglis to the Gulf of Mexico was completed in the 1960s. Saltwater conveyed by locks into man-made Lake Rousseau may be detrimental to both fish and invertebrate populations. The draft environmental impact statement for the canal project did not adequately address this possibility.

The fourth major environmental impact of the CFBC is the considerable loss of wildlife habitat that would occur if the canal were completed, from both construction operations and the day-to-day operations of the finished canal. The U.S. Fish and Wildlife Service has predicted serious adverse impacts on wildlife—including endangered species such as the manatee—along each of the canal's reaches.

Sixteen miles of the Oklawaha River valley were deforested and flooded in the late 1960s to form Rodman Reservoir at the east end of the canal. A significant amount of valuable swamp wetlands were lost in the process. It is predicted that raising the water

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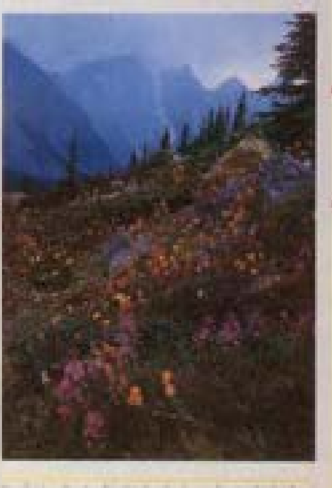
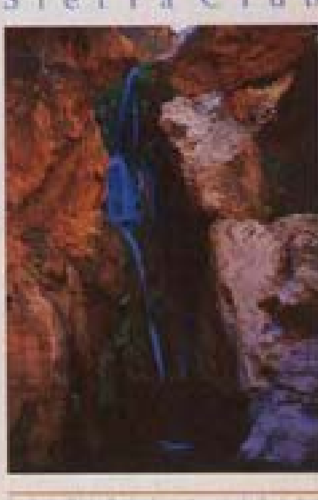


#2011 "Wildflowers in the Canadian Rockies" by Galen Rowell



#2012 "Canyon Waterfall in the Grand Canyon National Park" by Joseph Holmes

level along that reach to 21 feet above sea level (as called for by the canal plan) would adversely affect 36 sensitive wildlife species.

The plan for the Eureka Reach (between Eureka Dam and the planned Bert Dosh Lock) originally called for closing Eureka Dam to create another reservoir of the Rodman type by flooding the remainder of the Oklawaha River valley from Eureka to Silver Springs. Very significant habitat loss would occur in this eventuality. Four alternative plans have been proposed for this reach. One that calls for an upland alignment of the canal route would have the fewest adverse effects on wildlife; this would relocate the canal west of the swamplands associated with the Oklawaha River. However, this strategy would separate the swamplands from nearby upland habitat, a hardship for the wildlife populations that now move between the two ecosystems. It would also require the construction of a huge earthen dike in the Oklawaha River floodplain, causing significant destruction and fragmentation of that fragile ecosystem.

The struggle against the CFBC has been led since 1969 by Florida Defenders of the Environment (FDE), a statewide coalition of professional specialists in science, economics, and law who volunteer their time and expertise to help solve Florida's environmental problems. FDE was formed

SIGHTINGS

Denny Wilcher (right) presents the Denny and Ida Wilcher Award to Alan Kuper, ways-and-means chair of the Northeast Ohio Group of the Sierra Club. The award, honoring "achievement in the field of membership development," was presented at the International Assembly in Snowmass, Colo.

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out of a "Save the Oklawaha" campaign that antedated the construction of Rodman Dam in the late 1960s, once it became obvious that a concerted effort to combat the entire canal project would be required. The group is now working for congressional deauthorization of the CFBC and for the subsequent restoration of the 16-mile segment of the Oklawaha that still lies submerged under the waters of Rodman Reservoir.

Despite the many objections to the barge canal, the Coalition for Rational Economic and Energy Development (CREED), an organization formed in mid-1981 by then Florida State Rep. Andrew Johnson, has been aggressively pushing for its completion. CREED, most of whose members are businessmen in northeast Florida (specifically Jacksonville), claims that the canal project would make Jacksonville a strategic Atlantic port and would provide 20,000 to 30,000 new jobs in northeast Florida. Both Johnson and Reps. Chappell and Bennett support the dubious claim—refuted by Gov. Graham's letter to the Army Corps of Engineers—that the CFBC will benefit north Florida's electricity consumers by reducing the shipping distance (and therefore the cost) for midwestern coal.

Still more questionable logic informs the economic thinking of the canal's dwindling number of supporters. In the original $2.5-million environmental impact study, released in 1977, the Army Corps of Engineers came up with a break-even benefit/cost ratio of 1.00 for the CFBC. (For every dollar spent, a dollar in benefits supposedly would be returned.) This benefit/cost ratio was arrived at by using a discount rate of 2⅞ percent, which was the prevailing rate in 1942 when the canal was authorized. In 1976, the discount rate for new Corps projects was 6⅜ percent, while inflation has pushed today's discount rate up to 7⅞ percent. At rates of 6 to 7 percent, the project would return only 50¢ to 70¢ on the dollar, based on the 1977 report. Because the benefit/cost ratio was marginal at best, the Corps—looking also at possible environmental damage—recommended in 1977 against completing the remaining two thirds of the project. It would cost approximately $500 million to finish the Cross Florida Barge Canal today.

The failure of canal proponents to demonstrate a strong economic justification for the project has led to speculation that there is a "hidden reason" behind the push for the barge canal by Jacksonville financial interests. Specifically, completing the CFBC would make construction of the "missing link" in the Gulf Intracoastal Waterway (GIW) from Carrabelle to Anclote an attractive and logical next step. Completion of this segment would open the shallow Gulf Coast to navigation and open the unpopu-

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The CFBC project and the "missing link" in the Gulf waterway project were evaluated together in Corps studies during the 1960s. At that time, 57 percent of the navigation benefits to be derived from the "missing link" were dependent on completion of the CFBC. A later economic restudy of the waterway from St. Marks to Tampa Bay, done by the Corps in 1973, estimated the benefit/cost ratio to be only .46 to 1. (In the 1973 study, the 1968 discount rate of 3¼ percent was used because that was the legal rate when the GIW was authorized. Had a more realistic rate been used in 1973, the benefit/cost ratio would have been significantly lower than .46 to 1.) Use of outdated discount rates, failure to include environmental costs, exaggeration of expected recreational benefits, and gross understatement of other costs (such as timber loss and waterweed control) are other criticisms that have been aimed at the studies of the CFBC and the Gulf Intracoastal Waterway.

In 1976 the state of Florida requested that the CFBC be deauthorized and that various alternatives for restoring, preserving, or abandoning all or parts of the existing canal should proceed. In 1979 the state legislature —overcoming tough resistance from part of the Duval County (Jacksonville) delegation as well as threats by Rep. Chappell of cutoffs of federal aid—passed a bill dismantling the Florida Canal Authority and transferring its operations to the Florida Department of Natural Resources.

The legislature also laid out a plan for disposing of canal lands and returning tax monies to the six counties involved if and when the project is deauthorized by Congress. The counties originally provided nearly $7 million to the Canal Navigation District to buy rights-of-way. Under the legislature's reimbursement plan, the state would pay back that original amount plus interest—some $30 million now held in escrow. Duval County, for example, would get 73.4 percent of the total, or $22 million. This money could go toward modernizing the port of Jacksonville so that it could be competitive with Miami, Savannah, and Charleston—thus realizing one intention of the canal's backers without inviting environmental and economic disaster.

Deauthorization of the Cross Florida Barge Canal is an attainable goal for 1983. Because the project has only two strong supporters in Congress, it is vulnerable to a concerted effort by other members of Florida's congressional delegation, the governor, the state cabinet, and statewide and national conservation organizations. The deauthorization bill introduced this spring by Sen. Chiles (S. 1131) and Rep. MacKay (H.R. 2695) has a chance to pass both the

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Senate and the House late this year because of this strong joint sponsorship.

Such unnecessary pork-barrel projects as this one are the logical targets of rational spending cuts by Congress. Over the past three years more than $2 billion in federal water projects have been deauthorized; perhaps 1983 will at last see the final deauthorization of the Cross Florida Barge Canal, a project Rep. MacKay has termed "an idea whose time has passed."

Rosemary Carey, a botanical consultant to The Nature Conservancy, is pursuing graduate studies in water-pollution biology at Lehigh University in Bethlehem, Penn.

AFTER THE FLOOD
Grand Canyon 1983

JAMES R. UDALL

THE HEAVY SNOWS AND RAINS of 1982's winter filled the reservoirs on the Colorado River early, presenting a dilemma to the Bureau of Reclamation, which operates the dams on the Colorado. Should the reservoirs be kept full, to maximize power generation? Or should the reservoirs be drawn down, in case further wet weather created a potentially dangerous flood situation? The late-spring snows and rains answered the question: The reservoirs were full to overflowing, and emergency releases of stored water—large ones—were necessary.

The boatmen were the first to know. Strung along 225 miles of the Colorado, they glanced up in surprise as a National Park Service helicopter fluttered around the nearest downstream bend, hovered, and dropped this note:

"Glen Canyon Dam released 60,000 cubic feet per second (cfs) for one hour, 11 a.m., Monday, June 6. Flows will continue over 50,000 cfs through the day. CAMP HIGH. BE CAUTIOUS."

The warning was prudent: This volume of water—unmatched since 1963, and twice the dam's normal maximum release—is sufficient to drown many rafting camps along the Colorado; at some of these a retreat to higher ground is impossible.

For boaters the flood proved to be an inconvenience. But for the canyon's riverine biota it quickly became a scourge.

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Runoff from winter snows and spring rains pours over Crystal Dam as part of the Bureau of Reclamation's "controlled flooding."

In its natural state—before the construction of Glen Canyon Dam—the Colorado flooded each spring. As the snowmelt came down—from the Wind River Range, the Uintas, the Gore—the constricted river rose by 30, 40, 50 feet. For eons these scouring torrents prevented the establishment of a riparian community in the Grand Canyon.

But since Glen Canyon Dam was completed in 1963, uniform flows have nourished an explosive spread of two plants: the native coyote willow and an exotic (some say noxious) immigrant from North Africa, the tamarisk, or salt cedar.

This new habitat was quickly occupied by many different riparian birds, such as the willow flycatcher, the common yellowthroat, and Bell's vireo. Prior to the dam all of these avian colonists had been rare, or nonexistent, in the canyon.

"For these birds," says ornithologist Bryant Brown, "the dam has initiated an incredible natural experiment."

But even prior to this year's flood there was an obvious hitch in the biotic proceedings. The silt-free water released from the dam irreversibly erodes the beaches on which these lifeforms (and an annual 15,000 river runners) depend. Ominously, when the river rises, so does the rate of erosion.

Unfortunately, the June 6 release was just a prelude. Later that month the Colorado crested at 92,000 cfs. (It was ironic that just six months earlier the Bureau of Reclamation had promised it would limit "peaking power" releases to 31,500 cfs until a study to analyze the impact of higher flows could be completed.)

At 92,000 cfs the Colorado was destructive—and dangerous. Within one 24-hour period three 37-foot-long pontoon rafts—which weigh four tons each and are normally regarded as unflippable—capsized at Crystal Rapid. Some passengers were swept eight miles downstream through seven other major rapids before reaching shore. One person drowned; dozens more were hurt. In the aftermath, 140 people were evacuated from the canyon by helicopter.

The newly fledged riparian communities were inundated. Park Service officials were irate. In an interview with the *Los Angeles Times*, Grand Canyon Park Superintendent Richard W. Marks said of the bureau's anticipatory failure to draw down Lake Powell behind Glen Canyon Dam: "I would imagine there would be congressional oversight hearings. I don't know about an investigation, because that sounds like something criminal. But I think you have to look at it."

River Ranger Kim Crumbo was less circumspect. "This is a major screwup. The bureau knew damn well by the first of May they had too much water in Lake Powell. Why did they sit on so much water until it was too late?"

It was a question asked all along the flooding river from Utah to Mexico. After all, 14 major dams "control" the Colorado—a river that carries less water than the Atchafalaya, the Skagit, or the Apalachicola.

Paradoxically, one Reclamation official admitted that the West's dread of drought was a contributing factor. The system's prevailing philosophy, he said, is "keep *your* reservoir full."

More specifically, the Upper Basin states—Utah, New Mexico, Colorado, and Wyoming—like to have Lake Powell full, says hydrologist Ben Harding. "Not because they can do anything with that water once it gets that far downstream, but just to look at. As an item of religion."

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higher reservoir levels you get more power from less water," says boatman Nels Niemi, a Stanford Business School graduate. "Western water is a cash crop. Reclamation tries to wring every last kilowatt-hour out of every last acre-foot. They don't like to leave money on the table."

For his part, Bureau of Reclamation Commissioner Robert Broadbent blames the flooding on a near-record runoff produced by the combination of an unseasonably wet spring and a late-May heatwave. "How would you predict that Salt Lake City was going to have 100-degree temperatures on Memorial Day after a snowstorm the week before? The flow pattern was so unusual that it didn't fit our computer pattern."

But an analysis of the bureau's figures shows that Lake Powell had been positioned to spill some portion of the runoff. On May 1 the lake had room to store 2.2 million acre-feet (maf) when a runoff of 8 maf was predicted. The difference—5.8 maf—is roughly the volume of water involved in the bureau's "controlled flood."

As of this fall, the full extent of the damage couldn't be gauged; the river was still too high. But the first indications weren't encouraging. "In the upper half of the canyon," said Niemi, "there's not a stick of wood or a beach in sight—they're gone." In the lower half of the canyon, though, new beaches have appeared.

"But the bottom line," concludes Ranger Crumbo, "is that since the river is a closed system, there's been a net loss of sand."

Eighty percent of ornithologist Brown's riparian-bird nesting sites were drowned. "I hate to use a word so laden with emotional impact," Brown says, "but in the short term the flood's impacts have been disastrous. In the long run? Who knows? The dam could be—but never has been—managed to preserve the diversity of the river corridor."

Bob Lipmann, of Friends of the River, believes the Grand Canyon's environmental fate is tied to the Bureau of Reclamation's political interests. "The bureau will never pay more than lip service to our ecological concerns," he warns, "until it receives a special legislative instruction to do so . . . something on the order of a National Parks Protection Act."

Bruce Wright, an aide to Rep. Morris Udall (D-Ariz.) and one of a group of congressional staffers who rafted the canyon in August, feels such a legislative remedy is unlikely. "The Grand Canyon is a very small section of a very long river. Unfortunately, I don't think the integrity of the canyon will be a prime consideration in any redrafting of the law of the river. On the other hand, the canyon might yet benefit from everyone's desire to avoid such floods in the future."

In early September, as congressional

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oversight hearings to determine the cause of the flood were scheduled to begin, the Bureau of Reclamation and southwestern water officials convened a preemptive meeting in Phoenix. After Commissioner Broadbent acknowledged both that damage to Bureau of Reclamation dams exceeded $50 million and that the flood "raised serious questions, not only with the general public but within the agency as well," the session turned self-laudatory. Steve Reynolds, New Mexico state water engineer, opined that the bureau's actions "showed masterful manipulation of the unforeseen." (This reference was to the use of three-quarter-inch plywood "splashboards" to restrain a million acre-feet of Lake Powell—a maneuver that one bureau official quipped was "the most cost-effective reclamation project in history.")

Meanwhile, Superintendent Marks had been told by officials in the Department of the Interior (which also has jurisdiction over the Bureau of Reclamation) that no one from Grand Canyon National Park would be permitted to testify at the hearings.

Marks was dismayed. "A river trip down the Colorado is not just the world's finest whitewater experience. It also allows us to experience the story of this earth; to caress rocks that are 2 billion years old. The river is a priceless resource that demands special care."

But Interior's attempt to muzzle Marks and quell the controversy was regrettable on another count. After all, the fragility of the Grand Canyon simply underscores an even larger, potentially more ominous ecological dependence.

Gradually, beginning with the completion of Hoover Dam in 1935, the entire Southwest (including Los Angeles, San Diego and, in the near future, Phoenix, Tucson, and Tijuana) has become to some degree an artificial environment. Fifteen million people are now dependent, like the willow flycatchers in the Grand Canyon, on the Colorado River.

Thus, Broadbent is right—the flood does raise troubling questions about our management of the entire watershed. And it suggests that at some point our efforts to "make the desert bloom" may collapse—not from scarcity of water, but for lack of an even rarer resource: wisdom.

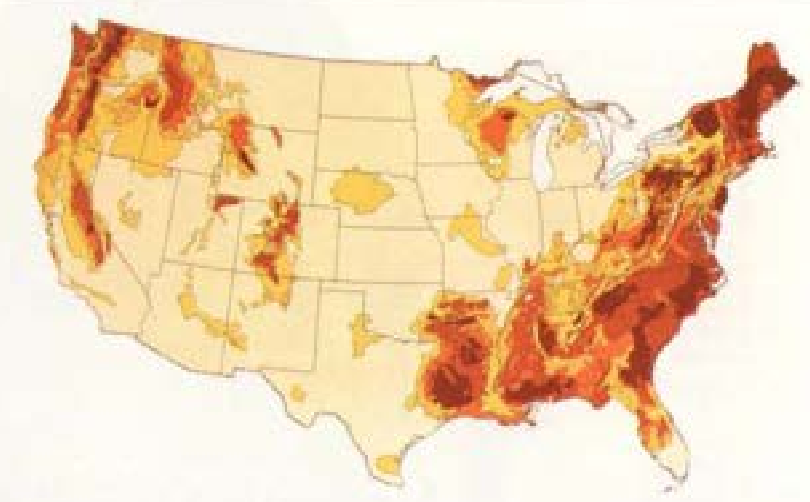
James R. Udall has written on environmental and outdoors topics for numerous publications, including Outside, Powder, High Country News, *and* The Christian Science Monitor.

ACID RAIN CONTROLS Is There a "Sensible" Compromise?

FRANK O'DONNELL

When William D. Ruckelshaus was sworn in as new chief of the Environmental Protection Agency on May 18, President Reagan publicly directed him to make control of acid rain his first priority.

"Many of us, both here and in Canada, are concerned about the harmful effects acid



Acid Rain and Surface Water *The light areas on the map show where surface waters are most alkaline; these regions are most resistant to damage from acid precipitation. The darker the shading, the less alkaline the surface waters. The darkest areas are most sensitive to acidification; the waters and soil in these regions cannot naturally buffer acids deposited by rain or snow.*

rain may be having on lakes and forests," the President said amid the pageantry, telling the man he called "Mr. Clean" to "meet this issue head-on."

Environmentalists viewed the President's statements as a startling turnabout—considering that his administration previously had stridently opposed any attempt to crack down on the sulfur and nitrogen pollutants that cause acid rain, and in fact had lobbied vigorously to loosen existing controls.

Only seven short months before, then-EPA Administrator Anne Gorsuch had assailed proposals pending on Capitol Hill for controlling acid rain as "blind groping in response to political passion." She sniffed at the suggestion that new controls could save even "one fish."

After Gorsuch's speech, however, environmentalists gained new political support in Washington as a result of the 1982 elections. Gorsuch herself (by then using her married name, Anne M. Burford) was forced to resign from office after a series of scandals involving favoritism to industrial polluters.

Administration officials acknowledged that their environmental policies had become a major political liability—one they hoped to neutralize through the appointment of Ruckelshaus. True to his mission, Ruckelshaus quickly let it be known he had set up a new EPA "task force" to generate hundreds of pages of "option papers" on acid rain.

"It's very clear that Reagan has ordered Ruckelshaus to make it look as if we are doing something," said one EPA task-force member who requested anonymity. "What we don't know is whether it's all for show, or whether something substantive will emerge."

Even before the new EPA chief was sworn in, scientific evidence had indicted acid rain as a major environmental problem. A 1982 congressional study warned that 9,000 lakes and 60,000 miles of stream in 34 states might be vulnerable to acid air pollution. A separate study by the Department of Energy cautioned that acid rain could be causing billions of dollars in damage to buildings annually.

More ominous warnings were sounded by the Congressional Office of Technology Assessment, which said sulfur dioxide could cause 51,000 premature deaths each year, and by researchers at several New England colleges, who fear acid rain may bring on Alzheimer's disease—a common and debilitating form of senility—by driving toxic aluminum into drinking-water supplies.

By late 1982 even some industry representatives had begun to concede that acid rain threatens serious damage. Betsy Ancker-Johnson, vice-president of environmental

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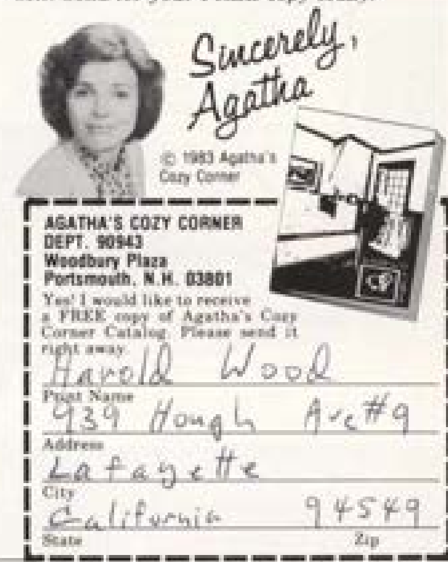

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activities for General Motors, told utility executives in a December 8 speech that they should swallow the "medicine" of new controls. Ancker-Johnson said GM's own research showed that the belching smokestacks of the Midwest were responsible not only for acid fallout, but for the blanket of haze that covers the eastern United States during the summer months.

Despite these warnings, however, the coal and electric-power industries continued to insist that too little was known about acid rain to warrant new pollution controls. As Joseph Mullan, a key lobbyist for the National Coal Association, confided to one reporter: "Sulfur dioxide has put my kids through college."

Soon after Ruckelshaus took office, however, a series of new studies appeared to limit his policy options—and to increase the likelihood that Congress eventually would enact new cleanup requirements. On June 8, the Reagan administration conceded for the first time that man-made pollutants cause acid rain. In a 55-page report, part of a 10-year interagency study of the issue, administration scientists concluded that acid rain threatens not only the Northeast and upper Midwest, but large portions of the South and West as well.

Only 19 days later, a White House science panel said "meaningful reductions" in sulfur pollution were required immediately to avoid irreversible damage to lakes and streams in eastern North America. The panel, chosen by the White House Office of Science and Technology Policy (OSTP), reported "extensive evidence" that acid rain is damaging forests in the Northeast. It also warned of the "grave" potential for damage to the food chain through increased soil acidity.

The OSTP panel was created in 1982 to critique U.S. and Canadian studies of acid rain after the administration refused to fund a similar review by the National Academy of Sciences. James McAvoy, now deputy director of the Bureau of Mines and then the chief White House spokesman on acid rain, explained that the administration didn't believe the academy was "objective"—because it had issued a report in 1981 calling for a 50-percent reduction in acidity to prevent further destruction of sensitive northeastern lakes and streams. Yet that academy report failed to address one critical question: Would a cutback in sulfur pollution actually produce a corresponding reduction in acid rain?

The academy answered that question June 29 when it concluded (in a report not funded by the administration) that a significant cutback in sulfur pollution would indeed largely eliminate the acid-rain prob-

SIGHTINGS

Bob Howard, the newest member of the Sierra Club's Board of Directors, was appointed by President Denny Shaffer in September to fill the vacancy created by Nicholas Robinson's resignation. Howard is a physician and a management and computer consultant in Albuquerque, N.M. A longtime Club leader, he is currently the Club's vice-president for planning.

lem. Rejecting arguments long advanced by the electric-power and coal industries, the academy said a "linear" relationship exists between sulfur emissions and acid fallout—in other words, a 50-percent cutback in smokestack pollution would produce a 50-percent reduction in rainfall acidity.

These new studies "effectively close the scientific debate," notes David Gardiner, a representative in the Sierra Club's Washington, D.C., office. "The question now is not whether controls are needed, but what sort of control program should be enacted." Gardiner adds, however, that the political battle is far from over. Although the 1982 elections and last spring's EPA scandals "put the nail in the coffin of Reagan administration attempts to gut the Clean Air Act," he observes, "environmental groups now have a much tougher task—persuading Congress to adopt new controls."

Last year the Senate Environment and Public Works Committee, chaired by Vermont Republican Robert Stafford, approved a bill that would reduce sulfur pollution in 31 eastern states by 8 million tons per year—about a 35-percent cutback. The bill would permit states to curb sulfur pollution in the cheapest way possible, and most analysts predicted it would induce midwestern power companies to stop using dirty local coal and instead buy cleaner coal from the West or from southern Appalachia.

Though the Senate bill was a compromise, it was ferociously opposed by some senators, who contended it could trigger mineworker layoffs in such states as Ohio, Illinois, and parts of Kentucky and West Virginia. Lobbying by the coal and power industries became so intense that Stafford never brought his panel's bill before the full Senate, for fear he couldn't command a majority. Similar acid-rain legislation failed last year to make it through the House, where midwestern representatives have relatively more power than do their Senate counterparts.

In an attempt to defuse midwestern opposition and break the apparent logjam, on June 23 several House members proposed a new strategy for acid-rain control, designed to protect mineworkers' jobs by forcing the nation's 50 dirtiest power plants to install sulfur-removing scrubbers. The legislation, introduced by Reps. Gerry Sikorski (D-Minn.), Henry Waxman (D-Calif.), and Judd Gregg (R-N.H.), also would require additional cutbacks on sulfur- and nitrogen-pollution levels nationwide, and would spread out the control costs through a small tax—amounting to about 50¢ to $1 per month per residential customer—on electricity produced by nonnuclear power plants throughout the lower 48 states.

Sen. Stafford called the Sikorski-Wax-

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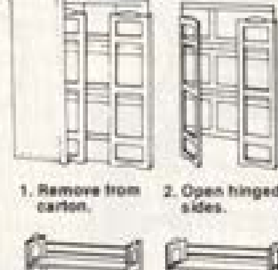

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man-Gregg proposal "a step toward answering some complaints about legislation from miners and midwestern representatives," and environmentalists also called it a positive development in the congressional debate. To date, however, the Sierra Club and other environmental groups have declined to endorse the bill, on the grounds that it doesn't go far enough to solve the acid-rain problem.

By early August the House bill had attracted 80 cosponsors, and it appeared to have enough support to clear its first major hurdle—the 19-member Subcommittee on Health & the Environment, chaired by Rep. Waxman.

But the fate of this and other acid-rain proposals throughout the congressional battle—which almost certainly will continue into 1984—could hinge on the attitude and tactics of EPA Administrator Ruckelshaus.

Ruckelshaus said in a July interview that he believes his mission entails stopping Congress from enacting an acid-rain program that "could create a great deal of social disruption." The EPA chief explained: "It's a question of whether the Congress is capable of resisting public pressure to do something about these problems. That pressure tends to be cyclical, and in times of high emotion it moves toward 'Let's clean up now and worry about the costs later or worry about the balances later.'" Ruckelshaus, who said the EPA scandals were "overblown" by the media, added that he strongly favors a "sensible" acid-rain program that would balance environmental benefits against "other societal goals."

He appeared to put this balancing philosophy into effect in early July when forced by a federal court to decide appropriate levels of pollution control for a Tacoma, Wash., copper smelter that emits cancer-causing arsenic. Ruckelshaus declared that the citizens of Tacoma should decide between two alternatives—accepting a high risk of cancer, or shutting down the smelter.

Ruth Weiner, chair of the Sierra Club's Cascade Chapter and professor of environmental studies at Western Washington University, called this proposal "job blackmail," and said Ruckelshaus hadn't explored other possibilities that could reduce pollution further without endangering jobs. The Sierra Club's Gardiner predicted Ruckelshaus would use the same approach to the acid-rain debate: "His view is, 'We've got to decide which areas to protect, because we can't protect everybody.'"

The new EPA chief has a particular debt to pay on the acid-rain issue. During his first tour of duty at the EPA—during the Nixon administration—Ruckelshaus disregarded environmentalists' warnings and encouraged midwestern and southern power companies to build skyscraper-high smokestacks to disperse pollution, rather than requiring them to clean it up. Later studies confirmed that tall stacks play at least a contributing role in the acid-rain problem. In some Washington circles, Ruckelshaus isn't known as "Mr. Clean," but as "the Godfather of acid rain." □

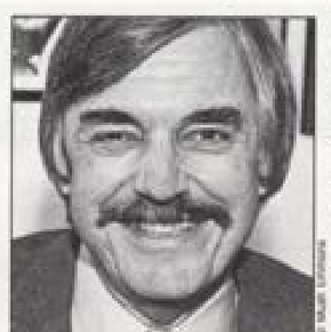
Frank O'Donnell has covered environmental issues from Washington, D.C., for eight years. His work has appeared in The Progressive, The New Republic, *and* Washington Monthly.

ELECTION '84
It's time to get started!

DENNY SHAFFER

THE 1984 PRESIDENTIAL ELECTION is still a year away, but the campaign is well under way. Democratic hopefuls have crisscrossed the nation raising environmental issues—acid rain in New Hampshire, wilderness in Colorado, the nuclear freeze in Iowa, James Watt in New Mexico. No Republican has emerged to challenge President Reagan, who as yet has not announced his intentions.

When the Sierra Club delivered 1 million "Dump Watt" petitions to Congress in October 1981, it pledged to continue the battle until both Watt and the Reagan/Watt environmental policies were gone. Although Watt has resigned, the 1984 election will still be one of the most critical challenges the Club has ever faced.



The first step in redeeming this pledge was taken by the Club's Board of Directors, which authorized Club staff and volunteers to cooperate with the campaigns of the six then-announced Democrat challengers to President Reagan, all of whom have demonstrated a substantial commitment to environmental protection.

The second step is for Sierra Club leaders and members to become participants in the delegate-selection and convention processes of both major parties, to guarantee the strongest possible challenge to Ronald Reagan's environmental policies.

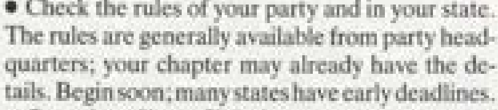
There need to be environmental—and Sierra Club—delegates at both national conventions next summer. To assist Club volunteers, and to build on the electoral experience and skills obtained in 1982 election work, the Sierra Club has launched a program to train environmentalists in how to participate in the delegate-selection process. Club chapters in 22 states requested such training; the Club has selected seven states for nationally supported training. (Resources are, unfortunately, limited.) I hope that members in other states will also become involved, using local training resources.

The delegate-selection stage of the presidential election is critical to our hope that the Sierra Club will develop as a major electoral force. Here the Sierra Club can learn the rules and skills of presidential-election politics. By becoming involved in the intensely local, volunteer-oriented county and precinct caucuses, the Club can also demonstrate the tremendous commitment and skills environmentalists can bring to the political process.

Environmental delegates to the national conventions will be working side-by-side with elected officials and political leaders, building lobbying relationships vital to our future efforts. Our involvement in the early stages guarantees that presidential candidates will continue to address the need for positive environmental policies. Our delegates to both conventions can fight for our principles in drafting the party platforms. And the next president will view environmentalists as insiders whose interests and views must be taken into account.

Only involvement in the nomination process will give us an active role in selecting the next President of the United States. The first steps are easy. Methods used to select delegates vary from state to state, but I'd like to suggest a few ways each interested Club member can get started:

- Check to be sure you are registered in a political party. The delegate-selection process is generally open only to registered party members.



- Check the rules of your party and in your state. The rules are generally available from party headquarters; your chapter may already have the details. Begin soon; many states have early deadlines.
- Organize a Sierra Club chapter or group meeting for other interested members. You might invite local party officials to explain the process and how it works in your state.
- Develop a strategy. Getting Sierra Club members elected as delegates will take time and effort, but above all it will take planning. Find the best possible candidates for delegates. Concentrate on just a few. Form coalitions with other groups active in the party process in your area. Getting a delegate elected requires a mini-campaign just like any other election.
- Volunteer for a presidential candidate. Let your candidate know you want Sierra Club members in his delegation from your state. Help him recruit other Sierra Club members to support his campaign and to help you elect Sierra Club delegates.
- Get involved in the regional platform hearings that both parties will be holding around the country.

Finally, would you drop me a personal note? Let me know if you are interested in being a delegate, or if you have ever been to a convention as a delegate. Let me know, too, if you would like to work in the delegate-selection process in your state. We'll get back in touch with you. Together we can ensure we will not face another four years of violently antienvironmental administrative policies.

The 1984 election can help the Sierra Club build its political strength, as well as develop its political skills. Having the environmental movement represented for the first time in its history by a bloc of delegates at each of the national conventions is a goal worth striving for in 1984. And now is the time to get started. □

SOIL CONSERVATION

Only long-term economic policies can halt the erosion of one of our nation's most precious resources

R. NEIL SAMPSON

OBSERVERS OF THE soil-erosion scene are fond of asking why, when this nation has spent so many billions of dollars over the past 50 years on soil-conservation programs, the problem still persists. The answer is simple: The nature of the problem has changed fairly recently in dramatic ways.

Soil erosion is a natural part of the environment. It has been occurring since the first wind or water struck the surface of dry earth, and it will continue as long as that process continues. Soil loss may be caused solely by the force of gravity acting on steep slopes, and there is some soil movement from the effects of agricultural tillage; but wind and water are the dominant causes.

Erosion from moving water is called sheet, rill, gully, or streambank erosion according to the type of soil movement that occurs. Both sheet and rill erosion are caused by water moving across the surface of the land. Sheet erosion removes soil fairly uniformly in a thin layer, or sheet, while rills are small channels formed as running water concentrates and flows in small rivulets down a slope. Gully erosion, in contrast, involves the formation or enlargement of small- to medium-sized ravines or channels that are too large to be obliterated by normal tillage operations. Streambank erosion refers to the soil moved from the banks of established streams, creeks, or rivers.

Most of the soil erosion on agricultural land—particularly cropland—is sheet and rill erosion. Tremendous amounts of soil are transported in this manner. As much as 10 to 20 tons per acre can be lost from farm fields during winter and spring runoff in rills so small that they are obliterated by the first spring cultivation. Thus, major topsoil losses on cropland may go largely unnoticed, even by the farmer.

To make such figures more meaningful, a ton of soil is roughly equivalent to a cubic yard. An inch of topsoil covering an acre weighs in the neighborhood of 165 tons. Six inches of topsoil, the depth normally cultivated in modern agriculture, weigh about 1,000 tons per acre. Thus, if a given field is losing 10 tons per acre per year, it will lose an inch of topsoil every 15 to 20 years, and the whole "plow layer" in roughly 100 years. Topsoil replacement occurs, most scientists feel, somewhere in the range of one to one-and-a-half tons per acre per year, depending on climate, soil factors, and agricultural management. At this rate, one inch of topsoil is replaced every 100 to 200 years.

According to recent estimates, 25 percent of the sheet and rill erosion on cropland occurs on only 15 percent of the land: the land that is marginal or unsuited for cropland. Continuing to use these lands for growing crops is certain to continue high soil-erosion rates. Farmers face the choice of converting these lands to grass or trees now, while some topsoil is left, or taking off a few more crops and then abandoning the land.

Wind can equal or exceed water in its destructive force on the land, particularly on soils that are devoid of plant cover, have a fairly smooth surface, and are composed of loose soil particles that can be lifted and carried by the wind. The winds blowing over the Mississippi River basin, for instance, are estimated to have 1,000 times the soil-carrying capacity of the river itself.

Although dust clouds often rise thousands of feet in the air, most soil movement takes place within a few inches or feet of the ground. Soil particles are "bounced" along by the wind when they are too large to be carried aloft, and by striking and dislodging other particles at the soil's surface, they add to the wind's effectiveness as a soil-mover.

Representing mountains of lost soil, the peaks on the map show where sheet and rill erosion are worst in the United States. In 1977 these forms of erosion cost U.S. farmers more than 2 billion tons of soil, far more than nature can replace in a year.

Wind erosion degrades soil in much the same way that a fanning mill separates wheat from chaff. Organic matter, clay, and fine silt are removed first and carried farthest away, often being transported for hundreds or even thousands of miles, or into rivers and lakes. The coarser, less fertile sand and coarse silt particles often are not moved far. These tend to pile up in drifts or mudbars wherever some change in topography or surface features causes the water or wind to slacken and lose its carrying energy.

Each time some soil is shifted by wind or water, the soil that remains loses more plant nutrients and becomes coarser-textured. After this happens several times, the remainder will be largely sand, regardless of its original texture. A study in Oklahoma in the 1930s showed that, due to cropping and wind erosion, the organic matter in the cultivated soils dropped by 18 percent, and the nitrogen decreased by 15 percent.

Newly formed rills on a Washington hillside seem minor, but this type of erosion accounts for most soil loss on croplands. Inset: Sloping grass banks of these contoured terraces in southeastern Iowa's corn belt prevent water-caused soil erosion.

In the past, many adverse effects of soil erosion on the productivity of land have been masked by other factors. New and more productive crop varieties—combined with the heavy use of fertilizers, better control of pests and crop diseases, and improved tillage and planting methods—have resulted in increased yield despite topsoil loss. While these technological improvements have hidden the permanent effects of soil erosion, they have not eliminated them. We are now dependent on such technology (much of which is growing more expensive as petroleum prices rise), and must, it appears, continue to have similar technological breakthroughs in the coming years to maintain or improve crop yields. How seriously this affects our future ability to produce will depend on our success in controlling soil erosion. If we continue to let topsoil slip away at today's rates, we are doomed to a future of spending more and more trying to coax less and less from a dying land.

Preventing soil erosion is largely a matter of devising a farming system that lets the land protect itself, as would occur naturally. Achieving this type of harmony with the land is not an impossible task, but it is very complex.

Vegetation is the key to soil-conservation management. Under natural conditions, year-round plant cover protects the soil as part of the total soil/water/plant ecosystem. Under crop management, however, soils often must be left bare for portions of the year that may coincide with periods of rainfall or snow melt. Consequently, some other form of protective soil covering must be provided.

The first step in designing a conservation system for the land is to pick a cropping system that is within the soil's capability. Once that is done, there is usually a wide variety of soil-conserving and soil-building techniques that will round out the system.

Often, the easiest method of providing protective cover is to leave the plant residues remaining on the surface of the soil after harvest. This can provide much if not all of the cover needed during the winter and early-spring seasons. The value of these residues for soil conservation explains much of the nervousness soil conservationists exhibit when someone suggests that these materials are "wastes" that can be readily diverted to uses such as energy production.

Where crop residues are not adequate for soil protection, a "cover crop" such as rye

Strip planting techniques—such as the alternating bands of corn and hay above—combat wind erosion by ensuring that entire fields are not bare. Inset: Windblown soil in Minnesota has lost much of its nutrient value and has turned into sand.

Sheet erosion, shown below in Washington's wheat country, affects marginal or poor croplands the most. Inset: Growing soybeans in grain stubble conserves soil moisture; crop residues also protect bare soil from erosion while a new crop is taking root.

may be planted immediately after harvest, allowed to grow until the following spring, then plowed down to add organic matter to the soil. New technologies such as no-till planting allow this technique to be employed with a great deal more ease, since planting right behind the harvester often utilizes soil moisture that would be lost in any cultivating operation.

In spite of soil-building efforts and soil protection, however, it often happens that the amount of falling moisture cannot be absorbed by the soil; some runoff is then inevitable. This leads to the second phase of a soil-conservation system—water management to carry excess water safely off the land.

Terraces have been used for centuries to allow cultivation on steep slopes, and have been a main feature of the soil-conservation technology that has emerged in the U.S. during the past 50 years. Terraces are banks built across the slope of the land to intercept surface water and carry it slowly and safely to the edge of the field. Here the water can be released into a grassed waterway or a pipe outlet, where it can run down the slope without causing soil damage

Where slopes are too steep, or water volumes too large for grassed waterways to function properly, a mechanical "drop structure" can be built in the stream. This involves building an artificial waterfall where the water can drop from one to several feet within an erosion-resistant structure made of concrete, rocks, logs, or other materials. Once the energy of the falling water has been absorbed by the structure, the water flows safely back into the grassed waterway.

Costs for soil and water conservation seldom return an offsetting profit in the first year—and may not return one in five years, or ten. When interest rates bounce around between 12 and 20 percent, farmers are forced to limit investments to those that will have relatively short-term paybacks. They must avoid long-term investments with high initial costs and slow paybacks, such as those associated with soil conservation or resource development.

Farmers thus must be very cautious about the costs they incur and the investments they make. Too often, unfortunately, the kinds of costs that can be avoided are those of applying soil- and water-conservation practices; the "optional" investments are those needed to build the soil's strength. In other words, farmers may know how to conserve soil, recognize that they should, and yet may still not do it because of overriding financial pressures.

What is worse, fewer farmers now plan for a farming future, and people who feel there is little future on the land for them or their families become speculators, not stewards, and make management and investment decisions based on a phase-out plan. This attitude may be the single most difficult social factor confronting the soil conservationist.

The problem is clearly revealed in a Nebraska study showing that many farmers simply do not think soil erosion is serious enough to worry about. The Nebraska farmers, presented with a set of situations where soil losses in the range of 10 to 15 tons per acre per year were occurring, were simply not alarmed. Such losses had not caused declining yields in the past, they noted, and would not interfere with normal field work or farming operations. No cost/no problem, was their view.

Soil conservationists, shown the same examples, reacted differently. Soil losses exceeding the rate of topsoil formation by that degree meant a steady loss of productivity that would drive future costs higher, future production down, and eventually make crop production on the land uneconomical if not impossible. For these reasons, the soil conservationist would be inclined to identify needs that the farmers could not and would not see, and then propose solutions whose costs the farmers would think both unnecessary and impractical. Since it is farmers, not conservationists, who must actually treat the land, this poses a serious dilemma.

Past farm policies that have pushed farmers to plow "fence row to fence row" have also added to social and economic pressures that work against soil conservation. The government provides significant financial support for added production through loans, price supports, or crop-insurance programs, but these are not in any way related to the use of the land. The farmer who misuses marginal land can qualify for government assistance as readily as the one who does not.

The prerequisite for any future farm policy is that somehow, through a combination of market and public-policy forces, farmers will be assured more stability in their lifestyle and economic future. If that is not done, the growing sense of insecurity and impermanence on the farm will destroy any chance for development of a new land ethic that results in better care and stewardship of the land.

To farmers, security is most deeply involved with the land. Many things can go wrong, but if the land is safe and the farmer has control over it, he will feel secure. When offered an economic bonus for practicing soil conservation, however, farmers will weigh the benefits and costs; and to get the bonus they will sign a contract that limits what they can do with the land, as they have gladly done in programs like the Great Plains Conservation Program. In that program, farmers enter contracts of 3 to 10 years' duration, whereby they agree to install a complete conservation system on their land. Some 5,000 farmers now await the opportunity to sign such a contract in the 10 Great Plains states.

The key to such programs is that they are voluntary—the farmer is not forced to enter the program unless he wants to do so. Once he enters, following the rules is not a problem. The number of defaulted contracts under the Great Plains program, for instance, has been very small. Therefore, any future government soil-conservation cost-sharing payments should be tied to a long-term contract that assures the installation and maintainance of a total conservation system.

But the difficulty of convincing landowners who farm eroding soils to change their ways and turn to conservation management must not be minimized. In such areas, a more significant set of economic incentives—probably tied to market prices rather than public cost-sharing, and backed by erosion-prevention standards of some type—will be required.

From 1935 to 1946, a federal Land Utilization Program bought up more than 11 million acres of worn-out cropland, rehabilitated the land with grass, trees, and other conservation treatment, and converted it into recreation areas, parks, forests, and grazing lands. The program was carried out by five federal agencies, with the Soil Conservation Service responsible for some 7 million acres. Those lands, in a 1953 reorganization, were turned over to the Forest Service for continued management. Today most of them are managed by the Forest Service as national grasslands.

Our government is rushing to the rescue.

It is doubtful that such a program is possible today. People no longer support major transfers of private land into public ownership. With local government so dependent on property-tax revenues, there is little support for removing more land from the local

tax rolls. In addition, support for resettlement at public expense of families farming marginal lands would not be easy to obtain.

There may still be some potential, however, for using government as an *intermediate* landholder to rehabilitate eroded and wasted soils. Perhaps the federal government could fund state and local programs that would purchase and assemble large tracts of land that is marginal or unsuited for cropland by virtue of soil conditions. The land would be seeded to grass or trees, held until the vegetation is established, then resold at auction to private owners. At the time of its resale, the state or local government would restrict the deed to the property so that the buyer would not have the right to use the land to cultivate crops, develop it for urban use, or convert it from range or forest use. The purchaser, fully aware that he was buying property with a restricted deed, would bid his price accordingly and establish his expectations for the land on the basis of what was allowable.

A closely related reform—one that would no doubt be controversial—would be for the USDA not to recognize as cropland *any* new lands that do not meet the criteria for Capability Classes I through IV. [*Editor's note:* The USDA's Soil Conservation Service rates soil types on factors that include soil characteristics, the slope, drainage, and erodibility of farmlands, and climatic conditions. Capability Classes I through IV are those soil types considered most suitable for crop production.] Programs such as crop insurance and disaster relief should not be available for lands that do not qualify as Class IV or better, unless the farmer can demonstrate that he has applied an effective conservation system on the land.

National policy leaders must develop a method of addressing all these issues at once, and devise a totally new farm-policy framework that not only considers the economic plight of the farmer, but also extracts a degree of responsible land stewardship in return for economic stability. Given the current set of economic and political pressures facing America, the chances of such an approach seem limited. Yet the outcomes facing us are far too risky for a do-nothing strategy.

We are losing farmland productivity at startling rates—rates that will bring us to the limit of our supply of good land sometime before 2000. At the same time, farm debt loads are soaring, bankruptcies are on the rise, and the spectre of a complete economic collapse in the farm sector is being raised in many quarters. If rising energy costs and high interest rates continue, if research fails to find a miraculous genetic breakthrough that causes a quantum leap in yields, or if farmland is needed to produce energy as well as food crops, this nation faces a historic reversal in its agricultural situation.

The answer to this dilemma lies, in large part, in developing a coordinated market-conservation system that allows price levels adequate not only to repay the costs of production but also to make the reinvestments necessary to keep the land in continued productivity. The only level of government that can accomplish this is the federal government.

This does not mean that states have no responsibility. In fact, they must be the second half of a combined program effort. Farmers who profit from federal price-support efforts should not do so at the expense of the land. Therefore, every farmer benefiting from federal programs should comply with state and local standards for appropriate land use and soil conservation. In this way, profit can be tied to responsibility.

Can this be done? Technically, yes. Several states, most notably Iowa and Illinois, have such programs in place today. Politically, however, there is no sign that the support exists for a national policy tying markets to conservation. Americans have not been treated to the kinds of shortages in the food stores that they saw in the gas lines of the early 1970s. Until that object lesson is driven home, the support of soil conservation will remain largely rhetoric. But the day when food becomes a crucial issue may be sooner than many policymakers would like to contemplate.

That day will come when either a national or worldwide climate swing results in two or three years of below-par crops; or it may come as the result of economic recession or depression. If the supply of megadollars needed to buy today's pesticides and fertilizers were reduced sharply, we could be one crop away from disaster. That kind of economic shock would force us to turn back to the *inherent* productivity of the land—unmodified by modern technology fixes—to produce the new wealth to bail us out of debt. But we would find it far less capable of doing so than ever before. Each year we permit excessive soil damage to continue worsens our plight.

If we wish a different future, one with a sustainable agriculture, we are challenged to do many things and do them soon. Besides the kind of government programs and policy reforms described above, business and industry must be willing to forego the quick profits of wasteful farming methods and to design products that will earn the steady, long-term profits needed by a permanent society. Individuals must do their part as well—whether as farmers, consumers, or policy advocates—to ensure that appropriate goals for a sustainable agriculture are quickly set and vigorously pursued.

Clearly, for all Americans, the emerging crisis of wasted farmland calls for new directions. Will we continue as we are currently heading, or will we begin to define and practice a new land ethic that produces a sustainable American agriculture? Deciding which way to go is up to us, and it is time to choose. □

Before-and-after aerial photographs contrast changing farming practices on the same sections of land in LaCrosse County, Wis. Rectangular fields laced with gullies characterize the 1934 photo (above), whereas contoured and strip-cropped fields mark the 1967 aerial. Note the absence of gullies in the later photo.

Stanley W. Trimble

R. Neil Sampson is executive vice-president of the National Association of Conservation Districts, and the author of Farmland or Wasteland *(Rodale Press). This article originally appeared in the Spring 1982 issue of* American Land Forum.

THE NEW ALCHEMY OF PHOTOVOLTAICS

It converts the sun's energy directly into electricity with no moving parts, no waste products, and no pollution. For environmentalists, it may well be the most attractive form of renewable energy. Here's an overview of the progress made so far in adapting this technology to everyday use.

JOHN PATRICK JEFFRIES

THE CB RADIO in Al Simpler's country cabin runs on batteries. So do the refrigerator, the lights, and the microwave oven. Not the ordinary "D" cells used in flashlights and children's toys, of course; even cases of those wouldn't power a refrigerator for long. Instead, the appliances draw their current from four deep-cycle, heavy-duty 12-volt batteries—the type generally used in golf carts. The batteries get their electrical charge directly from the sun.

Simpler's cabin nestles on an island in Lake Iomonia near Tallahassee, Fla., miles from the nearest road or powerline. Four panels of photovoltaic cells mounted on the roof are its sole source of electricity. Except for a propane cook stove (its 20-pound tank must be periodically refilled), the cabin is energy self-sufficient.

The photovoltaic panels, called an array in the industry's argot, are able to produce 100 peak watts of electricity—much less, say, than what is needed to power the microwave, which draws 700 watts. (Abbreviated kWp, this capacity is usually measured under full sunshine with insolation of 1,000 watts per square meter and an ambient outdoor temperature of 25 degrees Celsius.) But since the panels continue to charge the storage batteries throughout the week, Simpler is able to use the cabin on weekends without running out of power. Even when storm clouds obscure the sun, the fully charged batteries can power the house for nearly five days.

Of course, an eye must be kept on how much electricity is being used—a task made easier by continuous-readout volt and amp meters that monitor the amount of electricity being generated and used, plus the amount in storage. To Simpler, this chore is far from onerous: "As with any energy-efficient design, the system won't be effective if you don't work with it. Turning off unnecessary circuits and watching the meters are important tasks, but they are also good habits no matter where you live."

Simpler's cabin isn't the only house plugged into the sun instead of a utility. This past summer, Solar Design Associates of Lincoln, Mass., built a 2,600-square-foot house in the Hudson River valley of New York that generates 4,500 peak watts (4.5 kilowatts) of electricity from a 500-square-foot array of photovoltaic panels. Excess electricity is stored in a bank of 140 batteries. "It may seem odd to have a basement full of batteries, but we should have up to five days' storage capacity," says Steven Strong, president of Solar Designs.

Monitoring meters and recording devices will track just how well the superinsulated house, which includes passive and active solar space- and water-heating systems, performs through changing weather. A microprocessor control panel acts as the energy-management brain. It can determine power needs and switch loads on and off automatically to control how the house functions.

Like the country cabin, the Hudson River house is completely off the utility grid; it too depends on batteries to supply power at night, on cloudy days when sunlight is poor, or during repairs to the system. To date, the batteries have done the job, but the house contains a propane-fired generator for auxiliary power as an insurance measure.

Most of the photovoltaic systems currently in use rely on public utilities for backup power. The Carlisle House, Strong's first solar home to incorporate photovoltaics, was designed to rely completely on solar energy. Yet without on-site storage, Strong could not cut the umbilical cord to the power company. The panels cannot produce enough electricity to run the house in winter, and they generate no electricity at night.

Named for a nearby Massachusetts town, the Carlisle House has numerous passive solar features—south-facing windows, heat-storage systems, and extra insulation. Its crowning glory, however, is a 1,059-square-foot array of panels capable of generating 7.3 kilowatts of electricity under peak conditions. The panels produce more than enough current to power several small and large appliances at once. (Originally part of a federally funded project, the Carlisle House is now home to private owners.)

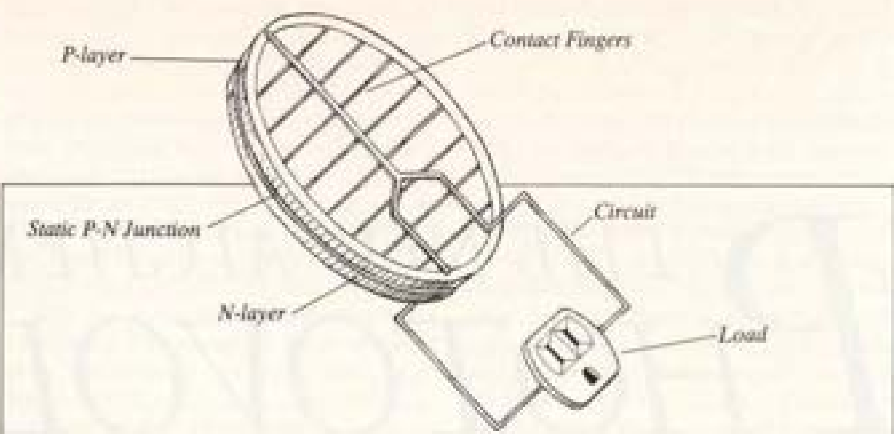
Because of the high cost of photovoltaic

panels, many of the full-size photovoltaic-equipped homes around the country have been funded as research projects by utilities, large corporations, or government agencies. One such home is Future I, a four-bedroom, two-story test house sponsored by Georgia Power Company. Its array of PV panels yields 4.1 kilowatts of electricity under peak conditions. Georgia Power's reasons for building Future I are simple enough: Because the Public Utilities Regulatory Policies Act of 1978 (PURPA) requires utilities to accept and pay for electricity from other producers, such as PV-equipped homes, tests will reveal how much electricity the house produces, and thus how much the utility will have to buy back at different times during the day.

The buy-back provisions of PURPA are critical to the cost-effectiveness of photovoltaic houses that do not have storage capability. In fact, they enable such houses to be virtually self-sufficient on an annual basis. In winter, when storm clouds often obscure the sun, the houses depend heavily on local utilities for power; in summer they produce a large surplus of electricity that, in effect, wipes out their winter bills.

The results of test houses such as Future I and the Carlisle House encouraged Solar Design Alternatives (along with Rational Alternatives, a Santa Fe-based solar builder and developer) to test the commercial market for a photovoltaic house. With the blessings of mortgage lenders, insurance underwriters, building officials, and the local utility—potentially major stumbling blocks for unconventional forms of housing—they built a pueblo-style passive-solar home in Eldorado, a solar-home development east of Santa Fe. The 2,400-square-foot single-story home has three bedrooms, two baths, a library, an open-plan living and dining area, a kitchen, utility and storage space, plus a two-car garage. In short, a fairly typical contemporary home, except for its energy-saving features: a solar sunspace, south-facing windows, earth-bermed north side, heat-storing adobe and masonry walls and tile floors, a solar hot-water heater, and a solar-heated hot tub.

Similar homes in the development, which rely on a combination of direct solar gain, wood-burning stoves, and electric resistance heaters to stay comfortable during Santa Fe's cold winters, average a mere $23 in heating bills for the entire year. Adding a 312-square-foot array of photovoltaic panels to the home was expected to produce more



How Photovoltaic Cells Work

THE PHENOMENON we call sunlight is truly a complex form of energy. When it falls on a green plant leaf, it triggers a chemical reaction called photosynthesis and enables the plant to manufacture food. Bathing the human body, it helps produce vitamin D and a little-understood hormone called melatonin, which among other properties seems to drive away melancholy. And when sunlight strikes a semiconductor such as silicon, some of its energy is absorbed within the silicon's atomic structure, creating an electrical charge.

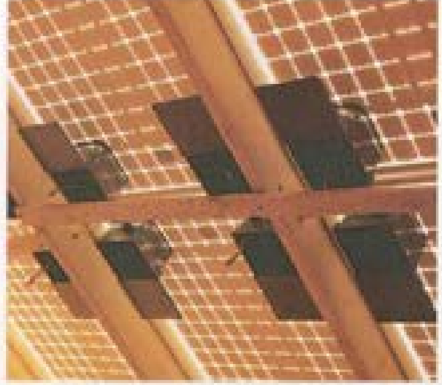
Photovoltaic cells convert that electrical charge into electricity by creating a circuit through which it can flow. Each cell comprises two wafer-thin layers of specially treated silicon. One, called the N-layer, accumulates an excess number of electrons when exposed to sunlight, while the other, the P-layer, needs electrons to complete its atomic makeup. A thin band of static electricity, called the P-N junction, keeps the electrical charge from jumping from layer to layer; instead, the charge flows through wires attached to both layers, creating electrical current.

To make panels, cells are affixed to clear glass, ⅛" or 3/16" thick. The glass panels are then sealed with a protective film and framed with extruded aluminum. For years, panels could be made only by hand; but automation is slowly being introduced, reducing costs and increasing supply.

Approximately 10 to 12 percent of the sunlight that strikes a photovoltaic cell at noon on a mild, sunny day is converted into electricity. (Efficiency falls as the sun travels across the sky and as temperatures rise.) Unlike utilities, photovoltaic cells deliver direct current, which must be converted to alternating current by a device called an inverter before it can power household apliances. The beauty of photovoltaic systems is that they can work in any climate, so long as the sun is shining.

The photovoltaic panels atop Future I make up only part of the home's energy system. Heavy insulation, south-facing double-glazed windows, black-painted heat-storage rods and Trombe wall, insulating earth berms, and retractable shutters reduce the amount of energy needed to keep the house comfortable year-round.

Two views of the photovoltaic panels on a house near Carlisle, Mass., show how they can replace traditional roofing materials. The panels produce electricity and keep the elements at bay.



M.I.T. Lincoln Laboratories

than 6,500 kWh annually—enough, the developers say, to make the house energy-independent on an annual basis. The house was completed in mid-February 1982. Asking price: $190,000. It sold the first day.

BRINGING COSTS DOWN TO EARTH

The first large-scale use of photovoltaics occurred with the Vanguard I space satellite in March 1958, only four years after Bell Laboratories developed the technique. Vanguard's system powered the satellite's radio transmitter, and increasingly sophisticated systems have continued to generate power for satellites, lunar probes, and shuttle flights in the nation's space program.

As might be expected, the price of photovoltaic power also started way out in space. The system used by Vanguard I cost about $600 for each watt of capacity delivered under peak conditions. Unfortunately, as the technology came down to earth, its price stayed sky-high. A decade ago, power from the first earthbound systems cost about $100 a watt. Today the average price is just under $10, with $7 to $15 the general range. For the consumer, this means that a 500-square-foot array of panels, which can produce approximately 4 kilowatts under peak conditions, can cost upward of $40,000. Adding a utility-interactive inverter, needed to link the system to the power grid, costs about $3,000 more.

Currently, this high initial cost is a major drawback, even though photovoltaic systems operate relatively cost-free once in place. (They work strictly on energy from the sun, they require minimal maintenance, and they seldom break down.) Still, consumers cannot expect the systems to pay for themselves as quickly, say, as insulation or a solar hot-water heater would. While the houses mentioned in this article are said to be energy self-sufficient, they are not designed to produce large surpluses of electricity at year's end. All their owners can

Future I (below) was built by Georgia Power Co. in Atlanta to test the feasibility of photovoltaics. Energy use is recorded by monitoring devices that feed data into the utility's computers. Results have not been fully collated, but the house is performing well.

Paul Beswick by permission of HOME Magazine © 1982 Sun by Sandra Pinckney

expect is to avoid paying utility bills and, perhaps, to generate a small yearly surplus that the utility is obligated to pay them for. Obviously, the more energy-efficient the home, the larger the surplus at year's end, and the shorter the payback period. But even with average electric bills of $85 a month (which would be steep in an energy-efficient home), it would take 40 years to pay off a 4-kilowatt system.

The Solar Energy Research Institute (SERI) admits that photovoltaic systems can become competitive with other forms of electricity only when the cost of building a system comes down to $3 a peak watt or less. Costs will be cut through more research and automated production. As mentioned earlier, PURPA has spurred at least one utility to conduct research, and with good reason. The 6,000 or so U.S. houses outfitted with photovoltaic systems are working so well that, as one researcher puts it, "The old power-distribution structure is scared of what's coming, because photovoltaics will change the way power is distributed in this country."

The utilities are not the only ones interested in converting sunlight to electricity. With photovoltaics' high potential—for affecting world energy supplies and for sales to an increasingly energy-conscious housing market—it is not surprising that major energy companies are also searching for more-efficient systems. Curiously, an alliance of sorts has been forged between solar advocates and their historic adversaries at Shell, Mobil, Arco, and Exxon, each of which is conducting research in photovoltaics.

Shell began its efforts at the partial behest of SERI, simply because of the large sums of money needed to manufacture increasingly sophisticated panels. SERI patented a ribbon-style cell-manufacturing process, developed it with Motorola, and licensed it to Solavolt International, a new company pooling the forces of Motorola and Shell. Strange bedfellows? Perhaps, but as Steven Strong sees it, "The involvement of major companies, with their vast technical and financial resources, is just what's needed to keep photovoltaics moving ahead and prices heading down."

LOOKING TOWARD THE FUTURE

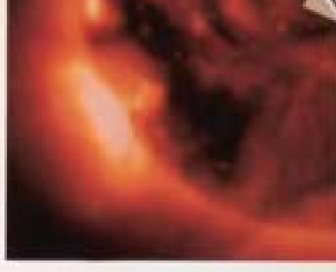
When will photovoltaic panels become a common neighborhood sight? The best estimate of most observers is 1990, given the present pace of research and development. Some advocates are more optimistic, citing among other factors the current state of the nuclear industry, which is limping along badly from cost overruns, widespread public doubt about its safety and economic viability, changing regulations, and a burgeoning problem with radioactive waste and plant decommissioning.

A recent article in *The Wall Street Journal* tells a different story: "Because of a slump in overall energy demand, depressed world oil prices, and changes in government policy, interest in all kinds of renewable-energy projects is dwindling." This change can be simply stated: Funding cuts have been severe since President Reagan took office. The renewable-energy budget in fiscal year 1981 was $500 million; Reagan's FY84 allocation is a mere 20 percent of that figure. Research monies at SERI have slumped as dramatically, down two thirds in two years, and the staff has been cut almost in half.

Experts in the field claim the government is backing off at the wrong time for the wrong reasons. According to them, the logic behind Reagan's actions is tragically simplistic: Because photovoltaics are commercially available, there's no longer a need for subsidy. To those in the industry, now is the time to push—especially in the face of increasing government-sponsored competition from abroad.

Last March, MIT's Energy Laboratory in Concord, Mass., held a three-day program

On sunny days, appliances in this Santa Fe kitchen rely on PV-generated electricity.



A solar sunspace and large south-facing windows capture the warmth of the winter sun in the first photovoltaic residence built for the commercial market. Roof-mounted photovoltaic panels (left) on the Santa Fe, N.M., house supply all the electricity the house needs annually. The complete system cost $35,000, roughly one fifth the home's selling price.

of seminars and demonstrations about photovoltaics in cooperation with the New England Solar Energy Association. The event was a great success. "We had people from within the industry—manufacturers, users, financiers, and other non-DOE types—in larger-than-expected numbers," says Miles Russell, an Energy Lab research engineer. "We raised a lot of money; but what's more important is that we experienced an encouraging mood at the show."

To Russell and other participants, the event signaled a turning point in the course of photovoltaic development. Says Russell: "The mood of the industry hit bottom in 1982 [because of funding cuts]; but now we realize that we've come a long way in a relatively short time, and we have high hopes for significant breakthroughs in the next few years."

In addition to less-expensive, more-efficient photovoltaic cells, an area in critical need of a breakthrough is storage. Before photovoltaic houses can become truly energy-independent, researchers must find a viable way to store electricity where it's generated. Working with golf-cart batteries is just a first step. With DOE backing, Texas Instruments is working on a combined photovoltaic and storage system that stores energy efficiently. They hope to have it ready for the new-home construction market by the mid-1980s, but at this time the unit is in the prototype stage.

The MIT Energy Lab, a pioneer in new-home systems, is beginning to focus elsewhere. "Finding the best methods of retrofitting older homes," says Miles Russell, "will take a lot of effort. Existing electrical systems in a home will have to be reconfigured somewhat, and we will have to solve size, orientation, and tilt problems for the photovoltaic panels themselves."

These and other difficult technical problems will need to be resolved before photovoltaic systems can come even close to supplying 20 to 30 percent of the world's energy needs, as predicted by the Washington, D.C.-based Worldwatch Institute. But despite the current low ebb in funding, no one committed to photovoltaics is in a quitting mood. Notes Steven Strong: "Despite the shell game with federal funding, photovoltaics *are* a coming reality. It's only a question of time." □

John Patrick Jeffries is a San Francisco, Calif., freelancer who writes about housing and energy issues.

HIKING *THE* DESERT *AND* SURVIVING

JOHN HART

THE WORD "DESERT" can be a synonym for desolation, for alien ground, for wildness taken too far. But to many hikers there is a certain daunting glamor about the desert—of all the wild landscapes of America, the least (and most) inviting.

What's the attraction? Exploration. Solitude. Unexpected beauty everywhere. Wilderness redoubled.

What are the difficulties? Real. Desert hiking certainly requires advanced backpacking experience as well as special skills, gear, and precautionary measures.

But desert hiking, though challenging, is by no means prohibitively chancy or difficult. The trick is all in knowing how.

A desert, the books may tell you, is an area that gets less than 10 inches of precipitation a year. While more complex definitions can be had, for the backpacker there is an unambiguous and practical meaning to the word: You are hiking in the desert whenever you have to think, and think hard, about water. Your main objective in planning desert travel must be to avoid running short of water—*ever*.

How much water does a desert hiker need? A lot. Not quarts, but gallons—at least 1.5 gallons a day, in liquid form and contained in food. Figure a six-quart daily minimum, and add a quart to that for every five miles to be traveled—in reasonably cool weather. In the heat of summer, you'll need even more. In Death Valley in July, a person requires nine quarts a day simply to survive while resting in the shade.

Water is heavy—a quart weighs more than two pounds. Two days' supply at two gallons a day weighs some 37 pounds. If you have to carry *all* this water, your hiking range is necessarily limited. For this reason, many desert hikers wind up taking a series of short trips rather than one long one—going out for just a day or two, and looping back to the car between excursions. This type of travel—sometimes called the "cluster trip"—is a desert specialty.

There are ways of increasing your range. One is to find water on the land. Often it is there to be found. What you must *not* do, however, is put yourself in the position of depending on a supply that may not be there. Don't count on local sources just because a map shows the blue squiggle of a spring. You may or may not find it; it may or may not be flowing. Plan your trip so that on-the-ground water will be a welcome surprise, not a vital necessity.

(The fact that a mountain mass is high, by the way, does not always guarantee *surface* water. Mountains built of limestone and dolomite have a way of swallowing runoff into subterranean courses.)

In addition to permanent springs, you sometimes find natural catchments or "tanks" that hold water for several days after a rain. As an emergency measure, you may be able to reach water by digging into the gravelly floor of a streambed, especially where vegetation indicates that roots are reaching the water table.

In winter, at about 8,000 feet or higher (lower in the northern Great Basin), a ready source of water is snow. It can be melted on a dark, waterproof cloth or in a container by your stove. (If you plan to melt a lot of snow, carry extra fuel.)

Often desert waters must be purified. Many are polluted by domestic stock or by feral burros. Some hikers carry portable filtration units of proven reliability, while chemical treatments that release iodine can also be effective. (See "Purifying Water in the Wild," July/August, 1983.) Lacking either of these capabilities, you should as a minimal precaution boil your drinking water—for 10 minutes at sea level, and up to 20 at high elevations.

A few springs are so alkaline as to be obviously undrinkable; a very few contain poisonous minerals. These are usually identified on maps, but be wary of sources that have no signs of life whatever around them. Purification, of course, is useless in such cases.

To repeat, it is essential that you not put yourself in the position of needing to find water on the land unless you have been able to confirm, through personal inspection, that it is there.

Caching water is another way of extending your range. Caching can be simple. For instance, if you will be hiking out and back on the same line, you can carry extra water

Illustration by Ward Schumaker

and plant a generous supply a few miles up the route. To extend your range further, you will have to do advance work by car, planting caches near roads. Caches should be close enough together so that, if you fail to find a particular one, you will be able to reach the next. Always plan such trips with considerable margin for error.

For containers, use gallon plastic bottles (bleach bottles are good) with screw-on caps, taped shut. The tradition was once to bury the bottles or place them under cairns, but this defaces the land and is now frowned on. Try to find a spot on the surface that provides concealment. Desert veterans take care to place caches unobserved. It is not unheard of for vandals to steal or destroy conspicuously placed supplies.

When you plant a cache, make sure you can find the place again. Look around carefully to establish landmarks. If the spot affords long views, take at least three compass bearings and write them down. Mark the spot on your map. Make a sketch of local topography. Try to place each cache in a spot that will be easy to recognize again. It is good to choose a spot on some prominent *line* on the landscape: a road or track or fenceline, the toe of a mountain slope, or the bank of a wash (but not *down in* the wash in summer thunderstorm season!).

This is an excellent time to practice precise navigation skills. As an exercise, flag several locations a mile or so apart. Then approach the area from a new angle, and see if you are able to locate each of your flags in succession.

What happens if, despite your best efforts, you do find yourself short of water and miles away from the next source? Research shows that a healthy person, not dehydrated to begin with, can walk about ten miles in the desert in daytime without additional water. If help or water is more distant than that, walk at night. If you have any water at all, it is better to drink it as you become thirsty; this will keep your body functioning well while you move toward help. To reduce water loss through perspiration, remain fully clothed, even in hot weather. Do not smoke; do not drink alcohol. Eat only a little, and avoid salt. Talk as little as possible, and breathe through your nose. If you find water that is undrinkable, you can use it to moisten your skin for cooling; urine, in a pinch, can be used in the same way.

Climate & Gear

We think of the desert as hot, but that isn't the whole story. The American deserts stretch a thousand miles north and south (even omitting the Mexican portion) and

range 5,000 feet or more in elevation. Nowhere is it hot *all* the time. Death Valley, where the summer temperature in the shade can climb above 120° F., is cool in the winter; in the high desert of Oregon, winter nights may be deeply subzero. By picking your hiking season, you can keep within a comfortable range.

Choosing the best season for your trip depends largely on the elevation of the country you will visit. Below 4,000 feet the desert summers are seriously hot. Areas above about 8,000 feet will be bitterly cold in winter, with plenty of snow. Areas of intermediate height are more forgiving; depending on elevation, latitude, and local climate, they may be fine in any given season. Autumn is the closest thing to a universally moderate desert and desert-mountain hiking season.

If you steer clear of the extremes, you will need nothing extraordinary in the way of gear. For shelter, a light tent—and often just a tarp or poncho—will do. Nights will require warm clothes, but not massive envelopes of nylon and down. A light, three-season sleeping bag will do nicely. At high elevations and on snow, a sunhat, suncream, and sunglasses will be essential.

Be prepared for rain (or hail or snow). Our deserts have two wet seasons. The winter period, lasting approximately from December to March, brings rain to low country, snow to higher ground. The summer wet season is the thundershower peak in July and August. In the Great Basin and Mojave deserts, the winter season accounts for most of the year's moisture; but in the Chihuahuan Desert it is the summer season that is strong. Between these two regions is a zone with two pronounced wet seasons. At Tucson, rainfall is about evenly split between winter and summer.

Not everyone chooses to hike in the more comfortable seasons. Some people take singular pleasure in crossing hot desert floors in summer. For such work, special precautions are required. Loose, lightly woven, light-colored clothing is worn to reflect light and heat. Hikers often carry canopies to pitch for the midday stop, tentpoles to pitch them with (since vegetation may be low and sparse), and air mattresses or thick foam pads to keep their bodies off scorching ground. They may hike mornings and evenings—even at night—and take a long siesta during the heat of the day.

At the other extreme are winter campers who visit high-desert mountain ranges in the cold months. Some of these ranges have considerable snow, so count on using skis and snowshoes above about 8,000 feet (lower in the north). Prepare for nights that go well below zero.

Perhaps the most vital piece of gear for the desert hiker is the automobile. That vehicle is more than transportation—it is home base. Make certain to store *lots* of water in it, together with food, stove fuel, and first-aid supplies. Desert driving is hard on cars. A little mechanical knowledge and a basic tool kit will serve you well. In remote areas, it is a good idea for a group to travel in two or more vehicles.

Getting Around

Desert travel is often cross-country, without explicit trails. To function in such a setting, you need confidence in your ability to plan your route and make your way across varied, trackless terrain.

Maps are vital. The 7.5-minute or 15-minute topographical map, the hiker's standard, may or may not be available for the area you've chosen. Parts of the desert West have so far been mapped by the U.S. Geological Survey only on the very generalized scale of 1:250,000—not ideal, but better than nothing.

Navigation tends to be straightforward. Often you are following an unmistakable ridgeline or canyon. Most desert-mountain masses are not very broad and have rather simple anatomies, with one or two major crests, and steep drops on either side. You can usually see a long way from any point. This advantage presents one drawback, however: Gazing through clear air and

Keeping Cool About Heatstroke

We know that hypothermia is the illness that comes from severe chilling. During the warmer months, desert travelers must guard against its hot-weather counterpart: *hyperthermia*.

Hyperthermia is what happens to you when your body is unable to dispose of heat as fast as it manufactures it and absorbs it from outside. Sweating is our most effective way of losing heat, and inadequate sweating is usually what leads to hyperthermia. In hot-weather hiking, one may have to sweat more than two quarts an hour to stay healthily cool. Hardly anybody can do this on the first hot hike of the season. But as time goes on the body adapts to heat stress, "learning" to sweat more copiously and with less loss of the important salts called electrolytes. An otherwise fit hiker needs eight to ten days of intermittent exercise in a hot climate to make this adjustment.

If you do overheat, the temperature of your vital organs rises and you begin to feel sick, then sicker. Early symptoms vary. You may feel faint and nauseated. You'll still be sweating a lot; yet your skin may feel oddly cool. Your face is likely to be pale, and your heartbeat may be rapid and uneven.

But the most important thing to watch for, in yourself or others, is a haziness, a growing indifference to surroundings. "Whenever somebody offers to sit down and catch up with the party later," one physician remarks, "it's a worrisome sign." In this early stage, the condition is often labeled *heat exhaustion*.

As the victim's temperature rises to high-fever levels, the system goes haywire. There may be a pounding pulse, labored breathing, and seizures. In the textbook case, the person stops sweating; his skin will be hot and dry. But the most reliable symptom is the person's mental state: A severely overheated hiker will lapse from indifference into confusion. At this stage, the disorder becomes *heatstroke*. . . and heatstroke can kill.

The treatment, early or late, is the same: rapid cooling. If there is a stream nearby, lay your friend down in the water; if there is no stream or pool, cover him with wet cloths and fan him. Keep doing these things until he is rational and steady. Once he is clearly aware and able to swallow, give him plenty of water.

Once the crisis has passed, you face the decision of whether to continue the trip or head for home. Except when dealing with a very mild case, getting out is probably the better choice—especially if the weather continues hot. After a severe attack, a person may remain oversensitive to heat for some time.

Even a relatively minor brush with hyperthermia is a warning. The body has tried to handle a taxing combination of effort and heat, and it has failed. Don't give it the same test again until conditioning is more complete.

across an open landscape, distances may seem shorter than they really are.

Your worst navigation problems may occur before you reach the roadhead, as you thread the maze of minor and ill-mapped roads that give access to many hiking destinations. When hiking in a system of branching canyons, you may need to keep close track of junctions in order to retrace your steps. Sophisticated compass work is vital if you strike out across a featureless *playa*, one of those dead-flat, lifeless, cream-colored sedimentary plains that fill the low points of many desert valleys; getting back to your starting point on the almost equally featureless *playa* rim can be tricky indeed. (One hint: Don't aim directly for your target, but rather a little to the right or left of it, so that you know which way to turn to find it.)

Detailed route-finding, making your way across the features of a landscape, is usually easy. Desert vegetation is seldom so thick that you cannot work through it. But obstacles do occur: unexpected bands of cliffs, thickets of fiercely spined cacti, dry beds of waterfalls in canyons. (If your plans include hiking a canyon not known to be easily passable, take a rope and make certain you know how to use it.)

Aside from the scarcity of water and extreme summer heat, desert backpacking is not more dangerous than other types, and many of the problems are the same. The desert has its rattlesnakes, but no more than you'd find in the woods. (A snakebite kit is a good thing to carry, if you know how to use it and when *not* to.) Travelers in Arizona and adjacent parts of California should inform themselves about one highly venomous scorpion, *Centuroides sculpturatus*.

Flash floods are a major danger in canyon travel. Thunderstorms, common in the Southwest through the summer and fall, are heaviest and most frequent in July and August. Even if the air is dry where you are, runoff from heavy rains elsewhere in the watershed may be channeled to your area. Don't camp in streamcourses, especially in the narrows of a gorge. Never try to cross a wash that is filling with water, whether you are on foot or in a vehicle.

Easily scarred, slow to repair themselves, America's desert lands are taking a beating. Desert hikers are not contributing much of the damage. It stems largely from overgrazing; from random, destructive prospecting; from off-road-vehicle use and proliferating roads. Even so, the conscientious hiker will want to use care here, as elsewhere.

All the familiar low-impact rules apply, and a few more besides. One important point: Don't compete with wildlife for limited water. If you draw water from an isolated waterhole or a section of perennial stream, don't then camp beside it; move a good distance away, say half a mile or more. This is crucial in desert mountains where bighorn sheep are struggling to maintain themselves.

In the desert, as at timberline, fires have no place. You won't find much burnable material anyway; what you do find should remain on the land.

For toilet needs, use the "individual cat method"—dig a small hole and fill it neatly after use. Some people burn their toilet paper to speed decomposition, but fires have been set that way, and agencies that manage desert lands now commonly discourage this practice.

When crossing range fences, don't climb the strands (which may break), but part them and slide between. If you go through a gate, leave it as you found it—open if it was open, shut if shut. Such courtesies ease friction between hikers and ranchers.

Desert soil might seem to be invulnerable to a disturbance as tiny as a hiker's footfall, but this is not always true. Sometimes the ground is covered with a veneer of lichens and other tiny plants that form what's called "cryptogamic crust." Once broken, this layer is slow to heal. When possible, avoid trampling this kind of groundcover. Particularly avoid breaking it with a tire track—for instance, when turning around at the end of a dead-end road.

The desert is a subtle and demanding wilderness. Careful planning and basic precautions will allow you to meet it on good terms: safely, gently, and enjoyably. □

John Hart is a writer and consultant on environmental issues. His most recent Sierra Club Book is Hiking the Great Basin.

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The mines and mills are closed, but their radioactive tailings still spread a legacy of death

Uranium Plagues the Navajos

SANDY TOLAN

"I CANNOT DO A JOB as a man—a normal man—anymore, due to my being an ex-miner. . . . A lot of guys I worked with have died, and now the doctor tells me there are a lot of spots on my lung—big spots, the size of golf balls, all over my lungs. This is what I'm going through."

Tommy Dee sits outside on a metal folding chair, in the shade of the Mexican Water chapter house on the Navajo Reservation. Dee, who began mining uranium 27 years ago, has cancer.

"When I started working for the mine, I was normal, healthy, and young," he says. "Now I am disabled. I can't work or support my family."

Tommy Dee's story is a common one. It is told many times each summer by ex-uranium miners and their widows to the dozens of reporters, anthropologists, and other non-Indians who come to the hot, sprawling reservation in compact cars ill-suited for the reservation's rutted dirt roads.

Tommy Dee (above) started working in the mines on the Navajo Reservation in 1956. He is among the many ex-miners who have been afflicted with cancer. Below: A tailings pile at Durango, Colo., towers 230 feet above the Animas River.

Morton McKay

The reports of an increased incidence of cancer and birth defects—from Mexican Water, Shiprock, Red Rock, Cameron, Tuba City, Crownpoint, and elsewhere on the reservation—do not prove that the Navajos' present afflictions are caused by past uranium development. But numerous health studies and water-quality analyses—and a litany of blunders by industry and Indians alike—suggest a smoking gun linking the Navajos' predicament to such development. Consider:

- In the 1940s and into the 1950s, lung cancer was virtually unheard of on the Navajo Reservation. Between 1965 and 1979, according to a study by Drs. Leon Gottlieb and LuVerne Hosen, 17 Navajo men were treated for lung cancer at the Shiprock, N.M., Indian hospital. Sixteen of these 17 patients were ex-uranium miners; 14 did not smoke.
- At Cameron, Ariz., an area of intensive uranium mining and milling during the 1950s and 1960s, the birth-defects rate, according to physiologist Alan Goodman, is seven times the national average.
- Families of uranium miners in Red Valley suffer twice as many birth defects, miscarriages, and infant deaths as do a group of nonminer families 30 miles away.

Life and land on the Navajo Reservation and across the Southwest has changed sharply since the demand for nuclear weapons and nuclear power began. Parts of the region, proposed as National Sacrifice Areas by the National Academy of Sciences in its 1974 energy-policy report to the Ford Foundation, have been written off for any other use in the minds of policymakers.

Critics of federal policies say the Southwest has been turned into a domestic energy colony. "It hasn't been by conspiracy, and it hasn't been by statute," says Brant Calkin, secretary of New Mexico's Natural Resources Department and former Southwest representative for the Sierra Club. Rather, Calkin explains, this "colonization" has occurred because of the plain fact that uranium and other resources lie in the Southwest: "The region has sought industry at any cost, with an unconscionable impact on workers and the environment."

There are few places that offer more evidence of the effects of uranium development than the Navajo Reservation. "All these things are still speculative," says Lynda Taylor of Southwest Research and Information Center in Albuquerque, "but you have these little fires all over the reservation." The "fires" were first ignited shortly after

World War II, when national priorities called for swift production of nuclear weapons. The Navajo Reservation, with its abundance of uranium ore, became the site of five mills and hundreds of mines that were active into the 1960s. By the mid-1970s, when production was curtailed, 14 million tons of raw uranium ore had been extracted from 300 mines on reservation land.

"I blasted the rocks away to get to the uranium," says Tommy Dee. "With the blasts and everything, it really smelled. With hardly any air you sometimes felt faint, but you had to keep going because your supervisor was there to kind of push you." Many of the miners in these unventilated "dog holes" had no masks or protective clothing. They drank water that seeped through the uranium ore to their work area, and went home with uranium caked on their coveralls.

"When I was on the job," says Dee, "only a white man dressed for safety when he walked down into the tunnel. . . . We did talk about it: 'Maybe it *is* dangerous. Why is he all protective-clothed-up? Why don't they do the same for us?' It never got anywhere. Nothing ever was done for us."

Dee and his fellow miners breathed in radon-222, a radioactive gas that is a decay product of radium-226. The gas settles in the lungs and breaks down into radioactive "daughters" (unstable isotopes of bismuth, polonium, and lead) that can cause cancer. The amount of radon inhaled by Navajo miners is about equal to the levels absorbed by some Eastern European pitchblende miners in the 19th century. Studies conducted by European doctors in 1913 and 1932 revealed that more than 40 percent of those miners died of lung cancer.

Current studies of Navajo ex-miners indicate high rates of lung cancer. These rates will increase should Navajo ex-miners develop cancers after long latency periods. In 1976, prior to the Gottlieb and Hosen study cited above, Drs. Victor Archer, Joseph Wagoner, and J. Dean Gillam found four times the normal amount of lung cancers in a study of Indian uranium miners. The confidence level of that study—the chance that those figures are not purely coincidental—is 99 percent.

Wagoner, who has studied the effects of uranium for the U.S. Public Health Service and other government agencies since 1962, believes there is "an epidemic of major proportions" among former uranium miners. Several other studies of Indian and white miners support that conclusion. For example, the 205 white miners who died of cancer through 1978, according to Wagoner's follow-up of Archer's data, represent a fivefold increase over the 40 who, statistically, would have been expected to get cancer.

Big John, a Navajo from Mexican Water who worked in the mines for 19 years, is also dying of lung cancer. "It's too late for me," he says, "because I know I'm going to die. The local community health representatives come around, talk to me. They tell me not to think about it, and not to take it so hard. But sometimes, when you're in so much pain, it's hard not to think about your grandchildren, your wife and your family, and the suffering you are going through as an individual. It's very hard. Sometimes I can't bear these things. . . . I know I'm going to go one time or another. But this cancer is just no way of a man going, because it's very painful."

ONCE THE URANIUM was blasted loose and brought to the surface, trucks hauled the raw ore away to be crushed and processed at huge mills on and off the reservation. At the mills the ore was ground, crushed thin as sand, mixed with

Minlar McKay

© John Running

Above: This abandoned but still radioactive mine near Cameron, Ariz., has been used as a swimming hole by children on the Navajo Reservation. Navajo sheepherders (right) are unwilling to leave their flocks unsupervised, for fear the animals will drink contaminated water or eat forage containing radioactive isotopes.

water, and pumped into an acidic chemical solution. From there the valuable "yellowcake" was extracted. The rest of the ore—99.9 percent of it, containing 85 percent of its original radioactivity—was dumped and, years later, abandoned when milling activities at the site were concluded.

Today, Navajo uranium tailings at Shiprock, Monument Valley, Mexican Hat, and Tuba City account for one quarter of the 24 million tons of uranium tailings the Department of Energy has earmarked for cleanup. (See box, page 58.)

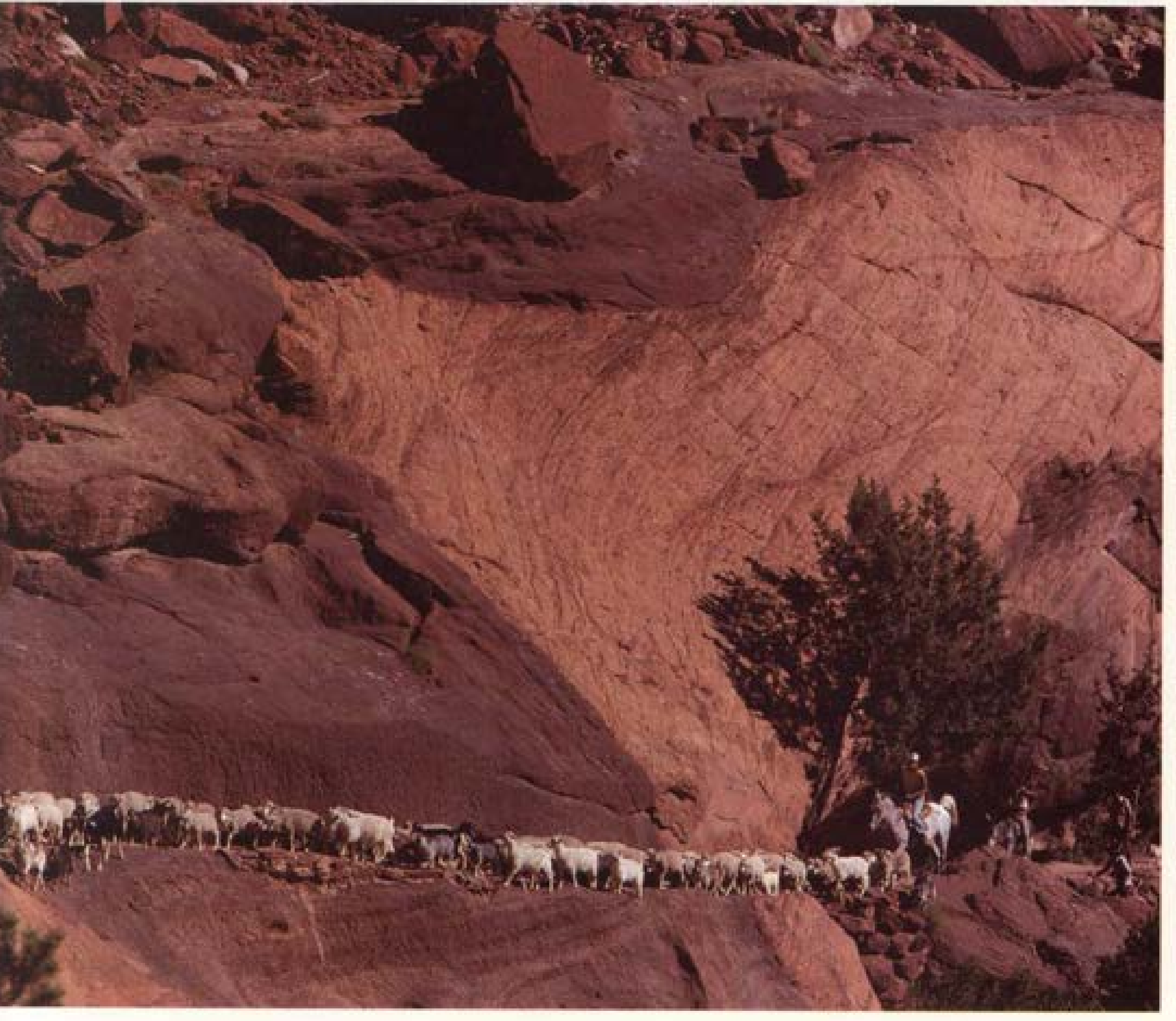
At Tuba City, 800,000 tons of tailings from the old Rare Metals Corporation mill lie below a former housing site five miles north of town. As recently as a year ago, children from the housing area used the tailings piles as a giant sandbox. "My kids, they run off when I'm not around," said Nesbah Curtis before the housing area was closed. "I keep telling them, I keep warning them, but you know how kids are. They take off down there"—she pointed to the uranium waste—"and they start playing down in that sand dune." Curtis said two of her sons suffered from fainting spells, a daughter had a permanent rash, and her two-month-old son died in his sleep.

Local Navajos believe the tailings are killing their livestock. Rosie Zahne, who lives in a hogan a mile from the site, says more than a dozen of her family's sheep, cattle, and horses have died shortly after grazing at the Rare Metals site. "We can't even go on a trip anymore, because of our livestock. We worry that they might go in there and have some more of that uranium."

Vegetation near the mill site may contain radioactive radon daughters that settle in flesh and lungs after being consumed. Navajos from Tuba City fear that dangerous levels of radiation enter the food chain when cows and sheep graze near the tailings.

"The Navajos love mutton. That's their main food," says Louise Yellowman, a Tuba City resident and the only Navajo member of the Coconino County Board of Supervisors. "If [the livestock] drink the water and eat the grass from that place, then the sheep and the mutton are contaminated. And then [the Navajos] butcher one of these animals, and the people eat it, and they also get it into their systems."

One of the two main hazards of uranium tailings—for people who haven't played on the piles or eaten contaminated livestock—comes from airborne radioactivity. At Tuba City the "radon flux rate" coming from the tailings is 10 times the current federal stan-



dard and 100 times the 1981 limit recommended by the Environmental Protection Agency. This radon level drops as distance from the pile increases, but cancer-causing radon daughters can attach to dirt particles and travel many miles before decaying into lead-206, a "stable" element.

The other major hazard associated with uranium tailings (and with some deep uranium mines) is possible contamination of surface- and groundwater—and, consequently, local drinking supplies. At Tuba City, the water table runs beneath the Rare Metals site, 70 feet below the tailings. Kate Vandemoer, a graduate student in hydrology at the University of Arizona, believes that a plume of contamination has moved into the aquifer from the tailings pile. Vandemoer has found high radioactivity and high levels of sulfate and chloride at Moenkopi Wash, two miles from the Rare Metals mill, at which sulfuric acid was used. Vandemoer is studying spring samples to determine if the water is chemically similar to the tailings "liquor" that may have seeped into the groundwater.

Another hydrologist believes that any contamination of groundwater at Tuba City could not have traveled two miles in the 16 years since the mill was abandoned. Richard White, a consultant to the federal cleanup program, believes the groundwater moves only one foot a year—which means it would take 10,000 years for contamination to reach Moenkopi Wash.

Vandemoer disagrees. "It's hard to tell," she says, "based on the limited data that's available. He would have to do an aquifer test to figure that [groundwater velocity] out. And there hasn't been any such aquifer test done." She suggests that possible fractures in the rock could be accelerating the groundwater flow toward Moenkopi Wash.

There is also evidence of surface-water contamination from mine "dewatering," a process whereby water is pumped out of a mine to the surface. Untreated mine water is often discharged directly into a creek or wash; in the West that usually means into a tributary of the Colorado River system, which supplies water for many western cities, including Phoenix and Los Angeles. Since 1977 all mine-water discharges have required National Pollutant Discharge Elimination System permits, but violations are still frequently reported.

The effects of uranium development will be determined in the future partly by market forces. Today's spot market price is $21.50 a pound, up $4.50 from the recent all-time low of $17, but the market is still depressed. As a consequence, some uranium mines and mills have been abandoned, while

Sierra Club Forces Action on Radioactive Tailings

VAWTER PARKER

IN 1978 CONGRESS enacted the Uranium Mill Tailings Radiation Control Act, requiring—or so Congress assumed—immediate action by federal and state governments to clean up uranium mill tailing sites.

Among the act's provisions, the Nuclear Regulatory Commission was given immediate authority to license the possession of, and thus regulate, uranium mill tailings at the 24 abandoned mill sites in the West and Pennsylvania. Congress intended that, at a minimum, the NRC would exercise this authority to confine the tailings to existing sites and prevent the contamination of new areas.

In addition, the Environmental Protection Agency was ordered to develop cleanup and disposal standards for the radioactive emissions from abandoned uranium mill tailings. These standards would presumably be consistent with emission-control standards the EPA was already obliged to develop (under provisions of the Clean Air Act) for airborne radionuclides from uranium mill tailings and other sources.

The Department of Energy was also directed to identify properties in the vicinity of mill-tailings piles that have been contaminated by off-site use of tailings and to develop a program, using EPA standards, to clean up abandoned sites and to handle mill tailings in the future. (The NRC estimates that uranium mills will produce seven times the volume of existing tailings by the year 2000.)

In 1980 the Sierra Club Legal Defense Fund retained San Francisco lawyers Roger Beers and Kathryn Dickson, who undertook an extensive review of the problems associated with uranium mill tailings. Despite the statutory requirement that the various agencies act within one year, none of them did anything that actually made a difference. The NRC, rather than exercise its short-term authority to license and regulate uranium mill tailings at abandoned mill sites, had promulgated a regulation specifically exempting tailings from licensing. The EPA, while taking the step of listing airborne radionuclides as hazardous pollutants governed by the Clean Air Act, failed to develop either regulations limiting their emissions or general standards on which a Department of Energy cleanup program could be based.

Finally, DOE itself made no significant progress toward identifying "vicinity properties" contaminated through erosion or by the use of tailings in construction. Indeed, DOE was quietly doing whatever it could, in cooperation with the ailing uranium industry, to downplay the seriousness of uranium mill tailings as a health hazard.

The Sierra Club's response to the government's stonewalling on uranium mill tailings has been to bring a series of legal actions designed to force government action, both through direct court orders and through increasing the public's awareness of the health hazards mill tailings create.

- In 1981, suit was filed against the EPA, seeking a court order that the agency set limits on airborne radioactive emissions from all major sources. In 1982 the court ruled that the EPA was in clear violation of the Clean Air Act in failing to issue such limits, rejected all of the agency's arguments why it should not be held to the letter of the law, and ordered that standards be set within six months for the control of airborne radionuclides.
- Legal action was also brought against the Department of Energy for its failure to locate and make publicly known "vicinity properties"—areas that have been contaminated near uranium mill tailings piles. Earlier this year another court ordered that vicinity properties be identified no later than September 30, 1984.
- A petition has been filed with the NRC to revoke its rule exempting abandoned uranium mill tailings from its licensing authority. That petition is pending. A court action against the NRC may be necessary if the commission does not act.

others have been shut down indefinitely.

The legacy of past uranium development is still felt on the Navajo Reservation. Houses have been built with uranium tailings. Abandoned mines, still radioactive, are used as swimming holes and storage sheds. Navajo ex-miners continue to die painful deaths from cancer, and the birth-defects rate on the reservation is far above the national average.

Physiologist Alan Goodman, in an examination of Arizona's birth records, discovered a birth-defects rate of nearly seven times the national average at Cameron, a center of mining during the 1950s and 1960s. Goodman also found severely distorted sex ratios—indicators of potential chromosomal and/or other kinds of damage—among Navajos born near Crownpoint and Gallup. Those areas are on the edge of the Grants Mineral Belt, where more uranium has been mined and milled since the 1950s than anywhere else in the world.

These studies join the other accounts of high cancer and birth-defects rates in the reservation's uranium-producing regions. But Goodman believes the evidence linking uranium to these afflictions is still circumstantial. "We do not know what is causing the birth-defects rates, or the sex ratios, or the cancers," he told a near-empty classroom during a well-publicized visit to Northern Arizona University. "We have proven nothing."

Not everyone agrees with Goodman on this count. "The evidence was there, and it was ignored," says Harold Tso, special assistant to Navajo Tribal Chairman Peterson Zah and former director of the tribe's Environmental Protection Commission. Tso and other Navajos believe it was the rush to build up nuclear stockpiles that imposed hundreds of unventilated mines and millions of tons of radioactive mill tailings on the reservation.

Brant Calkin also points a finger of blame at the nuclear industry: "They just plunged ahead. They turned their backs on every effort to accept any responsibility. Their culpability is long, continuous, and undiluted."

Current permitted levels of uranium exposure for workers are far lower than in the early days of the atomic age. Nuclear-industry officials say criticism of current mining and milling practices is not justifiable, because the high exposure standards that prevailed at one time have been banned for more than a decade.

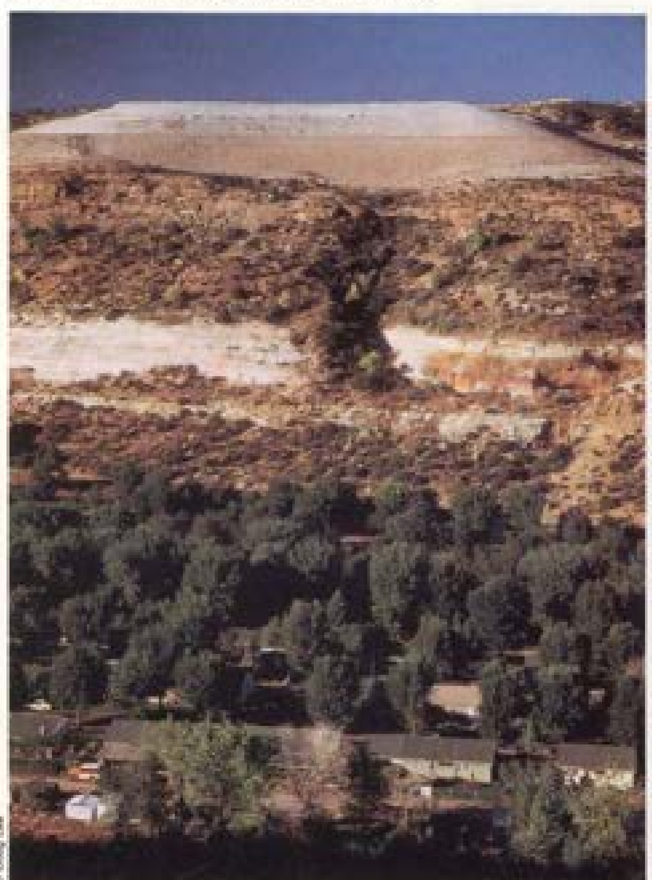
Some doctors, however, believe the current radon standard for uranium miners in this country is still far too high. Joseph Wagoner, for example, believes European

- As a result of this initial round of activity, the EPA in December 1982 published standards for uranium mill tailings to be used in a cleanup program. The standards are extremely important, because they will very likely be the standards not only for the disposal of existing tailings but for future accumulations. Unfortunately, the standards have been weakened in almost every respect from those initially proposed by the Carter administration. Under Reagan administration standards, disposal methods need only be effective for 200 years, not 1,000; radon-gas emissions 10 times as high as the Carter administration's limits are deemed legally acceptable; tailings need not be buried; and special exemptions are still available to the uranium industry in instances when cleanup would be especially costly. In February of this year the Sierra Club filed yet another suit in federal court to invalidate these standards and to require that stricter standards be adopted.
- Finally, in response to the Clean Air Act suit, the EPA has proposed tentative air-pollution standards for radionuclides. However, it has specifically exempted airborne radioactivity having its source in uranium mill tailings. The EPA's excuse—that such standards will be issued instead as part of the general cleanup standards under the Uranium Mill Tailings Radiation Control Act—sounds logical on its face. But the practical effect of failing to issue standards under the Clean Air Act is to prevent private enforcement under the Clean Air Act's citizen-suit provision. The Sierra Club is opposing this omission in current proceedings before the EPA.

The EPA has estimated that for every 100 people living near a uranium mill tailings pile, three will contract lung cancer just from radioactive exposure. As many as 10 out of 100 persons living or working in structures contaminated with tailings will contract lung cancer on account of that fact. These estimates do not include the risks of cancers of the lymphatic system, liver, and spleen, or the risks of genetic damage and increased birth defects.

Despite passage of the Uranium Mill Tailings Radiation Control Act, the federal government has done little to reduce these hazards, the results of its own production and promotion of nuclear weapons and energy. Indeed, the government's conscious policies still favor paying the costs of uranium milling in cancer and genetic damage—costs to which nuclear-industry executives are conveniently immune.

The mill town of Uravan, Colo., on the San Miguel River, sits uneasily beneath 8 million tons of radioactive mill tailings.



Vawter Parker is litigation coordinator for the Sierra Club Legal Defense Fund. His book review of Alexandra D. Dawson's Land-Use Planning and the Law *(Garland STPM Press) appeared in the September/October, 1983,* Sierra.

and Canadian studies indicate the inadequacy of current U.S. standards. These studies linked lung cancer to uranium mining for shorter periods than the current annual standard of four "working-level months." A working-level month (WLM) is a measurement of radon exposure over a one-month period. The current federal standard is 4.0 WLMs per year—or 120 WLMs for people who have worked in the mines for 30 years. Many Navajo miners have been exposed to more than 1,000 WLMs during their careers.

Dr. Wagoner also notes that the number of WLMs the miner has accumulated by the time his cancer is *diagnosed* is usually far greater than the amount of WLMs it took for his cancer to begin. Therefore, Wagoner argues, uranium miners could be getting cancer from far lower doses of radiation than the lifetime exposures their cancers are attributed to.

The current mine standard is also too high to satisfy the Oil, Chemical and Atomic Workers Union. The union is calling for a lower standard for working-level months—from 4.0 to 0.7. In a 1980 appeal to former Labor Secretary Ray Marshall, the union cited consistent industry violations of the current standard and frequent attempts to "adjust," or divert, radon levels during government inspection. "The Department of Labor," a union doctor wrote, "is engaging in the deadliest form of governmental lawlessness in failing to protect uranium miners from lung cancer. . . ." The Mine Safety and Health Administration is still considering the union's request. But the health analyst responsible for the study has left the government, and no one has been assigned to take over his job.

The mines and mills on the Navajo Reservation are quiet now. With the nuclear industry's future in question, the tribe may not have to contemplate mining and milling again. Harold Tso, however, says he believes the tribe will probably consider another round of development eventually. For now, tribal leaders appear more preoccupied with renegotiating the huge coal strip-mine leases on the northern part of the reservation. Energy Fuels Nuclear, a small Denver company operating the only active uranium mines in Arizona, has expressed interest in exploring the high-grade uranium at Marble Canyon, near the Colorado River.

Tso says that if more uranium is developed, he would like to see the tribe attempt to mitigate mining impacts by enforcing safer radon levels in the mines than were required in the past, by ensuring water discharged from mine dewatering be drinkable, and by promoting stronger Navajo partnership with the uranium companies. Energy Fuels Nuclear says it has offered the tribe a 50/50 royalty split for high-grade development, but that offer has not been well received so far. The company is waiting to see if Peterson Zah, the new Navajo chairman, will adopt a different attitude toward uranium. Zah battled uranium companies in court while he was director of DNA, the reservation's legal-aid service. And in the Zah campaign platform last fall there was a call for a temporary moratorium on uranium mining—a politically convenient plank in the face of a depressed uranium market.

Pam Hill of Energy Fuels Nuclear says she believes the Navajos are "going to have to come to grips" with the reality of energy development on the reservation. "There are many ways of doing it wisely," she says, adding: "I don't see how Mr. Zah can put his head in the sand, and just keep his people from what they should have." Zah continues to insist that any future development will be small-scale, performed only after agreement with the local Navajos.

Meanwhile, across the 24,000-square-mile reservation, a handful of community health workers tries to ease the pain of the former uranium miners now dying of cancer. Lula Jackson works in the Hogback Chapter near Four Corners. "I've seen a lot of people dying," she says. "The companies should have really took a serious look into it and not just think of the war. There, again, it was a matter of life and death. Over here, now, later in years, in so many years we are facing this matter of life and death." □

Sandy Tolan is a staff reporter with Desert News Service. His work has appeared in The New York Times *and* The Christian Science Monitor.

© John Running

This Navajo sheep-shearer maintains her traditional way of life despite fears and doubts engendered by radiation-related illnesses.

Monty McKay

Dr. Lorna M. Shields, a birth-defects researcher: "We knew there were possible hazards. But we just didn't take them very seriously."

SKIING THE KARAKORAM'S GLACIER HIGHWAY

Text and Photographs by GALEN ROWELL

I am frequently asked which of my mountain-climbing expeditions was the hardest. After 25 years of mountain sports, 11 journeys to the Himalaya, 10 to Alaska, and lots of first ascents around the world, my answer—always unexpected—is that my hardest expedition did not involve climbing a mountain.

In the late winter of 1980 I traversed 285 miles of the heart of the Karakoram Himalaya with three friends. Although we saw many of the most beautiful peaks on earth, we never intended to climb any of them. Our goal was more basic. After considerable study of maps, old books, and satellite photos, I had come to believe that the unique geography of this region holds an ideal natural pathway for a high-altitude traverse three-fourths of the way across northern Pakistan, from India nearly to Afghanistan.

Here four of the world's longest glaciers outside the subpolar latitudes lie almost end to end. I thought that in March and April, when the coldest part of winter is over, it might be possible to ski most of the distance while snow still covers the rock-strewn blue ice and yawning crevasses of the great glaciers. To accomplish this, we could not afford to think about such frivolous activities as climbing. Our "summit" would be reaching the Karakoram Highway in the kingdom of Hunza, the only through road across the Himalaya for 800 miles.

Let me skip the details of our preparation and take up my narrative at dawn during the second week of the journey.

My fingers go numb before I can unzip the tent door to check the reading on the Fahrenheit thermometer hanging on my pack. It reads minus 25 degrees. I rejoin my companions, who lie shivering, curled in fetal positions, inside light down sleeping bags. We have each known greater cold, but never in such an utterly vulnerable situation. Our umbilical cord to civilization has been purposely and completely severed. We are totally dependent on what we can carry ourselves. Unlike most high-altitude expeditions, we have no porters, basecamp, or even radio contact.

We are now on the Siachen Glacier, largest of all, 21 times the area of Manhattan Island and surrounded by skyscrapers of rock and ice on the same outsized scale. The peaks, however, are not placed as randomly as skyscrapers; they follow a uniform order, like rows of white teeth in a shark's jaw. In the center of that giant jaw, two tents flap in the frigid morning breeze.

There is little conversation today. We wait for the sun to warm us so we can break camp. I wonder if my friends share the fears that kept me awake in the hours before dawn.

Can we endure 22,000-foot heights on skis while we bear 120-pound loads? What if a ski, a boot, or a tent fails? We have no extras.

We are no strangers to frozen wilderness. My tentmate, Kim Schmitz, has joined me on previous expeditions to Nepal, India, and Pakistan. His strength is legendary among mountaineers. A sportswriter once described this man with a cartoon hero's torso and wide blue eyes as a cross between Captain Marvel and Conan the Barbarian.

Ned Gillette and Dan Asay are in the other tent. Ned has a thin, bespectacled, Clark Kent look that masks endurance equal to Kim's. He is America's foremost ski-mountaineer, veteran of crossings of the Brooks Range and the St. Elias Mountains in Alaska, the Southern Alps of New Zealand, and the Canadian Arctic. I was with him on the first circling of Mt. McKinley on skis, and the first one-day ascent of the same mountain. Dan is 6'3", an all-legs Spiderman who is also extremely fit from teaching cross-country skiing in the winter and climbing in the summer.

Daily rituals begin in both tents. Featherweight MSR stoves burn kerosene to melt snow for water, cook freeze-dried breakfasts, warm the tent air, and thaw frozen boots that clink together like empty bottles as we place them in toe-first circles around the flame.

We break camp, putting 60 pounds into each large internal-frame pack and 60 more on tiny "children's snow carpets"—$3 vinyl sheets that roll up like a newspaper when not in use and are virtually indestructible. After tying into two teams of two on 150-foot, 9mm ropes, we ski off through a land so boundless and alien that it destroys our normal perceptions. Distance and time become glacial. The air stays well below freezing, but intense solar radiation—similar to the effect of a microwave oven—melts a chocolate bar in my pack.

The days merge into one another. On each one we gain a thousand-odd vertical feet and a camp about six miles nearer to a distant col beneath Mt. Sia Kangri at an elevation of 20,500 feet. Reaching the col is a great disappointment: Our glacial freeway ends in an abyss. On the other side of the

gap, like the opposite abutment of a collapsed bridge, is Conway Saddle, connected to glaciers that lead toward K2, the second-highest peak in the world. The gap is deeper than the Grand Canyon, lined with ice, and far beyond our powers to cross with the limited climbing equipment and time we have. Our only hope is to traverse the south face of Mt. Sia Kangri itself, at an elevation of 22,500 feet.

"We'll never ski across there," I say in despair, looking at ice blocks as big as houses listing at crazy angles all across the slope.

"It's not as bad as that icefall on McKinley where we skied with just two rappels," Ned answers, recalling a similar struggle at half the elevation with lighter loads.

This glacier-to-glacier crossing—from the Siachen to the Baltoro—has been attempted several times but completed only once. That was in 1979, by a Japanese expedition (employing 116 porters) that stocked a camp on the opposite saddle for an ascent of 24,350-foot Sia Kangri. After their climb they traversed to where we are now camped; but the knowledge that a well-equipped mountaineering expedition traversed the face in summer does little to bolster my confidence about skiing across in winter conditions.

The next morning I awake to see Mustagh Tower framed through Conway Saddle as if in the sight of a rifle. Hidden by clouds until now, the 23,950-foot peak looks perpendicular on every side, just as in a famous 1909 photograph by Vittorio Sella that made it an international symbol of the inaccessible mountain for almost half a century, until a British expedition climbed the peak with surprising ease in 1956. The distorted perspective of Sella's extreme telephoto came to be regarded as just a cheap camera trick; but today our camp is in line with his viewpoint, and our eyes share the vision of his camera.

We ski away from camp through towering ice seracs, expecting to be stopped by crevasses or cliffs around every corner. Deep snow, however, has softened the icefall's contours, and by noon we have carried half loads to a sloping bench at 22,500 feet. Relaying partial loads for the first time, we plan to ski back to the previous night's camp and then bring up the remainder of the gear the next day.

"What a place for Nordic skiing!" Ned shouts with glee. He tries the racing stride he used on the 1968 Olympic team, but his stamina is a faint echo of its sea-level potential, and he stops to gasp after just 50 feet. We know all too well why no one before us has used Nordic skis at such heights.

We ski back toward camp in light powder that at lower altitudes would make us shout for joy. I watch Dan strain to make two turns, fall, and yell, "This isn't fun!" I make frequent, unplanned stops by planting my head in the snow. Only Ned can complete a long series of turns.

The next day we ski up the same course with the remainder of the gear, setting up camp just before sunset beneath a splendid rainbow formed by snow crystals blowing over Conway Saddle. At midnight I awake to the irresistible call of nature. The mercury rests on minus 22 degrees Fahrenheit, but the wind-chill factor translates that to below minus 60 degrees, a cold that quickly numbs exposed flesh. As I rush back into the tent I knock loose the hoarfrost clinging to its walls, and it blankets both of us with ice. Then I lie awake for hours, my world reduced to include just the remaining mile to Conway Saddle.

We spend part of the morning making a reconnaissance without packs. There is no way around a band of wide crevasses, so we must cross them. Rappelling into holes, climbing out, then hauling skis and sleds across the gaps on ropes, we reach the brink of the Grand Canyon-type chasm and begin a long traverse on its edge that will take the rest of the day.

When just one short overhang separates us from a snow slope leading to Conway Saddle, we set up another rappel. Dan and I descend first and wait for Ned and Kim to lower the packs. The very last one comes loose. I dash for the fall-line and trip on my skis, certain that the pack—with all Ned's personal gear plus a tent, stove, and pot—will plummet a vertical mile into the great abyss. Instead, Dan sprints like a halfback and tackles the 60 pounds of tumbling pack that is armored by the steel crampons and ice axe lashed to its sides.

After a night on Conway Saddle we descend for three days toward Concordia, a meeting place for great glaciers beneath six of the 17 highest peaks in the world. I remember my last time at Concordia–in 1975, on an expedition to K2, when a Balti mail-runner delivered a bulky envelope from my mother in California. It contained my 90 year-old father's ashes. He had died while I was on the expedition, and I released his remains to the winds over a moraine of pure white marble.

As we near Concordia, ice from every surrounding peak and canyon is curving toward a common juncture in long, fluid arcs reminiscent of a freeway interchange. We are indeed on a veritable highway, a smooth, hundred-foot-wide strip that runs for miles as far as the eye can see between chaotic jumbles of ice.

On the easy terrain I take off alone one morning. Rounding a corner, I come face to face with K2 rising above a block of white marble on the glacier. Thoughts of my father and the sight of the mountain I had tried to climb bring tears. I sit silently, unaware of time, until the others arrive just after the peak has disappeared in the clouds.

Below Concordia the highway ends. Tortuous ice mounds coated with loose rock and soft snow rise above interlocking meltwater streams. We have skied from winter to spring. The snow becomes so soft that by noon we are sinking to our thighs with our skis on. Heat has replaced cold as our main adversary.

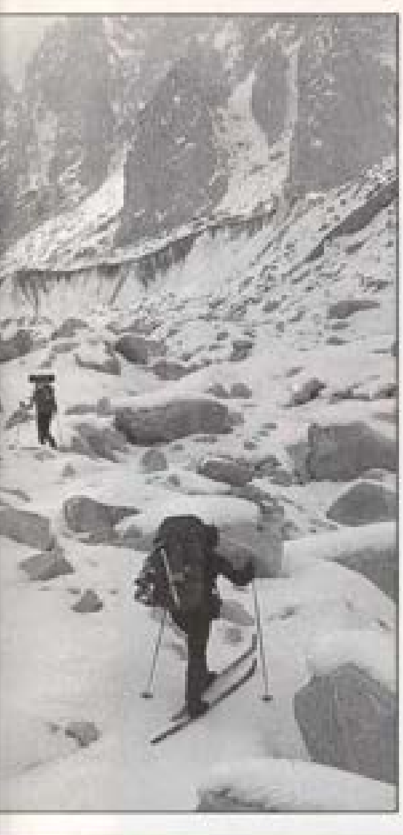
Clouds hide the remaining 30 miles of rockstrewn glacier. Our one food cache is another 30 miles below the glacier, in the highest village of Askole. At four the next morning it is 28 Fahrenheit degrees *above* zero, and snowing; our progress slows from the four miles an hour we achieved on the natural highway above Concordia, to four miles a day. Our route goes up and down over endless moraines on top of the ice, bare of snow on the sunny side, covered with deep slush in the lee. We are constantly taking off our skis, walking, then putting them on again.

The regimen we follow beats any known weight-reduction program. Breakfast is soup made with powdered potatoes. Dinner is a meager portion of freeze-dried stew and a cup of bouillon. There are no lunches. Exercise with hundred-pound weights every waking hour of each day is unavoidable. Pants slide off involuntarily. Ribs cast unfamilar zebra-striped shadows on our skin. Each of us has lost at least 20 pounds.

Days pass. As we descend, the weather stays cloudy and warm. One day the clouds part for a brief view of the Great Trango Tower, a block of granite and ice that rises 8,000 feet directly from the glacier's edge. Kim and I were the first to scale it in 1977, but we already know that our present expedition is the most demanding of our lives.

The sight of the Trango gives us new energy, and we move ahead of Dan and Ned for the rest of the day. Near dusk we come upon fresh snow-leopard tracks. Complementing the thrill of being near one of the world's rarest predators is the knowledge that we are descending into the living world. Two days later, crossing an ancient flood-plain below the glacier, we come upon more tracks. When we crest a rise, wind blowing in our faces, rushing water muting the sounds of our footsteps, we seem to be sharing the leopard's world as we come face to face with a herd of 30 Ladakh urial sheep. They spot us and burst away in unison.

On the morning of April 24, as we walk



The Rowell party's Karakoram traverse was no carefree cross-country jaunt; it required special equipment and skills, plus the willingness to move one carefully considered step at a time (left). With no porters along, each ski-mountaineer carried—and dragged—as much as 120 pounds of gear and supplies (right). Camp was made on icy-blue glaciers (above) in subzero temperatures rendered more intensely uncomfortable by a wind-chill factor that could drop the mercury below −60 degrees Fahrenheit. The reward for all this? The accomplishment of a superbly difficult task—and, of course, some of the world's most magnificent scenery.

toward Askole completely out of food, we encounter two herdsmen and a boy. I recognize the mail-runner who carried my father's ashes and call out, "Ali!" He shakes his head and says, "Hadji Ali . . . Mecca!"

A devout Moslem, he has added Hadji to his name by making the Hadj pilgrimage to Mecca. In his shelter under a house-sized boulder, he serves us tea and *tok*, a bread wrapped around smooth rocks, then baked in coals. With swelling stomachs we enter Askole—and the 16th century.

A cluster of stone huts forms the axis for wheatfields that radiate toward the Braldu River and an arc of high cliffs. Paths are shaded by willow and mulberry trees. Dzos —yak/bullock crossbreeds—pull wooden plows through fields where families dressed in undyed woolens work together. There are no roads, engines, or electricity. The scene defines tranquility.

Our journey is far from over. For three days we rest and gorge on cheese, smoked oysters, cream-filled cookies, and other treats from the barrel we had sent by a different route to be cached for us in Askole. Dan then decides to walk out the short way, partly because of a sore knee, but also so that we can travel more lightly and efficiently with just one tent, one stove, and one rope for the three of us. Light weight means speed, and speed is our key to taking less food and fuel. With loads trimmed by 25 pounds per person, we hire nine porters for three days to get us back to the snowline on the Biafo Glacier; our stop in Askole was a necessary detour from the high line of our glacial pathway.

Veteran ski-mountaineer and Olympic competitor Ned Gillette found he could make only limited progress on Nordic skis at 22,000 feet. Below, the Hispar Valley, near the kingdom of Hunza—and trip's end.

Beyond the steep-walled lower end of the Biafo Valley we enter a broad expanse flanked by moats of sand left by a recent recession of the ice. Suddenly we find easy hiking and lots of wildlife—more than 50 long-horned ibex, and the tracks of brown bears and snow leopards. This inner sanctum of the Karakoram is an alpine paradise that deserves to be a national park. The greatest display of spires in the entire range rises before us, like organ pipes in a huge cathedral. Beyond, we find the upper glacier more of a superhighway than the Baltoro above Concordia. With lighter loads, we seem to be skimming over the firm snow toward the 16,900-foot pass that connects with the Hispar, our final glacier.

A snowstorm that forces us to camp on top of the pass clears by evening, leaving deep powder for 16 miles of downhill skiing the next day. Lower on the glacier we are surprised to find the valley nearly devoid of wildlife, compared to the Biafo.

Ten days after leaving Askole we reach jeeps and hotels in the fabled kingdom of Hunza. We know we should rejoice, but after 44 days in the mountains, civilization is not as welcome as we expected it to be. As we move on to the city of Gilgit, the daily patterns we had become accustomed to are replaced by a new idleness as we sit in a high-ceilinged hotel with a multitude of servants.

At dinner I say, "Isn't it wonderful to return to hot water and cold beer?" I don't really believe it myself.

Kim has a thousand-yard stare. Without breaking his gaze, he replies, "The special things I miss are not what we're finding here, but what we've left behind in those dusty villages and our campsites in the snow." □

Galen Rowell is the author of the Sierra Club Book Mountains of the Middle Kingdom. *He contributed "A Different Beat for City Cops" to the September/October, 1983, issue of* Sierra.

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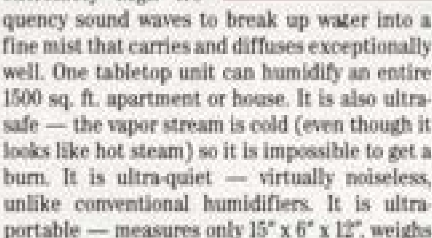

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ALICE KRUEPER

Running out of superlatives

Text and Photographs by VIRGINIA WESTERVELT

If the Sierra Club had a contest to find the person who best exemplifies the Club's ideals, Alice Krueper, chair of the San Gorgonio Chapter in Southern California, could well be the judges' first choice for the award.

Before assuming the San Gorgonio chair (which she has held for two years), Alice was vice-chair, outings chair, and secretary of the chapter. She has served on numerous committees, was a delegate to the Southern California Council, and has been a Basic Mountaineering Course instructor for the past 10 years.

As George Shipway, former chapter chair and former chair of the Southern California Council, put it: "Alice Krueper is a rare breed of lady—a highly skilled mountaineer, a dedicated and effective chapter leader and conservationist, a popular and dependable outing leader, an able and willing outing instructor, a skilled designer and producer of do-it-yourself outdoor equipment, and an always pleasant and cheerful friend."

Alice Krueper and son Ron pose before the start of the 1982 Hawaii Triathlon. Below: Alice during training for the bicycling leg of the race.

As a member of the Sierra Club for 32 years, Alice has led more than 200 trips: backpacking, camping, hiking, bicycling, mountain climbing. She has stood at the top of 41 peaks, climbing Mt. Whitney, the highest mountain in the contiguous United States (14,495 feet), seven times and Mt. San Gorgonio (11,502 feet) nine times. Her latest ascent of San Gorgonio—in driving rain and 50-mile-an-hour winds—was as leader of a chapter climb on the 50th anniversary of the founding in 1932 of the mountain's namesake chapter.

She has run in five marathons and 21 other races, usually placing first in her category. In October 1982, at the age of 56, Alice entered the Hawaii Triathlon, where participants must swim a mile out to sea and back, bicycle 112 miles, and then run another 26 miles. To train for this event, Alice, who stands 5'8" and weighs 128 pounds, ran about 50 miles, swam nearly eight miles, and cycled more than 200 hundred miles each week for the better part of a year.

"I like feeling fit," she says. "You know, our bodies were really meant to run 20 miles a day, but too many of us have let that incredible machine grow soft and flabby. And we wonder why we develop heart, lung, and back problems, why our joints creak and stiffen up, and why we feel tired or depressed half the time."

Alice's son Ron agrees with her philosophy. In fact, he was the one who kept urging his mother to try the Triathlon. In 1980 and 1981 he placed 10th and 14th, respectively, in the grueling event. (And he did it the second time with flu and fever, his mother explains.) They were the only mother-son combination in the 1981 race, in which Ron clipped seven minutes from his previous time, completing the course in 10 hours and 22 minutes.

Alice said before the race that she would be happy to be able to finish; she thought she could do it if she completed the swimming portion under the time limit of two-and-a-half hours. If she could not, she would be disqualified for the rest of the events. She did splash out of the water in less than the allotted time, and went on to finish first in her age category, in some 16 hours of swim-

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Krueper flashes her trophy—and a smile—after her first-place finish in the Hawaii Triathlon.

ming, bicycling, and running the Triathlon.

Alice was no novice cyclist. In the summer of 1981 she led a cross-country bicycle trip for Bikecentennial from Portland, Ore., to Yorktown, Va. Alice handled the finances, helped with mechanical problems, and, as a registered nurse, was available for first-aid service. The group averaged about 65 miles a day despite rain in Wyoming, hailstorms in the Midwest, and often buffeting headwinds. They slept outdoors whenever possible, but one stormy night found them lodged in the Murfreesville, N.C., jail—the best available shelter.

Alice neither looks nor acts as if she has passed the half-century mark. With her close-cropped, curly brown hair, ready smile, and eyes that sparkle, she has the energy, enthusiasm, and stamina of a woman half her age.

Her love affair with the outdoors and the various ways of preserving and enjoying it began when, as a student at U.C. Berkeley, she joined a hiking club. She not only met her husband in Berkeley, but they became one among 14 couples who made backpacking trips for many years, bringing their babies and toddlers along as they came on the scene.

When the youngsters reached a weight of 36 pounds, they had to climb out of the packs and hike along the trail with the rest of the family. Alice made the "child carriers" that supported the infants until that time, working out her own pattern; out of financial necessity, she also made their small sleeping bags, to save at least 50 percent of the cost.

This ingenuity led Alice to design other

camping equipment: a midframe bag for a bicycle, to carry tent poles and a tire pump; Alice's version of the fannypack; and her latest, a new type of tent and tarp designed to prevent bicycle theft.

"It's great for either a long trip or an overnight," Alice says. The bicycle leans up against a tree, and the rain fly is spread over both the tent and the bicycle. There is room enough between the bike and the tent to stow all the gear. Tent and tarp together weigh only three pounds. Because other cyclists admired her design, Alice has gone into cutting-and-sewing production on a small scale; she sells the outfit for around $175. Her next project is a two-bike tent and tarp designed for bicycling couples.

Letty French, vice-chair of the San Gorgonio Chapter, feels that Alice has been a mainstay of the chapter for many years. "Because she is capable, knowledgeable, and likable, she earns the respect and admiration of her friends and co-workers. She not only has a creative, artistic flair but also has the powerful self-discipline needed to initiate a project and then work through a difficult problem to its solution."

Ralph Westervelt, former vice-chair of the chapter, says he could run out of superlatives when talking about Alice Krueper. "She's unbelievably talented in so many fields. With Alice in charge, no one worries about the completion of any project. She always has time to talk, to plan, and then comes up with the best way to achieve any goal—the most efficient, practical, and effective way. And she's a fine teacher, whether the subject is wilderness survival, leadership training, sewing equipment, physical fitness, or camping and conservation knowledge. Alice shares her experience and her wisdom in such a way that everyone goes away stimulated to greater effort and a keener enjoyment of life."

Alice worked hard in the fight to keep San Gorgonio a wilderness instead of making it a recreational skiing area. As she explained during the excursion to celebrate the founding of the San Gorgonio Chapter: "It takes all of us, working hard together, to protect wilderness and wildlife from an encroaching and exploitive 'civilization.' We've lost some battles, but we've won many more, and if we keep thinking of future generations—our children and their children—we'll keep on trying to leave them a goodly heritage."

In her own life, Alice Krueper has indeed exemplified the Sierra Club's efforts to "study, explore, and enjoy" all aspects of our natural environment, and to educate others to support the Club's objectives. □

Virginia Westervelt, a longtime member of the San Gorgonio Chapter, has just published her sixth book: Pearl Buck: A Biographical Novel.

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JOSEPH L. SAX

Sacred Sands, by J. Ronald Engel. Wesleyan University Press, Middletown, Conn., 1983. $26.95, cloth. *Duel for the Dunes*, by Kay Franklin and Norma Schaeffer. University of Illinois Press, Urbana & Chicago, 1983. $18.95, cloth.

It's hard for those who have grown up in the splendidly endowed and less-vandalized regions of America to imagine how, for a youngster whose landscape was the brick flats of Chicago, the Indiana Dunes—even a few decades ago—was a magical place, open and wild, remote and free, and only an hour from the city of (nothing but) industry and commerce.

The dunes have now received sensitive and loving treatment in print—something they never got in action from the grasping industrialists and sleazy politicians of northern Indiana. J. Ronald Engel's *Sacred Sands* and Kay Franklin's and Norma Schaeffer's *Duel for the Dunes* are two of the best books yet written in the generally dreary genre of national-parks history. Better yet, though they appear almost simultaneously, there is little repetition in them, and each book whets the reader's appetite for the other. And each builds on an unconventional perspective that both surprises and enriches.

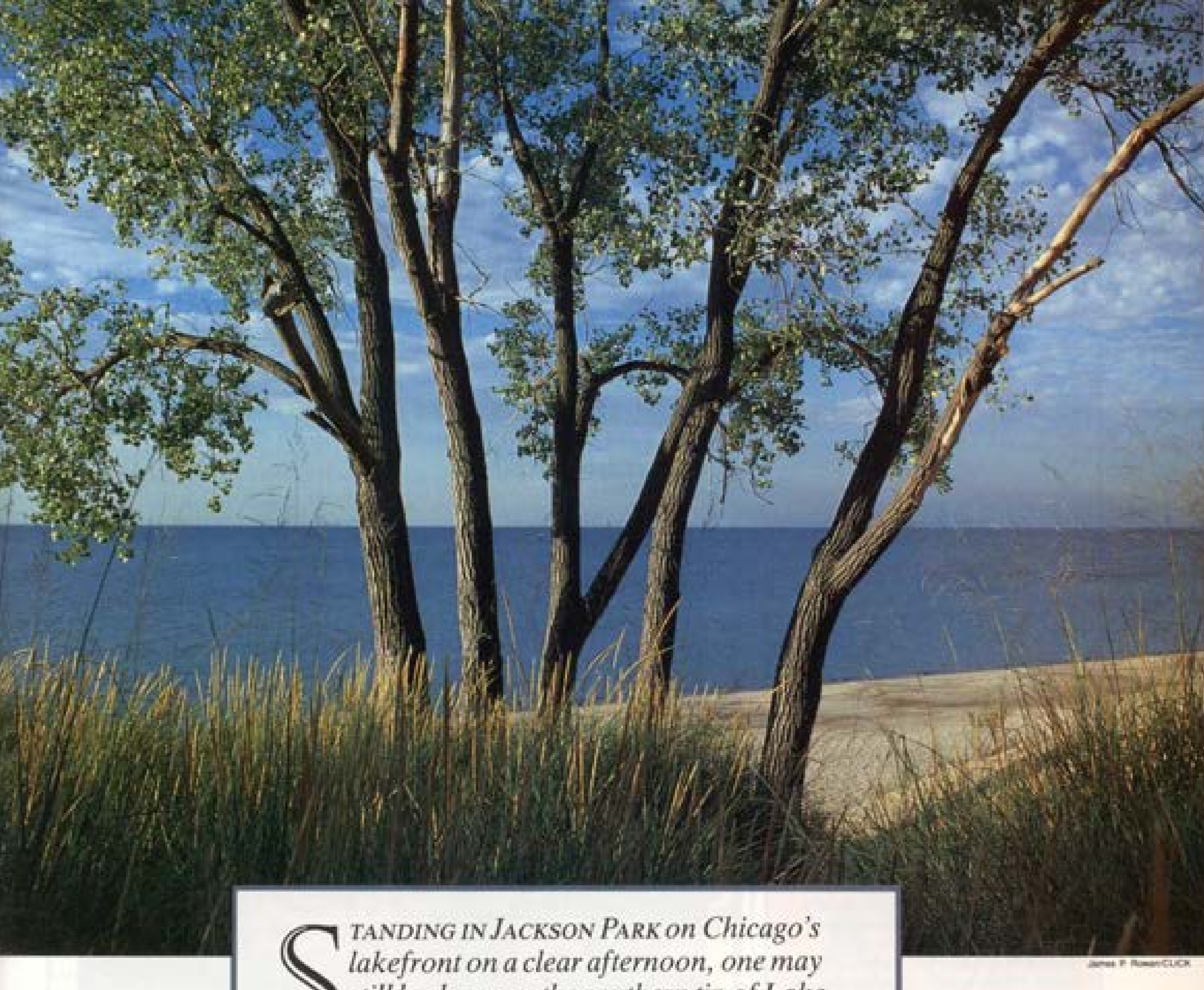
The Franklin and Schaeffer book is essentially a history of northern Indiana, a subject that seems unlikely to inspire; but before the authors finish, every reader will be persuaded that they have chosen their theme astutely. The dunes were saved in the first instance by chance; everything that made Chicago prosper made it a magnet for growth and development, and assured that Indiana's lakeshore would be ignored. Boosters of the Indiana coastal region writhed in frustration that the big city just to the west should get everything in the way of development while they should get nothing.

At the same time, the very things that caused developers to ignore the dunes, leaving them remote and natural, drew them to the attention of a core of Chicago intellectuals and progressives (at a time when Chicago was a vital artistic and literary center). These worthies saw in the dunes a symbol of contrast with mindless materialism and boundless industrialization. That symbolism, and the story of those artists, intellectuals, and reformers who wanted to sever the identification of democracy with competitive, avaricious individualism, comprise the motif of Engel's *Sacred Sands*. The list of luminous figures behind the battle for a national park, whose vision and images of "the mythic geography of the Chicago glacial plain" constitute the meat of Engel's fascinating intellectual history, is extraordinary: Carl Sandburg, Donald Culross Peattie, Edwin Way Teale, the pioneer ecologist and University of Chicago professor Henry Chandler Cowles, and a host of others who contributed to the Chicago renaissance.

The Indiana Dunes: a playground for the effete, or the region's natural center?

Deborah Bright

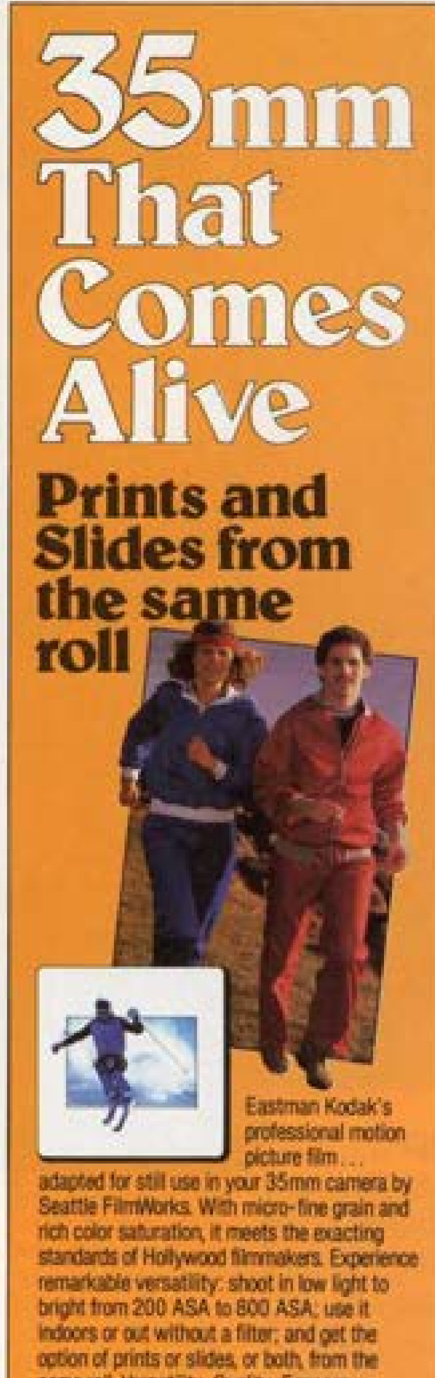
The intertwining themes of the two books set the stage for the dunes struggle that endured more than 50 years, and that is still not at an end. The landowners and politicians of northern Indiana, rebuffed in their efforts to generate another Chicago on their lakeshore, contented themselves with the in-



James P. Rowan/CLICK

*S*TANDING IN *J*ACKSON *P*ARK *on Chicago's lakefront on a clear afternoon, one may still look across the southern tip of Lake Michigan and see, low on the horizon, the greencapped headlands of the Indiana Dunes. For centuries they greeted Native Americans who traveled south by canoe to hunt and trap in the fertile crescent of marshland at the head of the lake, and when, in the seventeenth century, the* voyageurs *penetrated the Great Lakes, the Dunes rose before them to mark the entrance to the vast interior of the new continent. Although flanked and divided by factories and towers billowing clouds of smoke, and only a remnant of their former glory, the Dunes still rise to meet the eye—white and radiant in the sun.*

J. Ronald Engel, SACRED SANDS



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THE PROBLEM OF THE DUNES is a symbol of the crisis that faces all America. It is as though we are standing on the last acre, faced with a decision as to how it should be used. In actuality, it is the last acre, the last acre of its kind; in essence it foreshadows the time not too far removed when we will, in all truth, be standing on the last unused, unprotected acre, wondering which way to go. Have we the courage to stand up and place physical limits on the constant relentless march of industrialization?

Sen. Paul H. Douglas, U.S. Senate speech, May 26, 1958

Deborah Bright

dustrial dregs that even Chicagoans would not tolerate. Thus the sickening steel and petrochemical complex of Gary and its environs that I remember so clearly from my childhood. So too the endless trainloads of sand that were, at an earlier time, transported to fill in and rebuild Chicago, destroying the first segments of the dunes.

Nothing was too bad to be rejected by the moguls who ran the northernmost counties of Indiana, for what Chicagoans found repugnant was the source of their prosperity. The dunes region became America's leading, and self-selected, national sacrifice area. At the same time, it can hardly seem surprising that the residents of these fouled nests treated with the utmost contempt the efforts of Chicago painters, poets, and do-gooders to save the dunes, which they described as "the depth of the numinous—the ripe fecundity of a primordial place."

Still another twist added to the dilemma of the dunes. Within Indiana politics, power was centered in the central and southern, rural and conservative, regions of the state. It may have seemed easy to write off the dunes as a playground or totem for effete Chicagoans, but how about a park for the sweating steelworkers? This was not a much more appealing constituency in the eyes of the Hoosiers who ran things in Indianapolis. The mills of Gary, Whiting, and Hammond were full of foreigners, Catholics, and Democrats, and were becoming increasingly full of—what was worse, if possible—blacks.

The campaign for an Indiana Dunes National Park began before the First World War. In fact, it was one of the proposals that

the first director of the National Park Service, Steve Mather, himself a Chicagoan, brought to Congress in 1916, the same year the Park Service was established. Nothing happened, and nothing would happen until a small state dunes park was created in 1923, in significant measure to ward off the prospect of federal action. By the time the Indiana Dunes National Lakeshore was finally established, in 1966, the heart of the original dune country had already been ravished by the enormous Burns Waterway Harbor project of Bethlehem Steel, and only a few scattered remnants of this natural center of the Chicago region remained to be saved.

Even that would not have come about had it not been for the tireless efforts of Sen. Paul Douglas of Illinois. The commitment of this remarkable man to the politically distasteful task of leading the fight for a park in a state not his own, and against the determined opposition of Indiana's congressional delegation, is one of the great stories of America's modern environmental movement. "If we get this bill through," Douglas said, "I will feel that my life has not been in vain. Until I was 30, I wanted to save the world. Between the ages of 30 and 60, I wanted to save the country. But since I was 60, I've wanted to save the dunes."

At first, of course, Douglas sought to persuade Indiana's senators to sponsor the dunes legislation. Initially positive, according to Franklin and Schaeffer, Sen. Homer Capehart cautiously postponed an answer until he had consulted "the boys in Indianapolis." When Douglas pressed him for a reply, Capehart responded, "I can't do it; they have other plans." Indeed they did, and the Burns Harbor installation now stands as a tribute to the perseverance and cunning of the boys in Indianapolis.

But the Lakeshore—small and disjointed as it is—stands too, a tribute to Paul Douglas, Dorothy Buell (who founded the Save the Dunes Council), and a great many others who had a vision of what an industrial society could have been if nature were not always seen as the enemy. The Lakeshore stands too as a monument for all those who have never been able to see what urban national parks are all about. They can still stand on the dunes, look across to the skyline of Chicago, and picture the youngsters there who yearn to touch the earth.

(*Editor's note:* A third book on this subject was received too late for review by Professor Sax. *The Indiana Dunes* (text by Larry Waldron, photographs by Robert Daum; Eastern National Park & Monument Association, P.O. Box 308, Beverly Shores, IN 46301; $3.95) is an overview of the Dunes' place in the Lake Michigan environment. Brilliant color photographs complement the descriptions of the land, the lake, the plants,

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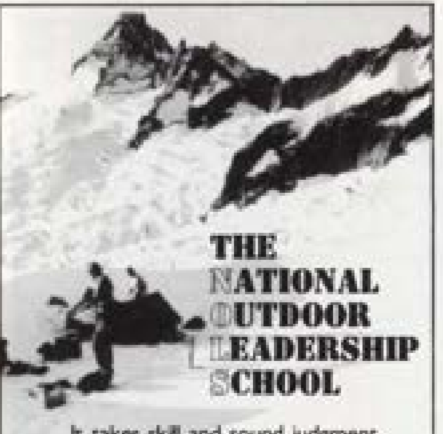

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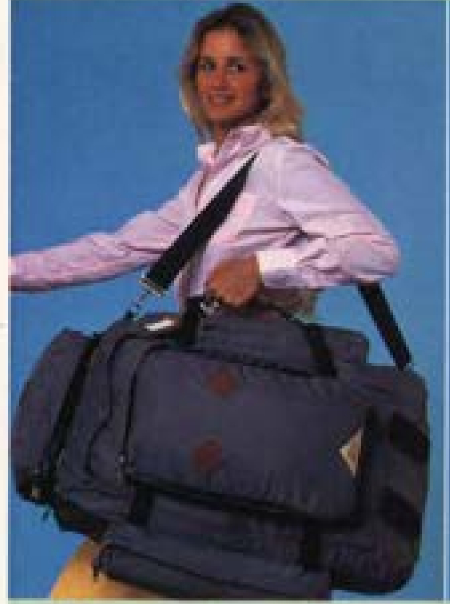

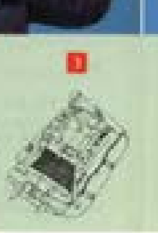

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and the people that together constitute the ecosystem Carl Sandburg called "a signature of time and eternity.")

Joseph L. Sax is the Philip A. Hart University Professor in the University of Michigan's law school. He is the author of Mountains Without Handrails: Reflections on the National Parks, *reviewed in the May/June, 1981,* Sierra.

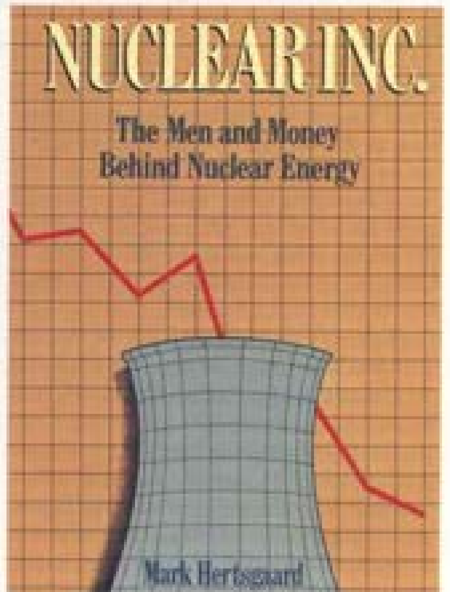
Inside the Atomic Brotherhood

MARVIN RESNIKOFF

Nuclear Inc.: The Men and Money Behind Nuclear Energy, by Mark Hertsgaard. Pantheon Books, New York, 1983. $15.95, cloth.

THOSE LEADING FIGURES of the nuclear industry "who share a deep faith in the essential goodness and historic inevitability of atomic energy" have been called the "Atomic Brotherhood." *Nuclear Inc.* is partly the story of how the Atomic Brotherhood was formed and what its members think. It is also a probing analysis of the historical basis and market forces that have shaped the present-day nuclear industry.

With an earnestness bordering on religious devotion, key industry executives see the growth of nuclear power as not only inevitable, but as the savior of Western civilization. Although no new reactors have been ordered since 1977, and many have been cancelled, this hiatus is viewed as temporary. With help from the White House and Congress, through lax enforcement of safety regulations and increased subsidies, the industry intends to turn around the un-



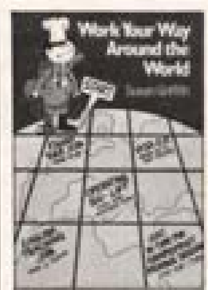
favorable economics of nuclear power. And time is on their side: The corporations that make up the nuclear industry—the reactor and component manufacturers, architecture/engineering firms, and uranium-mining companies—can sustain losses indefinitely, author Mark Hertsgaard says at one point, because nuclear power accounts for only a small fraction of their total 1981 sales of $400 billion.

Hertsgaard's analysis of how the nuclear industry has come to be is particularly acute and worth summarizing. The nuclear corporations are longtime participants in the nuclear-weapons program. General Electric and Westinghouse, who together enjoy 65 percent of total U.S. sales of nuclear reactors, are 40-year veterans. When nuclear power was demilitarized in the 1950s, and Congress encouraged sales of reactors to utilities by agreeing to cover major accidents with federal insurance, the nuclear-weapons suppliers had the inside track on commercial sales. For example, the Westinghouse reactor is just a scaled-up version of the reactor it built for the Navy.

As sales increased through the use of loss leaders, market forces led to a shakeout during the 1960s. Four reactor manufacturers prevailed. Competition during the early 1970s, the banner years for nuclear sales, was over the size of the reactors; more megawatts for the buck was the issue, not price. Because these one-of-a-kind reactors had to be individually scrutinized by the nuclear regulatory agency, licensing times lengthened and costs rose sharply.

As the Three Mile Island accident clearly demonstrated, the regulatory apparatus still has not caught up with the escalation in reactor sizes; numerous safety issues remain unresolved. Rather than deal constructively with these issues, which would only increase costs still further, the Reagan administration intends, with recently introduced legislation, to shorten the licensing process. If this legislation is enacted, its effect will be to lower the capital costs of nuclear energy, making it more cost-competitive with coal. The costs, in terms of potential health effects, would be externalized. (The Reagan administration also increased the Department of Energy's nuclear budget while reducing its aid to the competition: Support for solar-energy applications was reduced from $578 million to $70 million, and that for conservation from $558 million to $19 million. In fiscal year 1984, nukes are slated for $1.5 billion in federal funding.) Hertsgaard attributes the military's emphasis of the role of nuclear power in the national energy plan to its dominance within the Department of Energy; thus, 60 percent of the DOE budget is for defense.

The Atomic Brotherhood is right when it



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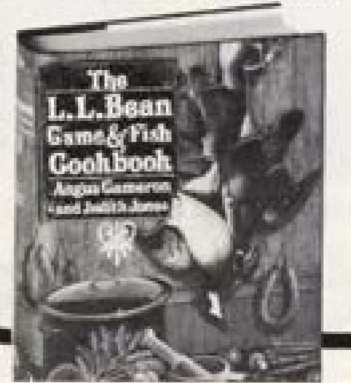

says that nuclear costs to utilities are relative. As more costs are pushed onto society in terms of potential health effects and increased tax subsidies, the relative cost to utilities declines. As a leader of the environmental movement, the Sierra Club must be prepared to fight these environmental insults and federal subsidies as it encourages more-benign energy sources.

If *Nuclear Inc.* has a weakness, it is that the author has spent too much time with industry executives; he sometimes uncritically repeats their arguments and blindly accepts their premises. When nuclear waste is described as a 600-year problem, based on the miscalculated time necessary for its toxicity to decay to that of uranium ore, it is clear that the author should have done further checking. He would have found that so-called "spent" fuel is a million-year hazard. Or when Hertsgaard says that reactor manufacturers must have export sales to survive, and then says that the major nuclear conglomerates have the financial strength to wait for the inevitable business upturn, which statement are we to believe? (The former, I think. No business will indefinitely endure financial losses in any department.)

Industry arguments that without nuclear power the country would face energy shortages, unemployment, and economic disaster go on *ad nauseum*. Nuclear executives describe themselves as pioneers for a better life. Give me a break! The truth is that high utility rates for nuclear energy are causing manufacturers and citizens to cut back on energy consumption. The Northwest's Washington Public Power Supply System (WPPSS, or "Whoops") project, if allowed to proceed, would have bankrupted the region. Nukes chew up large chunks of capital and yield few jobs. The chest-thumping by the Atomic Brotherhood's most powerful members is a mere rationalization. Yes, GE and Westinghouse are 40-year veterans of the atomic age, but the Sierra Club existed before the atom's nucleus was an idea in Rutherford's head. And despite the impressive conglomerate strength of the nuclear industry, the antinuclear movement has hurt it badly. "Knowledge is power," Hertsgaard asserts; but imperfect knowledge can bring defeat.

These reservations notwithstanding, *Nuclear Inc.* is a solid, well-documented, readable analysis of the nuclear industry. It is an invaluable tool both for activists and for the beginner who would like to know how the present-day industry came into being.

Marvin Resnikoff is codirector of the Sierra Club Radioactive Waste Campaign, and author of The Next Nuclear Gamble, *reviewed in the September/October, 1983,* Sierra.

No Wispy Spirit

PETER WILD

Rachel Carson, by Carol B. Gartner. Frederick Ungar Publishing Co., New York, 1983. $11.95, cloth; $6.95, paper.

It should be of some satisfaction to environmentalists that any list of the books that have done the most to shape Americans' thinking over the years would include a hefty number of ecologically oriented works. Thoreau's *Walden* and Aldo Leopold's *Sand County Almanac* certainly would qualify; but whatever the quibbles over other choices, *Silent Spring* deserves a spot near the top of the slate.

Rachel Carson's book about the poisoning of America by the chemical industry so jolted the nation that its author appeared on national television, Congress launched investigations, and bureaucrats and pesticide manufacturers alike danced through the hoops of public relations. Rarely does a book cause such flurries in high places.

Yet a greater measure of its impact is that *Silent Spring* helped bring on permanent changes. The issues Rachel Carson exposed 20 years ago remain in the news, as the debates over Love Canal and Times Beach bear witness. Furthermore, despite its specific focus, the exposé combined with related ecological concerns to foster passage of the Wilderness Act, creation of the Environmental Protection Agency, and the varieties of environmental legislation that continue into this decade. All of this, collectively, has been dubbed the "rebirth" of the conservation movement, a distinguishing feature of present-day America. So much we know historically about *Silent Spring*.

Over the years, the book has become legendary, while the author's life has been distorted in the intense light of her major success. The case of Thoreau offers a parallel example. One scholar wryly despairs that the man on the street might exclaim upon hearing the New Englander's name, "Oh, that's the fellow who spent half his life in the woods at Walden Pond and the other half in

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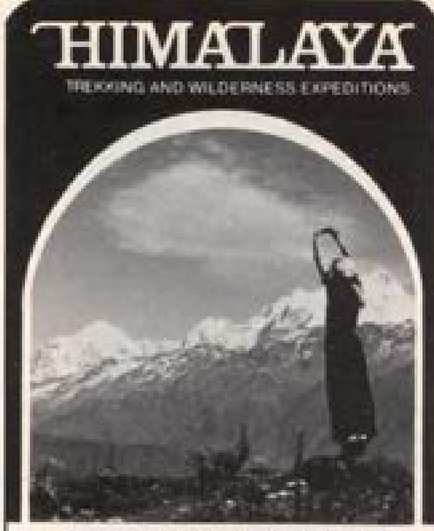

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jail." So we condemn well-known authors to simplified fame. In a similar manner, people tend to think of Rachel Carson largely in terms of *Silent Spring*, as if she had no other life and no other writings beyond her 1962 best-seller.

The purpose of Carol B. Gartner's *Rachel Carson* is to restore the balance, "to reconsider Rachel Carson's work and restate the nature of her accomplishments." In addition to that, Gartner wishes to promote Carson aesthetically, as an artist, creating a place for her "not only in history, but in literary history." The author's organization is as clear as her intent. The book recapitulates Carson's life, follows this with several chapters analyzing each of her writings, and concludes with a summary, "The Artistic Whole."

Though straightening the bent perceptions of public mythology is a Herculean task, the professor of English at Northeastern Illinois University succeeds on a number of points. Carson was a private person, cautious of making friends, but she was no fragile introvert, no wispy spirit withdrawing into nature's green, protective folds, as many of her admirers would have it. After earning a master's degree in biology from Johns Hopkins University in 1932, she rose steadily in the government until, as an editor at the Bureau of Fisheries, she directed the publication of a series of pamphlets, "Conservation in Action." No one can do that, Gartner argues, without a sense of "obligation [to help] others see and understand" and the ability to nudge fellow workers into common cause. Gartner quotes Shirley Briggs, then a member of Carson's staff: "Ruthless with her own writing, she tried equally to raise the standards of the federal prose she dealt with. . . . The tact and skill with which she tackled uninspired writers was a joy to watch."

In a similar vein, was the author of *Silent Spring* an activist? Again, as is often ignored in her public image, early in her career she led a local chapter of the Audubon Society, and later served on the board of directors of the Defenders of Wildlife. Ill with the cancer that killed her in 1964, she continued to give speeches rallying the nation to awareness of the dangers of uncontrolled pesticide use, staying "in the battle to the limits her health allowed," as Gartner puts it. In short, Carson did more than her share on the front lines of activism.

Though such aspects of Rachel Carson's life bear repetition, they have been covered before, ably so by Paul Brooks in *The House of Life: Rachel Carson at Work* and by Frank Graham, Jr., in *Since Silent Spring*. Hence, Gartner's original contributions start with her literary analyses of Carson's books. As to their philosophic substrata, she weighs the influences of Emerson, Thoreau, and

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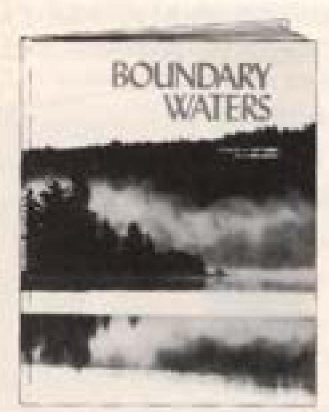

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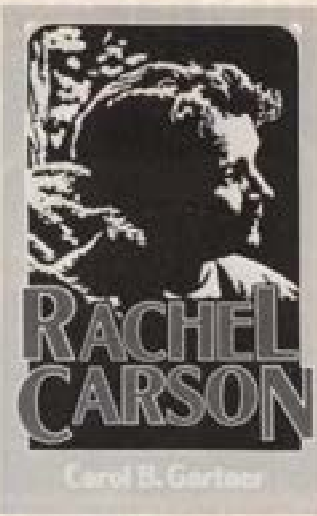


John Muir. On less obvious notes, she traces Carson's thought back to its roots in 18th-century concepts of "plenitude" and "chain of being," which celebrate, again in Gartner's words, "the abundance and variety of life and the strength of the life force" as manifestations of God's beneficence.

Beyond this, the real strength of the book lies in its discussion of Carson's literary devices, her use of rhetorical questions, humor, parallelisms, similes, metaphors, assonance, alliteration, and leitmotifs. Employing such techniques, Carson wove a rich texture of language around the core of scientific facts. And Gartner carefully details many of Carson's literary allusions, from the Bible, Longfellow, even the Declaration of Independence. In the delicacy of their refinement, they can pass right by the reader. For instance, her title, *Silent Spring*, echoes John Keats's lines:

The sedge is wither'd from the lake,
And no birds sing.

Gartner's probings should make already appreciative readers more aware of the full and subtle range of Carson's craft.

Yet, as with many a scholar, Gartner's enthusiasm for her subject finally clouds her judgment. To say, as she does on page one, that *Silent Spring* "started a worldwide environmental revolution" is to overstate a complex process. It ignores the cumulative effects of the long fight for the Wilderness Act and the unifying struggle during the 1950s to keep dams out of Dinosaur National Monument. Such causes stirred ever-widening environmental concerns in the public. The battle against pesticides did not leap out of *Silent Spring* like Athena fully armed from the brow of Zeus. In short, many forces, including the publication of Carson's best-known volume, contributed to the "rebirth" of the environmental movement in the 1960s.

Yet Gartner's unbridled zeal persists,

leading her further astray. She wishes to place Carson in "the pantheon of American writers with Henry David Thoreau." Elsewhere, she ranks Carson with Herman Melville and Joseph Conrad. Granted Rachel Carson's fine talents, that is an eyebrow-raiser. One finds it hard to imagine many students of literature, including Carson herself, agreeing with Gartner's proposal. Whatever its other virtues, in these respects *Rachel Carson* needs to be read with some caution.

Peter Wild is a professor of English at the University of Arizona, Tucson. His most recent book review for Sierra appeared in the July/August, 1983, issue.

OF BIRDS AND BIRDERS

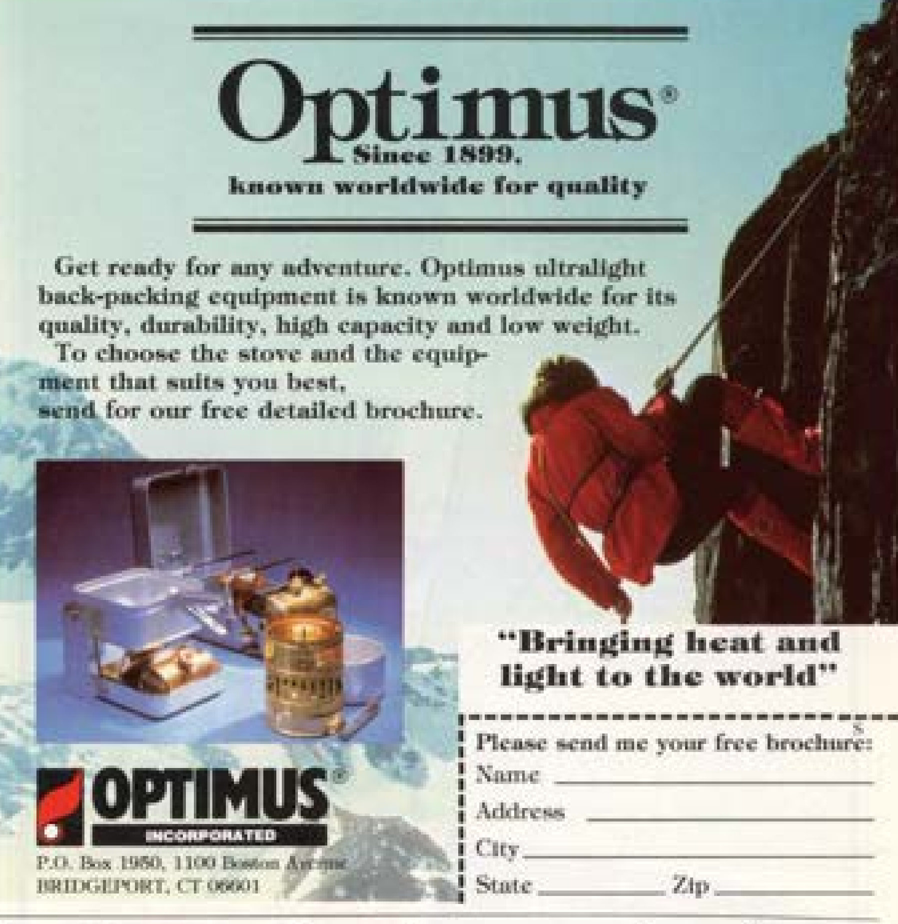
HARRY MIDDLETON

The Birdwatcher's Companion: An Encyclopedic Handbook of North American Birds, by Christopher Leahy; illustrated by Gordon Morrison. Hill & Wang, New York, 1982. $29.50, cloth.

A PLETHORA OF BIRDING BOOKS, field guides, and related birdwatching paraphernalia makes life for today's birdwatcher not simpler but rather more complex. No longer can we simply delight in the birds of our backyard. Instead, we are encouraged to get out and list them, to keep a detailed record of their comings and goings, habits and moods.

An astonishing number of bird books are published each year to help the frazzled birdwatcher along. No moment of a bird's existence is left unstudied, uncatalogued, unaccounted for. The trouble with all this information is that it has been, for the most part, too widely scattered to be of much use to the average birder. At least, such was the case until the appearance in 1980 of John Terres's *Audubon Society Encyclopedia of North American Birds* (Knopf), to which we may now add Christopher Leahy's wonderful book, *The Birdwatcher's Companion*.

Leahy has written what no one else in the world of birdwatching has been able to come up with—a compact book that has something to say about almost every imaginable aspect of birds and their lives. Among the book's more than 1,250 entries are excellent essays on all the major topics dear to a birdwatcher's heart—flight, song, migration, the complex questions of bird behavior, and so on. In each case Leahy brings the



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topic up to date with the latest research and findings from the field. There are also fine biographies of the men and women who have made lasting contributions to ornithology in particular and to our understanding of birds in general.

Leahy's book is easy to consult—listings are alphabetical—and a joy to read. Hardly a page can be turned without something of interest catching the reader's eye. Take for example what Leahy has to say of purple martins and mosquitoes. Great claims have been made that martins eat huge quantities of mosquitoes and thus are a logical means of controlling the insect. Unfortunately, martins and mosquitoes do not keep the same schedules. Leahy writes, "Martins are mainly diurnal, mosquitoes mainly crepuscular and nocturnal. . . . One should be particularly wary of extravagant claims made by those offering martin houses for sale. None of this should diminish anyone's enthusiasm for purple martins one iota. They are beautiful, interesting, and charming birds—well worth attracting." But they will not keep your life free of mosquitoes.

Elsewhere, in a delightful essay on birdwatching, Leahy draws some insightful conclusions regarding the differences between Americans and Europeans. "American birdwatching (birding)," he writes, "is largely a form of competitive sport involving how many species of birds one can see in a day, year, life, state, or the world; a great deal of driving and talking are usually involved in a day's birding, and relatively little attention is paid to individual birds. European birders (birdwatchers) concentrate more on honing field identification skills under difficult conditions; they tend to walk (and slog) more, write a great deal in notebooks. . . , are not very tolerant of idle conversation while 'watching,' and are usually suspicious of listers; they consider good notes on a particular species better evidence of a good day in the field than a long species list."

Everywhere Leahy's book is marked by

sound scholarship, good writing, and candor. In talking of birders, Leahy admits that "it probably must be taken for granted that there will be a few yahoos in any interest group, and the slob birders are doubtless best checked by the responsible majority of the birding community." Given both that the number of birders is forever increasing and that among them will be the ungrateful, the rude, the pushy, and the discourteous, Leahy proposes his own Birdwatcher's Code of Conduct. Among his many sound and reasonable points are these: "Don't approach active nests too closely. . . . Keep talk to a minimum or at least at low volume—a particularly tough one for American birders. If you are obliged to lead a group, keep your lectures brief and dulcet. . . . Leave your dog at home. . . . Don't assume that all birders benefit from the sounds issuing from your tape recorder; many prefer to pursue their quarry without resorting to mechanical trickery; botanists and hikers trying to capture a semblance of wilderness are likely to be even less sympathetic to taped bird calls."

Leahy also confesses to what a great many ornithologists refuse to admit—that, despite all the trouble the professional ornithological community has gone to in ordering and naming the birds of North America, most of us know the birds by their unofficial, colloquial names. Since, as Leahy says, it is the Latin names that we depend on for nomenclatural consistency, there is no reason not to keep and even treasure our heritage of colloquial names. It is comforting, anyway, to know that there are those who will always know the loggerhead shrike as butcherbird, the osprey as fish hawk, the bobolink as ricebird, the wood thrush as swamp angel.

Whatever the birdwatcher's question, Leahy has an answer. A list of major North American birding "hot spots" complements the excellent appendices, including one that cites all species occurring regularly and irregularly in North America. Leahy also provides one of the richest bird and birding bibliographies available.

Remarkably, Leahy has been able to give us a book on birds full of both wonder and fact—one that reminds us that birds do not as yet recognize the difference between professional ornithologists and novice birdwatchers, and sing as wonderfully in the presence of either. Reading Leahy's book, I remembered again that I so love watching birds because it is an activity that freely gives the same excitement, beauty, and reward to professional and amateur alike. □

Harry Middleton, a frequent contributor to Sierra, *writes nature reviews on a regular basis for* The Philadelphia Inquirer. *His work has also appeared in* Sports Illustrated *and* Blair & Ketchum's Country Journal.

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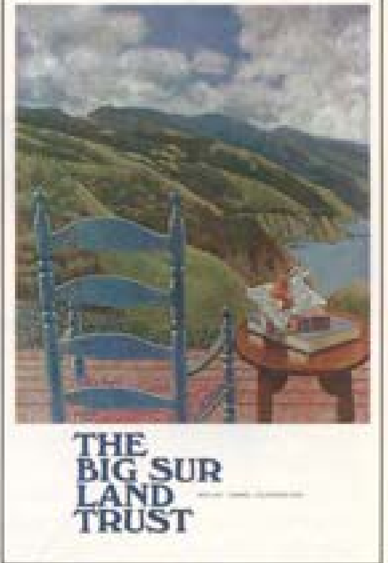

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Sierra Club trips average from 12 to 30 members and are generally organized on a cooperative basis. Trip members help with camp chores, including food preparation and cleanup, under the direction of a staff member. First-timers are often surprised by the satisfaction they derive from this participation. Please read the following trip descriptions carefully and send in the coupon "For More Details on Outings." Reservations are being accepted now for all spring trips. Make sure you read the Reservation & Cancellation Policy thoroughly (page 88) before applying. Watch for your January/February issue of *Sierra* for the complete listing of 1984 Outings.

SPRING TRIPS

(200) High Desert Special, Mojave Desert, California—January 29-February 4. *Leader, Dolph Amster, P.O. Box 1106, Ridgecrest, CA 93555. Cost: $225.*

The Mojave Desert is best visited in late winter when temperatures are moderate, lighting low and soft, and shadows transparent. We will car-camp at sites in or near Death Valley, with ample time for leisurely exploration of sand dunes, canyons, and unique formations. Members of all ages are welcome—especially the artist or photographer around whose deliberate ways this trip will be planned.

(26) Natural History of the Anza-Borrego Desert, California—March 24-31. *Leader, Bob Miller, 11713 NE 150th Pl., Bothell, WA 98011. Cost: $255.*

Join us on this week-long desert adventure in an area rich in scenery and in Indian and early Spanish history. Enjoy the flexibility of a base camp from which to explore the backcountry of California's largest state park, and to observe the flora and fauna of the living desert in the springtime.

(27) Big Bend Potpourri, Texas—April 11-17. *Leader, John Colburn, P.O. Box 37199, Sta. D, Albuquerque, NM 87176. Cost: $395.*

Whitewater rafting through Santa Elena Canyon on the Rio Grande; backpacking in the Chisos Mountains; dayhiking in the varied ecosystems of the Chihuahuan Desert—these things and more will fill our week on the Mexican border. Early spring means desert wildflowers for our enjoyment and moderate weather for our comfort. We will use our personal vehicles to travel to the campsites and trailheads within the park.

(28) Hawaiian Islands Spring Trip: Oahu, Lana'i, Maui—April 12-20. *Leader, Mia Monroe, 428 10th Ave., San Francisco, CA 94118. Cost: $510.*

Discover the "other Hawaii"! We will see and experience Oahu as no Waikiki-bound tourist ever has, and we'll also have the rare treat of enjoying one of Hawaii's least-visited islands, Lana'i. From our first camp in a botanical garden beneath the pali (steep cliffs) we will delve into Hawaii's indigenous culture; visits to archaeological sites and native gardens, spectacular hikes, and such crafts as lei-making await us. On Lana'i we will camp at beautiful Hulopoe Bay. Our days will be spent leisurely discovering ancient petroglyphs and the finest swimming and snorkeling on the Pineapple Island. A sailing cruise takes us to Maui at the trip's end.

(29) Maui—Tropical Paradise—April 13-21. *Leaders, Lynne & Ray Simpson, 1300 Carter Rd., Sacramento, CA 95825. Cost: $390.*

Join us on the friendly island of Maui, legendary home of the sun. Here we will celebrate the transition from winter to spring, camping in a variety of beach locations, and traveling between sites by rental vehicles. Day and overnight hikes will explore the diverse geographical areas available on this spectacular island. Menus feature Pacific Basin fare, cooperatively prepared by trip staff and participants.

(30) Rogue River Trail Wilderness Lodges, Oregon—May 13-18. *Leader, Mark Minnis, 14900 Galice Rd., Merlin, OR 97532. Cost: $460.*

Hike the historic Rogue River Trail through the Wild Rogue Wilderness, carrying only a daypack. Other gear will be carried by raft, following the trail along the river. We will stay in rustic wilderness lodges each night with clean beds, hot showers, and fabulous home-cooked meals. Two layover days will be spent at Half Moon Bar, where we can enjoy the beauties of spring and the abundant wildlife of the Rogue River canyon. Bring your cameras; spring birds and flowers will highlight this trip.

BACKPACK TRIPS

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

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

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

Strenuousness is measured also in less obvious ways. On desert trips members are

SPRING OUTINGS

often required to carry liquids that significantly increase their pack loads. Canyon trips entail steep descents and climbs, and temperatures may vary considerably from top to bottom.

The demands of backpacking require that the leader approve each trip member based on responses to questions about previous backpacking experience and equipment. If you lack experience or have never backpacked at high elevations for any length of time, you may qualify for one of the less strenuous trips by going on weekend backpack outings prior to the trip. Unless otherwise stated, minimum age on backpack trips is 16, although qualified youngsters of 15 are welcome if accompanied by a parent.

(31) New Year in Big Bend, Big Bend Park, Texas—December 29, 1983-January 4, 1984. *Leader, Rick Brown, 3305 Westhill Dr., Austin, TX 78704. Cost: $230.*
Winter is a wonderful time to enjoy the Big Bend, with crisp nights and clear, warm days. Our 45-mile hike through a remote corner of west Texas will take us from the heart of the wooded Chisos Mountains, the southernmost range in the United States, down through the colorful Chihuahuan Desert to the banks of the Rio Grande, there to relax in a 105-degree spring. En route we will visit several frontier sites, including Glenn Spring (with a New Year's layover day), and Mariscal, an abandoned mine ringed by mountains. Highest elevation is 7,835-foot Emory Peak. (Rated L-M)

(32) Superstition Wilderness, Arizona—March 4-10. *Leader, Ken McGinty, 2221D W. Turney Ave., Phoenix, AZ 85015. Cost: $170.*
This backpack trip will make a 60-mile loop through an area of rugged and magnificent volcanic mountains and canyons, where elevations range from 2,400 to 6,000 feet. We will climb peaks, visit Indian ruins and enjoy some of the best scenery in the Sonoran Desert. (Rated M-S)

(33) Galiuro Wilderness, Galiuro Mountains, Arizona—April 8-14. *Leader, Sid Hirsh, 4322 E. 7th St., Tucson, AZ 85711. Cost: $160.*
Wild, very rugged, and little affected by

Donald L. Gibbon

modern man, the Galiuros in southeastern Arizona are wilderness at its finest. We will travel over brushy, waterless ridges, up and down steep slopes with brightly colored soils and oddly shaped rocks, and through heavily forested canyons with, perhaps, running water. Moving days will range from 5 to 14 miles over good trails, bad trails, and no trails. There will be two layover days to give us an opportunity to explore each of the main inner canyons and to visit the remains of an historic gold mine. (Rated M-S)

(34) Painted Rocks Leisure Loop, Santa Ynez Mountains, California—April 8-14. *Leader, Len Lewis, 2106-A Clinton Ave., Alameda, CA 94501. Cost: $150.*
The Santa Ynez Mountains lie northeast of Santa Barbara, and feature high meadows and deep, rugged canyons. This seven-day on-trail trip will take us from the desert, across the high Potrero and to explore the Sisquoc River. Novice backpackers in good shape will be welcome. (Rated L-M)

(35) Ventana Desert to Redwood Forest, Coast Range, California—April 14-21. *Leader, Bob Berges, 974 Post St., Alameda, CA 94501. Cost: $155.*
Spring is the time to get your boots moving on the pleasant trails of the upper Big Sur drainage. Camps will be on 1,000-meter ridges and in river canyons. Our layover day will be spent at Redwood Creek. A short walk from there will let us enjoy a soak in a hot spring. On a short side trip, we will walk to the top of South Ventana Cone (4,965), the highest summit in the wilderness. Wildflowers will be blooming, and all required hiking is on trails. (Rated L-M)

(36) Pacific Crest Trail—Mojave to Sierra—April 14-22. *Leader, Bill Allen, Rt. 1A, Box 34, Red Bluff, CA 96080. Cost: $185.*
A challenging portion of this National Scenic Trail heads north from Mojave (2,782) 60 miles through topography shaped by the same forces that created the Sierra Nevada. This trip will require members to use desert travel skills for full enjoyment of a desert experience. Spring flowers and encounters with many species of wildlife, especially nocturnal, are anticipated. Our central commissary features a modified natural-food menu and loads proportional to your body weight. (Rated M)

(37) Crest of the Black Range, Death Valley Monument, California—April 14-22. *Leader, Laurie Williams, Box 124, Canyon, CA 94516. Cost: $190.*
Extended backpacking in the convoluted mountains of Death Valley requires water caches and much scouting. This is a rare opportunity to see the great canyons, distant vistas, sites of mining camps, and charming hidden springs of the rugged mountains that rise directly above the lowest point in the Western Hemisphere. (Rated M-S)

(38) Hurricane Deck, San Rafael Wilderness, California—April 15-21. *Leader, John Ingvoldstad, 777 Charmain Dr., Campbell, CA 95008. Cost: $160.*
Located in the Coast Range, the San Rafael Wilderness is a land of ridges and stream-bottomed canyons. We will visit the unique rock formations of Hurricane Deck, hike along the boundary of the Sisquoc Condor Sanctuary, and enjoy the waterfalls of the Sisquoc River. On our layover day there will be a climb of Big Pine Mountain (6,828), the highest summit in the wilderness. (Rated L-M)

(39) Kanab Canyon/Thunder River, Grand Canyon, Arizona—April 28-May 5. *Leader, Peter Curia, 1334 W. Willetta, Phoenix, AZ 85007. Cost: $185.*
The sights and scenery in this area are among the best that the Grand Canyon offers to the off-trail adventurer. There are the expanse of the Esplanade, the redwall narrows of Jumpup, the usually muddy and always sinuous Kanab Creek, the sculptured floor in Scotty's Hollow, the murmur of Whispering Falls, the torrent of Deer Creek Falls, and finally the explosive headwaters of Thunder River. The terrain is difficult and there are no layover days, but the memories that go with you are forever. (Rated S)

(40) Navajo Mountain-Rainbow Bridge—May 6-13. *Leader, Nancy Wahl, 325 Oro Valley Dr., Tucson, AZ 85704. Cost: $190.*
On the Navajo Indian Reservation in northern Arizona, Navajo Mountain rises 10,388 feet, dominating the landscape. Rainbow Bridge, magnificent sandstone canyons, slickrock vistas, wildflowers, and sparkling creeks make this trip a hiker's and photographer's delight. Time is allotted in the eight-day hike for exploration. (Rated M)

(41) Secret Backpack, Coconino Forest, Arizona—May 13-19. *Leader, Jim Ricker, 525 S. Elden, Flagstaff, AZ 86001. Cost: $175.*
Journey to the beautiful and secret places of Sycamore Canyon and Secret Canyon. We will average eight miles a day on rough trails and rocky creek-bottoms. There will be one layover day and one 2,000-foot climb. The views from Secret Mountain (6,400) are spectacular, and the seldom-visited side canyons offer excellent opportunities for exploration. Wildlife is abundant, and the wildflowers should be at their peak. Expect warm, dry days and mild, cool nights. (Rated M)

For More Details On Outings

Outings are described more fully in trip supplements that are available from the Outing Department. For more detailed information on a trip, request the specific supplement for that outing. 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 or interests. Don't be lured onto 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 five supplements are free. Please enclose 50 cents apiece for the extras. Write or phone the trip leader if any further questions remain.

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(42) Tuckup Trail, Grand Canyon Park, Arizona—May 19-26. *Leader, Bob Marley, 4245 N. 26th St., Phoenix, AZ 85016. Cost: $220.*
The Tuckup Trail follows the Esplanade 2,500 feet above the Colorado River within the seldom-visited western Grand Canyon. A wet spring will insure desert wildflowers in this arid region. Midway through the trip we descend Tuckup Canyon and return following the Colorado River. A camp at Lava Falls the last evening should allow time for photographing rafters at Grand Canyon's largest rapid. We will exit the canyon via Lava Falls Trail for views from Toroweap Overlook. Much of the trip will be off-trail, and there will be one rappel. (Rated S)

(43) Canyonlands Park, Salt Creek and Needles, Utah—May 19-27. *Leaders, Linda and Barry Morenz, 1209 N. Stewart, Tucson, AZ 85716. Cost: $350.*
We will hike up Salt Creek Canyon with its red sandstone walls, desert wildflowers and waterfalls. Time will be taken to inspect the many Anasazi ruins and pictographs, arches and side canyons. After three days we will hike out of the canyon and be driven by four-wheel-drive vehicles to The Needles (named for the many spires in the area). Our slickrock hike will wind through a labyrinth of dry canyons, taking us to Chesler Park and Druid Arch. The hiking will be at 5,000 to 6,000 feet, with time for day hiking. (Rated L-M)

(48) Dark Canyon, Utah—May 26-June 2. *Leader, Pete Nelson, 5906 Dirac St., San Diego, CA 92122. Cost: $235.*
Dark Canyon is a proposed wilderness south of Canyonlands National Park and north of Natural Bridges National Monument. From Manti-LaSal National Forest (8,000+) we descend 40 miles through pine to juniper, then to cottonwood at the Colorado River. The lower canyon has flowing water, plunge pools below waterfalls, and canyon walls of varied hues. The last day we climb out on the Sundance Trail. (Rated M)

WILDERNESS THRESHOLD

(49) Easter in Aravaipa Wilderness, Arizona—April 17-22. *Leaders, Beth & Bob Flores, 2112 W. Portobello, Mesa, AZ 85202. Cost: Family of three-$540. Each additional child-$135.*
Aravaipa Canyon is rich in natural beauty and western lore. An unusual, perennial phenomenon in the Arizona desert, the canyon nurtures sycamore, ash, cottonwood, and willow trees. Aravaipa Canyon, home to the Whittal Wildlife Preserve, hosts desert bighorn sheep, deer, coati-mundi, javelina and more than 150 species of birds. Historic and prehistoric ruins plus the Arizona desert in full bloom make this area even more intriguing. Easy access by air brings you to nearby Phoenix or Tucson. This trip is suitable for children of any age.

SERVICE TRIPS

(50) Kanab Creek Trail Maintenance Project, Kaibab Forest, Arizona—March 23-April 2. *Leader, Tim Wernette, 10 N. Bella Vista, Tucson, AZ 85745. Cost: $85.*
Kanab Creek is one of the major drainages on the North Rim of the Grand Canyon, with spectacular sandstone cliffs, side canyons, cottonwood and oak thickets, and wide sandy benches. The first four work days will consist of building trail tread, making large rock cairns to mark the trail, and moving rocks and light brushing. The latter half of the trip will be a long hike down into the Grand Canyon to the Colorado River. The trip will be moderately strenuous.

(51) Mazatzal Wilderness, Tonto Forest, Arizona—April 15-22. *Leader, Rodney Ricker, P.O. Box 807, Cottonwood, AZ 86326. Cost: $75.*
Especially beautiful in the spring, the little-used Mazatzal Wilderness is part of one of the largest roadless wilderness areas in the state. This backpack trail-maintenance trip is in rugged and picturesque mountain country, cut by steep-sided canyons. Pine and Douglas fir in the higher elevations yield to the upper Sonoran Desert.

(52) Red Rock Trail Maintenance, Coconino Forest, Arizona—April 22-28. *Leader, Jim Ricker, 525 S. Elden, Flagstaff, AZ 86001. Cost: $75.*
The Red Rock country of central Arizona is a beautiful land of sandstone canyons and pine-covered mountains. The Forest Service is upgrading its trail system here, as most trails suffer from erosion, rocky terrain, and thick brush. We will tentatively work the Taylor Cabin Trail (4,600-6,600) in Sycamore Wilderness. We will work every other day, and there will be plenty of time to explore the canyons, photograph the views, or just soak up the wilderness atmosphere. Expect warm days in the lower elevations and a chance of snow higher up.

(53) Guadalupe Mountains Wilderness Restoration, Texas—May 1-10. *Leader, John Colburn, P.O. Box 37199, Sta. D, Albuquerque, NM 87176. Cost: $75.*
Old range improvements in the high country of the 46,850-acre Guadalupe Mountains Wilderness will be removed to restore this "Island in the Desert Sky" to its wild state. A hike to the highest point in Texas, a visit to undeveloped New Cave in nearby Carlsbad Caverns National Park, and exploration of McKittrick Canyon and the Capitan Reef will offer respite from the hard, but rewarding, work.

SKI TRIPS

(291) Adirondack Ski Touring, New York—January 15-20. *Leader, Hank Scudder, 2 Troy Pl., Schenectady, NY 12309. Cost: $345.*
Continuous wilderness skiing in the southern Adirondacks is featured on this trip. We ski to different inns or wilderness log cabins each day. Your baggage is carried for you by

vehicle. The trip includes lodging, meals and assistance in transferring your luggage.

(54) Yellowstone Backcountry Ski Tour—March 3-9. *Leader, Randy Klein, c/o Johnson Associates, Park Meadows Plaza, Park City, UT 84060. Cost: $315.*

We will take a snow coach into Old Faithful and ski two tours of three days each, spending the layover night in cabins. The topography is not extreme, but the weather in Wyoming dictates that all participants must be intermediate skiers with some previous winter camping experience. The trip will be moderate to strenuous. Leader approval is required.

(55) Oregon Cascades Cross-Country Skiing, Deschutes Forest, Oregon—March 18-24. *Leaders, Marriner Orum & Bill Bankston, 2389 Floral Hill Dr., Eugene, OR 97403. Cost: $245.*

This trip will consist of three nights of winter camping, two nights in a backcountry lodge, and one night in a city motel. There will be approximately 11 miles of skiing with full pack; all other skiing will be with daypack only. Expect varied skiing from forest trails to open hillsides, with superb views of Bachelor Butte and the Three Sisters. The area is on the fringe of the Three Sisters Wilderness Area, near the Bachelor Butte Ski Area just west of Bend. Oregon spring weather is unpredictable—sometimes sunny, often stormy.

(56) Zealand Valley Cross-Country Ski Tour, White Mountain Forest, New Hampshire—March 24-28. *Leaders, Jeanne Blauner & Phil Titus, c/o 54 Allenhurst Rd., Buffalo, NY 14214. Cost: $235.*

Located between the Franconia Range and Crawford Notch, the Zealand Valley offers opportunity for several excellent day trips from the AMC hut where we will be lodged. Day tours include Zealand Notch to the Ethan Pond shelter and along the Thoreau Falls trail to the Pemigewasset Wilderness and River. Spectacular winter views of the White Mountains are nearby. We will ski all food into the hut via seven miles of old railroad bed. Group chores will include meal preparation and wood gathering. This is a perfect trip for intermediate-level skiers, provided they can ski that first day carrying gear and food.

(57) Crater Lake Cross-Country Ski Tour, Oregon—April 8-14. *Leader, Tim Odell, 750 W. Broadway, Eugene, OR 97402. Cost: $200.*

Crater Lake National Park offers outstanding ski touring, with magnificent views of the lake, the caldera, and the mountains of southern Oregon. The first three days will be spent day-touring from a base camp, a short ski in from the road. We will come out for a night in a lodge, and then spend four days in the 38-mile circumnavigation of the lake. The trip will be moderate to strenuous, depending on snow conditions. Skiers should have intermediate skills and snow-camping experience.

(58) Markagunt Plateau Alpine Ski Tour, Fishlake and Dixie Forests, Utah—April 14-21. *Leader, Bob Paul, 13017 Caminito Mar Villa, Del Mar, CA 92014. Cost: $220.*

Our cross-country tour will explore the snowy wilderness of the mountain plateaus of southern Utah. We will ski the powder slopes, frozen lakes, ridgelines, and high valleys at elevations of 7,500-10,500 feet, ending our trip at Brianhead Ski Resort. All equipment and supplies will be carried except for a midtrip food cache. This 45-mile tour is rated moderate to strenuous and is for strong intermediate skiers with snow-camping experience. Leader approval is required.

WATER TRIPS

(283) Suwanee River Canoe and Backpack, Florida—January 15-20. *Leader, Eric Hohnwald, 2709 Stickney Point Rd., Sarasota, FL 33581. Cost: $190.*

A unique combination of northern Florida oaks, cypress, a major spring-fed river, bluffs, and ravines offer an unusual contrast to the typical southern Florida scene on this combination canoe-backpack trip. There will be two days of easy downstream paddling (no rapids) on this undeveloped, tea-colored river. We'll hike back alongside the river for three days on the Florida Trail.

(45) The Grey Whales of Magdalena Bay, Baja—January 28-February 4. *Leader, Mary O'Connor, 2504 Webster St., Palo Alto, CA 94301. Cost: $995.*

Magdalena Bay is one of the largest grey-whale mating grounds in Baja, covering 80 square miles of quiet, deep water, small canals, inlets and islands. We will observe the breaching, fluking, and skyhopping of these magnificent animals from our floating home, the *Don Jose*, a comfortable 80-foot boat. Also of interest are mangrove swamps that support a variety of sea and shore birds, plus rolling dunes and shell-filled stretches of beach. Cost includes roundtrip transportation from La Paz, Mexico.

(46) River of Ruins Raft Trip, Mexico—February 8-19. *Leader, John Garcia, 124 Romero Circle, Alamo, CA 94507. Cost: $995.*

The "River of Ruins," Rio Usamacinta, forms the boundary between northern Guatemala and Mexico. We will visit ruins of great Mayan city-states. The river is quick and deep with some rapids, and the surrounding area is tropical jungle. We will see many varieties of animals and birds, among them monkeys, iguanas, and caymans, as well as parakeets, parrots, macaws, toucans, and more. Cost includes roundtrip transportation from Villahermosa, Mexico.

(47) Blue Whale Expedition, Sea of Cortez, Mexico—March 18-24. *Leader, Jeanne Watkins, 26 Miramonte Dr., Moraga, CA 94556. Cost: $995.*

The special goal of this expedition will be to observe the magnificent blue whale, the largest living creature on earth. We will drift along with the whales—listening to their

sounds and observing their behavior. We'll also have the opportunity to observe finbacks, Bryde's, minke, sperm, grey, and killer whales and several species of dolphin. We will cruise north from La Paz aboard the 80-foot *Don Jose*, visiting islands and fishing villages. Cost includes roundtrip transportation from La Paz, Mexico.

(59) Scenic Suwannee River Canoe, Florida —March 24-31. *Leader, Rick Egedi, 117 Hawkins Ave., Somerset, KY 42501. Cost: $320.*
Warm days and cool nights are anticipated on the Suwannee River trip. By late March the flowers will be blooming and the birds will be chirping. Your trip will cover 75 miles of scenic river with a layover day at Big Shoals, the only Class II rapid on the Suwannee. Starting at Fargo, Georgia, we will travel at a relaxing pace to Suwannee Springs, Florida. A special trip for beginning through advanced canoeists.

(60) Dismal Swamp Canoe Base Camp, Virginia/North Carolina—April 15-21. *Leader, Connie Thomas, 128 Muriel St., Ithaca, NY 14850. Cost: $165.*
Extending south from Norfolk, Virginia, into North Carolina, the Dismal Swamp comprises an area of lowlands, lakes, and the Northwest River, fed by tributaries of swamp origin. The swamp isn't really "dismal" and we should observe spring warblers and other birds, frogs, snakes and budding flora, while hopefully visiting before mosquito season. Our base camp will be on the Northwest River, where exploratory trips on tributaries and backwaters are planned, along with trips to Lake Drummond, Merchants Millpond State Park (with stands of moss-draped cypress), and the Outer Banks. Canoeing will be on flat water, but possible high winds on open expanses require prior canoeing experience.

(61) Gila River Float Trip, New Mexico—April 29-May 5. *Leader, John Ricker, 2610 N. 3rd St., Phoenix, AZ 85004. Cost: $215.*
We will take advantage of the spring runoff to experience the whitewater of the Gila River. This trip is suitable for beginners who have previously rowed or paddled a boat. We start at the forks of the Gila, run through Gila River Canyon in the Wilderness Area, and end at Turkey Creek. There will be time for one or two side trips. Rubber rafts will be provided, as well as some inflatable kayaks. In case of low water, the trip will be changed to the Salt River of Arizona or to a backpack in the Gila Wilderness.

(62) Pine Barrens Canoe and Backpack, Pinelands Reserve, Southern New Jersey—May 6-12. *Leader, Herb Schwartz, 2203 St. James Pl., Philadelphia, PA 19103. Cost: $220.*
Located surprisingly near New York and Philadelphia, this 2,000-square-mile wilderness remains a sand-bedded forest with cedar swamps and canoeable rivers. Once a colonial industrial area, its bog-iron furnaces supplied Washington with cannonballs. This vanished society is re-created in the restored town of Batsto, where our trip begins. We'll circle the heart of the Pine Barrens, hiking through ghost towns, cedar swamps, and dwarf pine forests, then canoeing on winding, dark, cedar-water rivers.

(63) Owyhee River "Row-it-Yourself" Raft Trip, Oregon—May 13-17. *Leader, Bill Gifford, 3512 NE Davis, Portland, OR 97232. Cost: $385.*
Flowing through a series of dramatic high-desert canyons in southeast Oregon, the Owyhee offers superb whitewater and continually changing geography, reminiscent of the Grand Canyon. This is true wilderness, perhaps the most remote river trip in Oregon. The river is on the Pacific flyway and is a birdwatcher's paradise. No rafting experience is necessary; this trip is ideal for the beginning or intermediate rafter. Instruction in rowing and all river gear are provided. A geologist who has studied the area will accompany us.

(64) Rogue River Raft and Lodges, Oregon —May 23-27. *Leader, Mark Minnis, 14900 Galice Rd., Merlin, OR 97532. Cost: $515.*
Raft the wild and scenic Rogue River while staying in wilderness lodges with all the comforts of home. We will spend five days on the Rogue in oar boats, led by experienced river guides. Each night we will be staying in a wilderness lodge with home-cooked family style meals, clean beds, and hot showers. We will layover at Half Moon Bar and enjoy the awakening of spring. A naturalist will lead field trips to discuss the flora and fauna of the canyon. We hope to have a chance to hear the drumming of the ruffed grouse in the splendor of the Wild Rogue Wilderness.

(65) Grand Canyon Oar Trip, Arizona—May 25-June 5. *Trip Coordinator, Ruth Dyche, 2747 Kring Drive, San Jose, CA 95125. Cost: $1,240.*
The Colorado River, one of the greatest whitewater rivers in the world, provides an unforgettable experience for those who travel its 225 miles by oar-power. Each of our rafts will carry four to five passengers and a professional oarsman. The quietness and natural flow of the rafts will allow us to fully appreciate the character of this river and the solitude of the canyons. We will stop frequently to study and explore things and places often missed on commercial trips. Minimum age 15 (18 solo). Cost includes roundtrip transportation from Flagstaff, Arizona.

FOREIGN TRIPS

For a complete listing of 1984 Foreign Trips, as well as descriptions of the following spring trips, see the July/August issue of *Sierra*.

(760) Sierra Nevada del Cocuy, Colombia—January 2-15. *Leaders, Frances and Patrick Colgan.*

(765) Mountains to the Sea, Kenya—February 5-24. *Leader, Emily Benner.*

(767) Barranca and Jungle: Mexican Birds —February 25-March 9. *Leader, Richard Taylor.*

(768) Ski Touring in Norway—March 11-24. *Leaders, Madeleine and Jim W. Watters.*

(770) Tramping and Camping in New Zealand—March 12-April 2. *Leader, Vicky Hoover.*

(780) Mountains and Islands of Northern Japan—April 22-May 12. *Leaders, Mildred and Tony Look.*

(785) Sherpa Country Trek, Nepal—April 30-May 26. *Leader, Patrick Colgan.*

RESERVATION AND

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

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

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

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

Reservations are confirmed on a first-come, first-served basis. However, when acceptance by the leader is required (based on applicant's experience, physical condition, etc.), reservations will be confirmed upon acceptance; such conditions will be noted. When a trip is full, later applicants are put on a waiting list.

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

River-Raft, Sailing & Whalewatching Cancellation Policy

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

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

*If the trip place can be filled, then the cancellation policy penalty shall amount to the nonrefundable deposit or 10% of the total trip cost, whichever is greater.

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

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

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

Trip Price per person	*Deposit per person*
up to $499.00	*$35.00 per individual (with a maximum of $100.00 per family on family trips)*
$500.00 and above (except Foreign Outings)	*$70.00 per individual*
All Foreign Trips	*$100.00 per individual*

The amount of a deposit is applied to the trip price when the reservation is confirmed.

Payments: Generally, adults and children pay the same price; some exceptions for family outings are noted. You will be billed upon receipt of your application. Full payment of trip fee is due 90 days prior to trip departure. Trips listed under "FOREIGN" section require payment of $200 per person six months before departure. Payments for trips requiring the leader's acceptance are also due at the above times, regardless of your status. If payment is not received on time, the reservation may be cancelled and the deposit forfeited.

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

The trip price does not include travel to and from the roadhead nor specialized transportation on some trips. Hawaii, Alaska, Foreign and Sailing trip prices are all exclusive of airfare.

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

Confirmation: A reservation is held for a trip applicant if there is space available, when the appropriate deposit has been received at the Outing Department. A written confirmation is sent to the applicant. Where leader approval is not required, there is an

CANCELLATION POLICY

unconditional confirmation. Where leader approval is required, the reservation is confirmed, subject to the leader's approval. Where there is no space available when the application is received, the applicant is placed on the waitlist and the deposit is held pending an opening. When a leader-approval trip application is placed on the waitlist, the applicant should seek immediate leader approval, so that in the event of a vacancy, we can confirm reservations of applicants who have leader approval. When a person with a confirmed reservation cancels, the person at the head of the waitlist will automatically be confirmed on the trip, subject to leader approval on leader-approval trips. The applicant will not be contacted prior to this automatic reservation confirmation, except in the three days before trip departure.

Refunds: You must notify the Outing Department directly during working hours (M-F; 9-5) of cancellation from either the trip or the waitlist. The amount of the refund is determined as of the date that the notice of cancellation by a trip applicant is received at the Outing Department.

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

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

The Cancellation Policy for River-Raft-Sailing Trips is separately stated: See last column.

The Outing Committee regrets that it cannot make exceptions to the Cancellation Policy for any reason including personal emergencies. Cancellations for medical reasons are often covered by traveler's insurance, and trip applicants will receive a brochure describing this type of coverage. You can also obtain information from your local travel or insurance agent.

Trip leaders have no authority to grant or promise refunds.

Transfers: For transfers from a confirmed reservation, made 14 or more days prior to the trip departure date, a transfer fee of $35.00 is charged.

Transfers made 1-13 days prior to the trip departure date will be treated as a cancellation, and the Cancellation Policy will apply. No transfer fee is charged if you transfer from a waiting list.

Medical Precautions: On a few trips, a physician's statement of your physical fitness may be needed, and special inoculations may be required for foreign travel. Check with a physician regarding immunization against tetanus.

Emergency Care: In case of accident, illness or a missing trip member, the Sierra Club, through its leaders, will attempt to provide aid and arrange search and evacuation assistance when the leader determines it is necessary or desirable. Cost of specialized means of evacuation or search (helicopter, etc.) and of medical care beyond first aid are the financial responsibility of the ill or injured person. Medical and evacuation insurance is advised, as the Club does not provide this coverage. Professional medical assistance is not ordinarily available on trips.

The Leader Is In Charge: At the leader's discretion, a member may be asked to leave the trip if the leader feels the person's further participation may be detrimental to the trip or to the individual.

Please Don't Bring These: Radios, sound equipment, firearms and pets are not allowed on trips.

Mail Checks and Applications to:
Sierra Club Outing Department
P.O. Box 3961, Rincon Annex
San Francisco, CA 94120

Mail All Other Correspondence to:
Sierra Club Outing Department
530 Bush Street
San Francisco, CA 94108
(415) 981-8634

Time or Event of Cancellation	Amount forfeited per person	Amount refunded per person
1) disapproval by leader on leader-approved trips	None	All amounts paid toward the trip price
2) cancellation from waitlist, or the person has not been confirmed three days prior to trip departure	None	All amounts paid toward trip price
3) trip cancelled by Sierra Club	None	All amounts paid toward trip price
4) cancellation from confirmed position or confirmed position subject to leader approval		
a) 60 days or more prior to departure date	$35.00	All amounts paid toward trip price exceeding forfeited amount
b) 14-59 days prior to the trip departure date	10% of trip fee, but not less than $35.00	As above
c) 4-13 days prior to trip departure date if replacement can be obtained from waitlist	10% of trip fee, plus $35.00 processing fee, but in no event more than 50% of total trip fee	As above
d) 4-13 days prior to trip departure date if replacement *cannot* be obtained from waitlist (or if there is no waitlist at the time of cancellation processing)	40% of trip fee, plus $35.00 processing fee, but in no event more than 50% of total trip fee	As above
e) 0-3 days prior to trip departure date	Trip fee	No refund
f) "No-show" at the roadhead, or if participant leaves during trip	Trip fee	No refund

Some trees—this Monterey pine, for example—have rough bark on their trunks and smoother bark on their twigs.

The thin, reddish-brown bark of the madrone peels off to reveal the smooth, yellowish-green new bark underneath.

The dark, rough bark of this older coast live oak was thin and smooth when the tree was young.

The bark of the "Blue Gum" eucalyptus shreds in long, thin strips, exposing the tree's tan-and-green trunk.

The orange-brown, scaly bark of the lodgepole pine is not very thick—rarely more than one inch.

The holes in this crabapple tree were made by birds going after insects that live in its bark.

Lichens are tiny plants that grow on hard surfaces, such as rocks—or the bark of these fir trees.

Fire is the great enemy of most trees. This burnt pine may be attacked by beetles that can now penetrate its bark.

FOR YOUNGER READERS

ALL ABOUT BARK

PHOTOGRAPHY AND TEXT BY MARK E. GIBSON

EVERY HEALTHY LIVING thing—each animal and plant—has a "skin" layer of some sort to protect the delicate organs inside its body. The skin of trees is what we call "bark."

You may be used to thinking of bark as something that just sits there. But bark actually works hard to keep a tree's insides healthy. In fact, your own skin and the bark of a tree grow, die, and fall off in very similar ways.

The living part of your skin is located beneath a surface layer of dead skin on the outside of your body. Here is where the new skin cells are made that slowly move to the surface of your body. Those cells that reach the outside then die from a lack of nutrition, but they stay on the outside of your body for a while and work as an inert (non-living) shield that covers you from head to toe. Eventually these dead, outside cells fall off or are rubbed off, but new ones always replace them from underneath. This process of skin growth, replacement, and loss goes on for years and years—the whole time we are alive and healthy.

Trees grow bark in the same way. When you run up to a tree and rub the rough bark, you actually are rubbing an outer layer of dead cells that once were alive, when they were deeper within the tree. Birch trees, apple trees, and we human beings are really "thin-skinned." That is, dead skin cells fall off us quickly; so we do do not build up thick layers of "bark" on the outsides of our bodies. However, some trees, especially the huge redwoods and giant sequoias, let the layers of dead bark pile up on the outside, to protect the inner, living wood from harmful pests and destructive environmental forces.

Notice that trees with rough bark (maple, oak, pine) usually are much larger around the trunk than those with smooth bark (madrone, aspen, birch). Most large trees have rough bark because the bark on the outside stretched, broke, and pulled apart to form deep cracks ("fissures") as the distance around the tree's trunk continuously increased with growth. Smaller trees, therefore, often do not pull their bark apart so much.

Yet rough-barked trees still have areas where you can find smooth bark; you can see that twigs of oak, maple, and pine are smooth-barked. As they grow into larger limbs, their bark will eventually pull apart and get as rough as the rest of the tree. And don't forget the roots! Even though they are underground, the roots also are covered with bark. Root-bark tissues stay relatively smooth, so they do not look like the rough bark we see on the tree trunks.

Scientists who study trees and forests agree that the most important role of bark is to keep water inside the tree so that the sapwood—which conducts water and minerals upward from the ground—does not dry out and die, causing the rest of the tree to die also. Bark keeps the water inside the tree from evaporating into the air, in the same way that your skin keeps the water inside your body, where it is needed the most. Bark also protects the cambium, the layer beneath the bark where cell division necessary for the tree's growth takes place. If the cambium dries out, the tree will die.

Bark also forms a tough barrier that works to keep pests and disease organisms from invading the living tissues of the tree. Some insects, such as bark beetles, have developed ways to burrow through the bark of trees; they can cause great damage in this way. Thick bark also works well as "thermal insulation" to protect the tree's sensitive inner parts from fire. Weak flames can burn the outside layer of bark, but this does not seriously harm the tree—just as healthy people do not suffer grave health problems from minor skin burns. But really hot fires, such as wildfires, often burn right through the bark and destroy the living cambium tissues beneath it.

Now do you understand why it is important for you not to damage the bark of any tree? Trees need their bark every bit as much as you need your skin! □

Mark E. Gibson is a color-photojournalist interested in agriculture and natural history. He is a frequent contributor to Oceans *and* Motorland.

Chapter Lobbying Goes Professional

BOB IRWIN

On July 15, Ohio Gov. Richard F. Celeste (seated) signed into law a measure that could raise millions for the state's Department of Natural Resources (ODNR) by permitting people to donate their state tax refunds to nongame-wildlife, nature-preserve, and scenic-river programs administered by ODNR. Directly behind Gov. Celeste in this photo taken at the signing ceremony are the Ohio Chapter's lobbyists, Janet Gentzler and Ron Good.

Anyone familiar with the history of the Sierra Club knows that lobbying on behalf of environmental and conservation legislation has been a significant Club activity for decades. It's true that during the first years of its existence the Club was by and large a California organization, based in the Golden State and dedicated to issues with a California emphasis. But the Sierra Club has grown tremendously overall in more recent times; what with Watt, and one thing and another, the Club now boasts 56 chapters and more than 340,000 members across the United States and Canada.

In the past five years another factor besides rapid growth has spread and increased the effectiveness of chapter lobbying: the Lobbying Training Seminar conducted three times a year by staff in the Club's Washington, D.C., office. The one-week sessions are attended by about 18 activists, each of whom must be nominated by a chapter or by a regional vice-president. Participants are briefed on the top environmental issues pending before Congress and are introduced to the inner workings of the legislative process. Sierra Club staff also sharpen participants' lobbying skills, while congressional staff members instruct them

in protocol and the practicalities of contacting and dealing with lawmakers. They also get to meet with workers from other environmental groups and with administrative officials in such agencies as the EPA and the National Forest Service.

In reporting to his chapter (Mississippi) on his experience in the Lobbying Training Seminar, Lewis McCool said that by midweek he was ready to be "turned loose to invade Capitol Hill." There he was able to talk with both a senator and a representative as well as with the aides of three other lawmakers from his state. According to another participant, Walter Schrader of the South Carolina Chapter, contact with the aides was advantageous. They're the specialists, he explained—the ones who do the research and write the legislation.

The seminars are by no means junkets. The participants not only have to work, but they also have to pay the bulk of their expenses, usually with some help from their chapters or regional conservation committees (RCCs). The national Club can provide only minor funding. If you are interested in taking part in a future Lobbying Training Seminar, contact your chapter chair or regional vice-president.

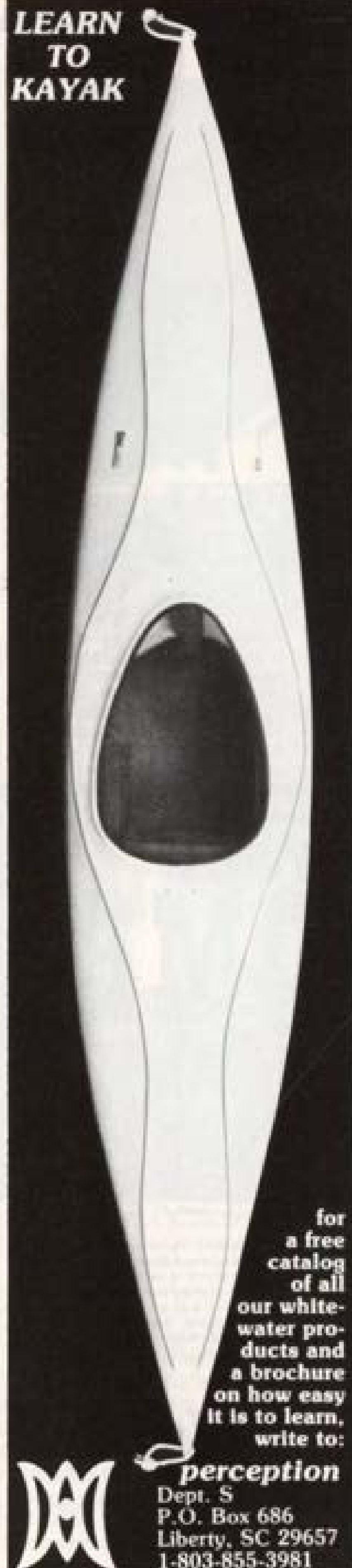
PROS IN ACTION

There is not enough space to report here on the lobbying programs of every chapter. The following account attempts to reflect fairly the wide diversity in age, size, and regional location among all 56 of the Club's chapters engaged in lobbying on the state level. Each chapter's name is followed by its founding date and number of members (plus its location when that may not be clear).

CASCADE (*Washington; 1978; 8,000*). Mike Gillett, the chapter's political-action chair, works with other Cascade leaders when any concerted lobbying effort is needed. Organization is not highly structured, but because the chapter has developed a large pool of issues specialists, Mike says, getting the right people at the right time is no problem.

There is also strong support from rank-and-file volunteers. This past June's Senate hearing in Seattle on the Washington Wilderness Bill (the chapter's top national issue) was packed as a result of phone calls to more than 800 people made by a couple of dozen volunteers. (At that hearing 10-year-old Julia Bringloe, daughter of conservation committee chair Anne, received a long ovation for her articulate testimony on why she and her classmates feel wilderness is necessary. The late Sen. Henry Jackson called her the "star witness.")

Chapter Chair Ruth Weiner was the chief lobbyist on one of the chapter's two big state-level issues: defense of the state's Environ-



mental Protection Act against efforts by developers and timber interests to weaken it. For that and similar work on clean-air and nuclear-waste issues, she was honored by the chapter as its Outstanding Conservationist of 1983.

Another chapter lobbyist, Doris Cellarius, won a Special Service Award chiefly for her successful efforts on a series of bills on the management of hazardous waste—the chapter's other top-priority issue. Doris chairs the chapter's committee on toxics and co-chairs the Club's national hazardous-materials committee.

DELTA (*Louisiana; 1970; 2,200*). The Delta Chapter may be small in numbers, but it is well organized and has plenty of political savvy. Last year, before the November election, the Club's campaign desk compiled a list of chapter lobbyists. Of the 54 (both paid and volunteer), 15 were Louisianans—and they were all volunteers.

For the last three years the chapter has hired a full-time lobbyist for the duration of the state legislature's annual 85-day session. Michael Halle, the chapter's legislative chair, orchestrates the lobbying program. He and Joan Phillips, who chairs the chapter's wetlands committee and is another veteran lobbyist, have worked out a computerized system (based on a chapter-wide 1982 mailing) that permits them to tap activist members in all parts of the state. They can now break down the membership list so that mailing labels can be sorted by legislative districts and city or parish wards. The computer can then quickly tell which members live in each legislator's district. This is doubly useful for Halle, who also heads the Delta Chapter's SCCOPE (political action) committee.

HAWAII (*1968; 1,800*). The Hawaii Chapter is fortunate to have Lola Mench as its legislative chair. Since she retired from teaching science three years ago, she has been working full-time (and then some) as the chapter's principal lobbyist. Lots of people in the Honolulu Group give her strong backup. The chapter's political-action chair, Susan Miller, researches issues and provides advice and encouragement to her. Mench can also call on law and science specialists such as Phil Deters and Lynne Rodgers.

In ten years of off-and-on lobbying, Lola says, she has learned a lot from her predecessor, David Raney, a former Sierra Club regional vice-president. He still acts as an advisor, and other members employed in the public sector work for the chapter behind the scenes. Because 70 percent of its members live in the Honolulu area, one could say that Mench's "committee" is the group's conservation committee, with which she consults regularly.

Five years ago, Lola attended one of the

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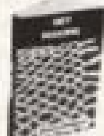

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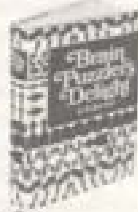

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first Washington Lobbying Training Seminars. She says it improved her performance immensely, which she sharpened with more on-the-job training—the best teacher, she adds.

In last spring's session of the state legislature, Lola and her cohorts worked on 10 environmental issues, earning a draw (no win, no loss) on eight of them and a victory of sorts on one: state purchase of trail-access rights-of-way. Everything was won but the money. Nevertheless, on April 23 *The Honolulu Advertiser* could say: "More than any other group this year, the environmentalists have influenced important pieces of legislation—although one notes that it seems easier to kill bills than to get them passed."

The chapter fought hardest to defeat a bill that would have permitted development of geothermal power in conservation districts, notably in the shadow of the Kilauea volcano. Many of its objectionable features were killed, but in the end the bill became law.

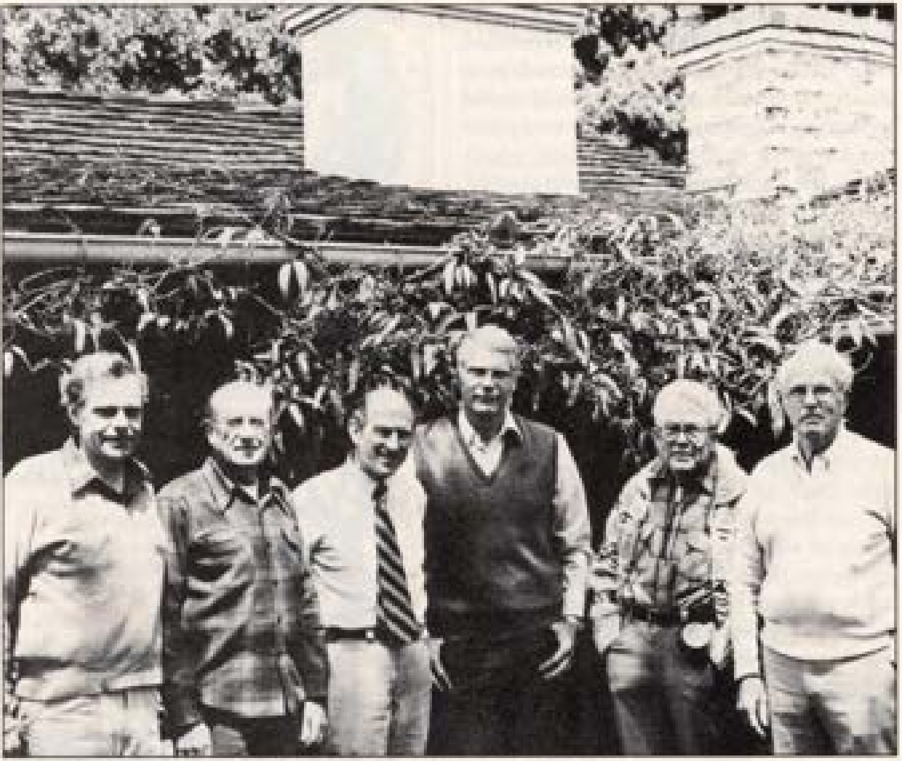
Mench had had strong lobbying support from the chapter's volunteers, including Rick Warshauer, Nelson Ho, and Russell Kokubun—all neighbors of the erupting volcano—and legal advisor Kenneth Kupchak. But if angry Kilauea should keep up her fiery ways, says Mench, both the Club's lawsuit against development there and the newly enacted legislation might become moot.

HOOSIER (*Indiana; 1975; 2,500*). For five consecutive years this young chapter has found it worthwhile to have a paid lobbyist working for it in Indianapolis. Paul Bryan, a longtime Club member, has completed his third year in the job, working full-time during the sessions of a part-time legislature. The chapter and the Izaak Walton League hired him as an independent contractor, splitting his services (and his fee) between them.

Now Bryan has taken a new job—as director of environmental affairs for the 25-state Citizens Action Coalition. Hoosier Chapter Chair Bob Graham—who has done much volunteer lobbying himself—is searching for a replacement. In the meantime, an Indiana Environmental Coalition is forming, to be made up of state chapters of the Sierra Club, the Izaak Walton League, the Audubon Society, and the National Wildlife Association. The coalition is to have a full-time, year-round staff, and it will do everything but lobby. That task will be performed by the Hoosier Chapter, with backing from the other organizations.

The chapter's legislative scorecard

SIGHTINGS



Past and present leaders of the Sierra Club Outing Committee gathered at a recent meeting of the full committee. From left: Jerry South, Stewart Kimball, Ted Snyder (current Outing Committee chair), Jim Watters, Dick Leonard (the Sierra Club's Honorary President), and John Ricker.

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doesn't look impressive, Graham points out, "because most of our victories have been negative—year after year of beating back efforts to repeal or nullify the environmental laws we do have." The law regulating phosphates is a perennial target, he says. But maybe the Hoosiers will get a landmark piece of legislation on the books next year. They have targeted three issues for 1984: (1) Hazardous wastes (nuclear, and agricultural and industrial chemicals); (2) clean air (acid rain and energy); and (3) Hoosier National Forest (protection through a forest-management plan for prime areas that were left out of the recently established Charles C. Deam Wilderness).

JOHN MUIR (*Wisconsin; 1959; 5,900*). This old chapter is changing some of its old ways. In the past, says Michael Brandt, political-action chair, it was dominated by the Madison-Milwaukee axis, along which most of the members lived. However, those in outlying regions—especially the north, which has most of the state's big environmental problems—had little voice and less involvement. "We're bringing those people in now," says the former chapter chair, who now works part-time in the chapter office in Madison.

One of Brandt's responsibilities is to head the chapter's lobbying in the state capital. Brandt runs lobbying workshops of his own, bringing people in from all eight regional groups. Graduates go back to their home districts primed to get better acquainted with their legislators. For, Brandt maintains, it is "who knows whom" that counts in lobbying. Getting to know and to work and swap ideas with other environmentalists is also important for lobbyists. An informal environmentalist caucus gathers every Friday for lunch in the chapter office, which shares the same building with several other conservation groups.

One of the more satisfying roles Brandt has taken on recently is that of mentor to Florence Crawford, a Milwaukee grandmother who joined the Sierra Club last January to help combat President Reagan's "privatization" plans for the national forests—including the northern Wisconsin lands she grew up in. A month after joining the club, Mrs. Crawford found herself the conservation chair of the Southeast Wisconsin Group. She soon began trekking to Madison to confer with Brandt on a bill that (1) would guarantee the state prior right to buy any lands within its boundaries put on the block by the U.S. government and (2) would also bar Wisconsin from turning around and selling off any such newly acquired property. Mrs. Crawford has appeared before the legislature in support of resolutions opposing the sale or exchange of any federal lands within the state when it would be detrimental to the state of Wisconsin or its people.

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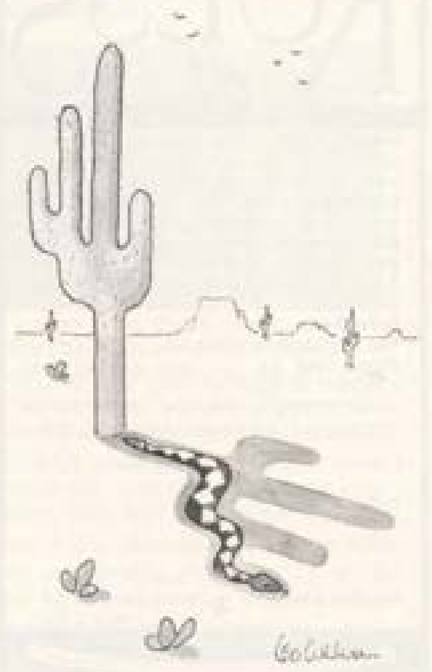
She hasn't stopped with that one issue, either. She has gone on to lobby for tighter landfill regulations and to work for legislation on clean air, acid rain, mass transit, and more. Lobbying, she insists, is one of the most important parts of a conservation chair's job.

LONE STAR (*Texas; 1965; 11,600*). The chapter has had a professional lobbyist and a corps of volunteers on hand for every regular session of the legislature since 1973. When it held its first Earth Day-Lobby Day last April 22, some 40 volunteer lobbyists from around the state descended on Austin to meet with legislators and their aides and to discuss the chapter's legislative program.

A strong lobbying network of volunteers centered in Austin maintains good communications with the chapter's 13 groups; led by Ken Kramer, the present lobbying pro, this network coordinates the whole program. Kramer, who is also the chapter's legislative chair and Executive Committee member, is paid as a consultant on a half-time basis. The former political-science professor also serves as a consultant to other public-service groups.

Looking back at the 1983 session, Kramer said a good deal more was accomplished than the passage of some significant conservation bills, which included creation of a Texas trails system, renewal of the Texas Local Parks Fund, and new restrictions on siting hazardous-waste facilities. More important, he said, the Club and the conservation movement came out with a more positive image—trying to have "good" bills passed rather than seeking to get "bad" ones killed. He also cited more respect for environmental lobbyists and more coopera-



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tion and coordination in their efforts as additional pluses.

A final note: Kramer stressed that lobbying programs need to be carried on before, after, and between as well as during legislative sessions. Issues need to be researched, hearings monitored, legislative proposals drafted, and contacts maintained. "There is a hell of a lot of work" that must be done between sessions if lobbying organizations

SIERRA NOTES

• Sierra Club Executive Director Mike McCloskey flew to Australia on September 13 for a 17-day speaking tour arranged by the Australian Conservation Foundation. He gave the keynote address at the foundation's third National Wilderness Conference, in Katoomba; the subject was "How the Wilderness Was Won: Lessons to Be Learned from the U.S.A. Experience." McCloskey gave a total of 14 press interviews and 7 speeches in appearances in Sydney, Melbourne, Brisbane, and Dalby.

• Former Sierra Club President Brant Calkin has been appointed secretary of New Mexico's Natural Resources Department by Gov. Toney Anaya. Calkin held the post of deputy secretary in the department at the time of his appointment. Calkin, 49, was Club President from May 1976 to May 1977; he then served as the Club's Southwest representative until 1982.

• Sierra Club Books has announced the publication of several new titles. All may be ordered through the Sierra Club Catalogue, which is mailed to all Club members. Nonmembers may order books (*not* other Catalogue items) from Sierra Club Books (P.O. Box 3886, Rincon Annex, San Francisco, CA 94119).

Among the new titles are: *Mountains of the Middle Kingdom: Exploring the High Peaks of China and Tibet*, photographs and text by Galen Rowell, cloth, $40 ($32 for Club members); *Healing Journey: The Odyssey of an Uncommon Athlete*, by David Smith with Franklin Russell, cloth, $13.95 ($11.15); *Annapurna—A Woman's Place*, by Arlene Blum, paper, $8.95 ($7.15); *The Sierra Club Handbook of Whales and Dolphins*, by Stephen Leatherwood and Randall R. Reeves, $12.95 ($10.35) paper, $25 ($20)

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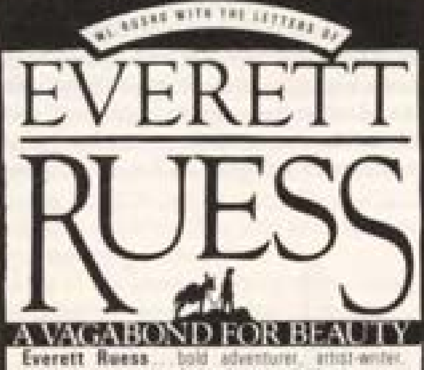

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wish to stay on top of things and have influence on policy-making by legislatures, Kramer observed.

NEW ENGLAND (*1970; 13,200*). With five state capitals to keep tabs on, the New England Chapter has delegated lobbying responsibilities to its regional groups: five in Massachusetts, three in New Hampshire, and one each in Maine, Rhode Island, and Vermont. (Connecticut is a chapter on its own.) There are only two other chapters in the Sierra Club that have more than one legislature to watch: Potomac (3) and Western Canada (5).

Although the chapter office is virtually in the shadow of the Massachusetts capitol in Boston, Executive Director Priscilla Chapman only rarely ventures inside the State House. The chapter itself, she says, focuses on the regional and national issues that

cloth; and *Hazardous Waste in America*, by Samuel S. Epstein, M.D., Lester O. Brown, and Carl Pope, paper, $12.95 ($10.35).

• A 3,800-mile-long "Walk for the Earth" is scheduled for April 1 through October 27, 1984. Planned as a "grassroots display of support for environmental protection, global security, and earth awareness," the California-to-Washington, D.C. trek—organized by Club volunteer Doug Alderson of Tallahassee, Fla.—will be conducted by a core group of 25 to 50 hikers, supplemented by hundreds of local hikers who will join the procession for shorter periods. The Sierra Club Board of Directors unanimously endorsed Walk For The Earth 1984 at its September meeting in San Francisco, viewing the effort as a successor to the "Dump Watt" petition drive. For information, contact: Native Culture and Ecology Research Foundation, Inc. (2301 Mavis Circle, Tallahassee, FL 32301).

• The Sierra Club's Conservation Department has produced an eight-page brochure on the National Wilderness Preservation System that includes a description of the history and management of the system, a comprehensive listing of designated areas, and a map showing their locations. The brochure is available for 75¢ (50¢ for Club members), plus 25¢ postage, from Sierra Club Information Services (530 Bush St., San Francisco, CA 94108).

Also available from Information Services is scheduling information for an exhibit of the eight prize-winning photographs from *Sierra*'s Fourth Annual Photo Contest, now available to Club chapters and groups. You can take another look at the winners in the July/August, 1983, issue of *Sierra*.

• September saw the publication of the second issue of *Sierraecology*, the Club's new environmental-education newsletter. Editor Pat Suiter, chair of the Club's Environmental Education Committee, says *Sierraecology* will be mailed to all Club groups, chapters, newsletter editors, and Board members; eventually, it is hoped, the newsletter will reach teachers and librarians everywhere, to aid in their selection of environmental-education materials. Requests for sample copies should be addressed to Information Services at Club headquarters; suggestions for future issues may be sent to Pat Suiter (P.O. Box 557953, Miami, FL 33155).

• A new quarterly newspaper, designed to keep Sierra Club leaders and staff informed on administrative issues and news, has been approved by the Executive Committee of the Sierra Club Council. According to Carroll Tichenor, former Council chair, *Grassroots* "can become the vehicle for much of the information contained in the many small Club newsletters that are minimally funded and sent to only a few people, and can reach many more of our leaders at all club levels." Managing Editor Monica Walden (1714 Nash Ave., #101, Austin, TX 78704) welcomes suggestions, contributions, and letters.

© Toby McLeod

• *The Four Corners: A National Sacrifice Area?*, a documentary on energy development on the Colorado Plateau, was shown at the Sierra Club's International Assembly at Snowmass, Colo., to an enthusiastic reception. The hour-long film by Toby McLeod will be aired on many Public Broadcasting System stations on Tuesday, November 15, at 10 p.m. EST. Consult local listings for the exact date and time in your area.

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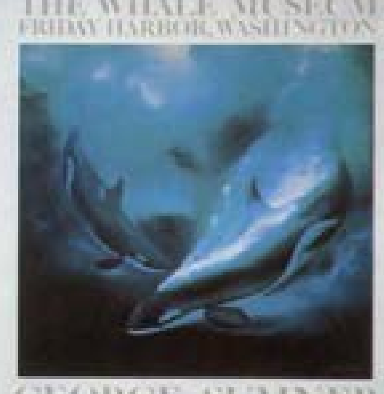

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abound in its territory, which contains some of the most concentrated urban areas in the nation as well as some of its wildest country. Volunteers from the Greater Boston Group (and others) pool their state-level lobbying efforts with those of the nine other Bay State conservation organizations that together make up the Massachusetts Environmental Alliance. They meet early in the year, set half a dozen (or so) priority issues, and coordinate strategies.

The Maine Natural Resources Council, a similar type of umbrella organization, is used by the Maine Group's lobbyists in Augusta. Vermont also has a Natural Resources Council, with which its Club group does its lobbying in Montpelier. The three New Hampshire groups do their lobbying in Concord more independently, calling on their issues specialists (e.g., acid rain, low-level radioactive wastes). The Rhode Island Group's lobbying is on hold while the group gets reorganized.

The North Star Chapter's Project Environment contributed to passage of Minnesota's new Environmental Response and Liability Act—the "state Superfund bill." Nelson French (back row, right) and Kris Sigford (back row, third from right), Project Environment's lobbyists, posed with Gov. Rudy Perpich (front row, center) and other backers of the bill at the signing ceremony.

NORTH STAR (*Minnesota; 1968; 6,700*). Many chapters have commendable records in their state-level lobbying, but none can match North Star's. For 10 years the chapter has been supporting a full-time professional lobbyist in the Minnesota capital with a program that can compete effectively with the efforts of salaried representatives of industry and other powerful interests in the state. In 1972 it set up Project Environment (PE) as the lobbying arm of the chapter, whose Executive Committee administers its paid staff of two: Nelson French and Kris Sigford, who also are in charge of the PE Foundation (which is involved in educational and legal work only).

As many as 100 chapter volunteers, mostly from the Twin Cities area, where more than half of the chapter's members live, may be involved in PE's work during a legislative session: doing research, testifying at hearings, helping to draft bills. Two lawyer members, Charles Dayton and John

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Herman, also perform legal tasks for PE—for modest fees.

Modest or not, it all takes money. For the last two years the annual appeal has averaged about $30,000 for PE and $35,000 for its foundation. That $30,000 got results in the 1983 session, which acted on 10 major environmental measures. French, in his report, called passage of the State Superfund bill "the biggest environmental victory at the legislature in years."

OHIO (*1968; 9,000*). Although it was organized the same year as North Star, it wasn't until nine years later that the Ohio Chapter took its first tentative step toward using a full-time professional lobbyist. It hired one on a two-month trial basis for a fee of $1,000. A 1978 fund drive netted $8,000, and then the chapter scrimped and managed to keep a series of lobbyists in Columbus.

Late in 1980 the chapter Executive Committee decided to involve all six groups in fund-raisers to support an ongoing, effective lobbying effort. Once funds were raised, the wife-and-husband team of Janet Gentzler and lawyer Rod Good were hired, and in September 1981 they took on their year-round, full-time duties. Gentzler and Good—Sierra Club members since 1972—both know their way around Columbus, having served earlier on the staff of the state Legislative Service Commission. They report to the chapter's Excom and to its legislative-liaison steering committee, which includes representatives from each of the groups and from various chapter task forces.

And report the lobbying team does—in detail. They report the status of the Club's priority bills, listing the people they have contacted and the hours spent on each issue. Outstanding among a string of successes was the enactment of a bill providing for a check-off (full or partial) of state-tax refunds to support state programs for nongame wildlife, nature preserves, and scenic rivers. Major issues remain: (1) low-level radioactive wastes; (2) pollution from oil and gas by-products; and (3) coal strip-mining.

PENNSYLVANIA (*1972; 10,000*). Of the 413 lobbyists registered with the Pennsylvania legislature, only one represents environmentalists. He is Jeff Schmidt, who became the chapter's first full-time professional lobbyist on January 1, 1983. The former industrial-systems analyst served a six-year apprenticeship doing volunteer lobbying for the chapter, mostly on water issues. (And well he should have, for it had been an attempt to dam his favorite fishing stream that led to his decision to join the Club.) One of the founders of the Lehigh Valley Group, Schmidt became conservation chair and later vice-chair of the chapter.

Many other chapter activists from all parts of the state also were doing lobbying duty along with Jeff in Harrisburg. By 1982, chapter membership had doubled, and so the chapter Excom decided it was time to go for full-time lobbying. It established SPEL (Sierra Club Pennsylvania Environmental Lobby), with its office in Harrisburg, and budgeted $40,000 for the whole 1983 operation. *SPELbinder*, a more-or-less monthly newsletter, updates Club members on issues, sets priorities, and determines the positions to be taken. The current issues include oil-and-gas drilling, acid rain, hazardous wastes (chemical and low-level radioactive), and right-to-know legislation on hazardous material.

LOBBYING IN CALIFORNIA

Other chapters—including Atlantic, Connecticut, Florida, Iowa, Mackinac, Nebraska, New Jersey, and Potomac—also sponsor state lobbying efforts. But none have been at it as long as California's chapters have.

Before 1966 there was no professional lobbyist in Sacramento for the Sierra Club or any of its chapters. In 1966, however, John Zierold was engaged by the Club on a shared-time basis with the California Planning and Conservation League, which had hired him the year before. In 1970 the Club opened an office in Sacramento—with

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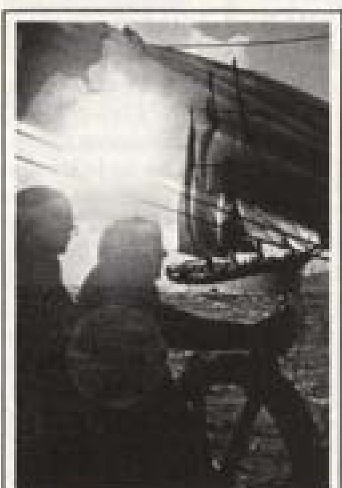

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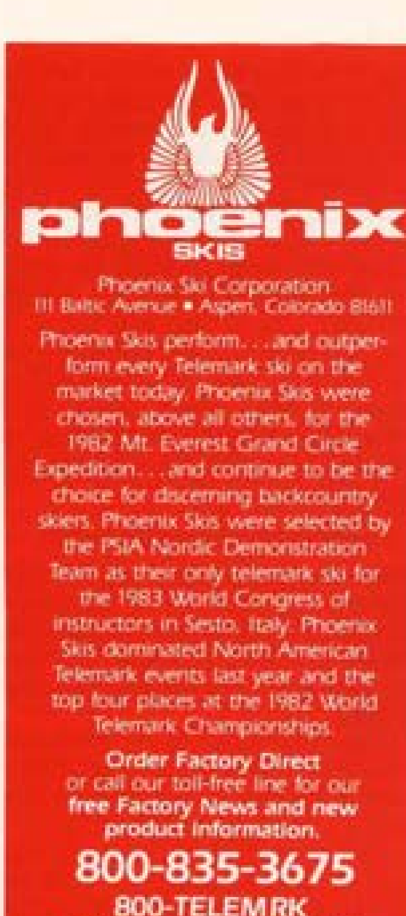

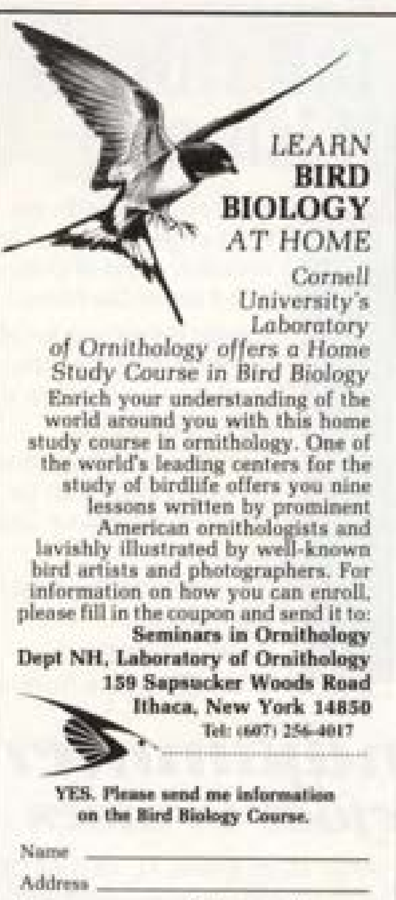

© Jeff Holmes, courtesy of *The Daily Collegian*

Jeff Schmidt is the Pennsylvania Chapter's first full-time lobbyist in Harrisburg.

Zierold in charge—to lobby full-time for the Club and its chapters in the state.

Today, besides Zierold, the staff consists of a staff assistant, Janie Hawker, and two assistant legislative aides: Paula Carrell (on coastal issues, land use, parks) and Michael Paparian (on energy and toxics). California's 13 chapters provide 55 percent of the funding for the operation; the national Club picks up the rest.

The chapters' involvement goes beyond funding. Through their delegates to the state's two RCCs they help determine conservation policies and priorities. Chapters also send delegates to the California Legislative Committee (CLC), which oversees the Sacramento office and gives it specific positions on bills before the legislature. Zierold and his staff meet quarterly with the CLC to review the 300-odd bills actively followed by the Club. All chapter and other leaders in the state are kept up to date on bills and issues throughout the session by the office's newsletter, the *Weekly Agenda.*

Chapter members lobbying face-to-face with legislators as constituents in their home districts is most helpful, says Zierold. Volunteer issues specialists from the chapters are often called to Sacramento, either to testify at hearings or to provide information: Mark Palmer of the Bay Chapter on wildlife, or Gail Lucas of Redwood on forest practices, for example. Despite all the strong support from the chapters and their volunteers, this has not been a good year, Zierold concedes, what with the new state administration's general antienvironment slant and the state

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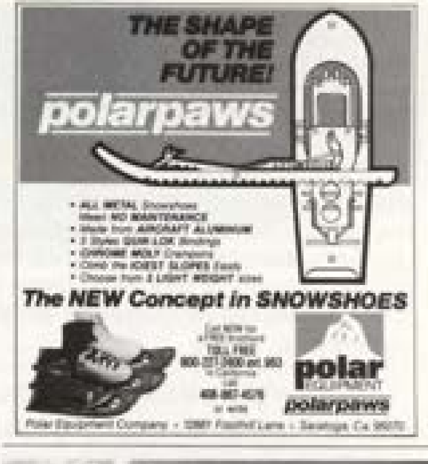

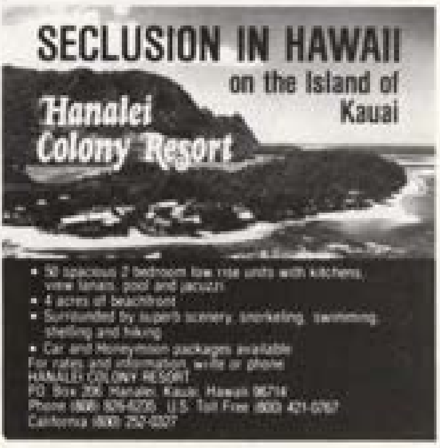

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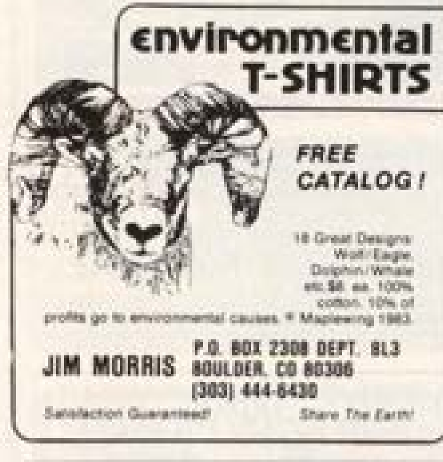


budget in shambles. Results so far have been a far cry from the 1973-74 session, which—as Zierold told *The Sacramento Bee* at the time—was the greatest ever for environmentalists. He cited a long list of new laws for parks, energy conservation, wildlife, "the nation's toughest forest practices law," and more.

Today, however, Zierold notes a disturbing reluctance by legislators to move on environmental issues—a reluctance displayed even by former friends. He cites a rise in special-interest bills introduced specifically to exempt an individual business or project from the provisions of a particular environmental law.

ROCKEFELLERS FUND CLUB PROJECT

The Rockefeller Brothers Fund recently contributed $20,000 to the Sierra Club Foundation in support of work being done by the Club's International Office. Costs for the project, which will develop guidelines for the conservation of mangroves on the coasts of Venezuela and the Republic of Trinidad and Tobago, will be shared by the RBF and the United Nations Environmental Programme.

Part of the Club's long-term campaign to preserve and conserve coastal ecosystems in the Caribbean region, the project follows the pattern established by the International Office's work on tropical forests, which resulted in the setting aside of forest areas recommended by the Club for preservation. The Club hopes that the governments of Venezuela and Trinidad and Tobago will act in similar fashion on the guidelines arising from this new project. □

Statement required by the Act of Congress of August 24, 1912, amended by the Acts of March 3, 1933, July 2, 1946, June 11, 1960 (74 STAT. 208), and October 23, 1962, showing the OWNERSHIP, MANAGEMENT AND CIRCULATION of *Sierra, The Sierra Club Bulletin*, published six times yearly at San Francisco, California—for September/October, 1983.

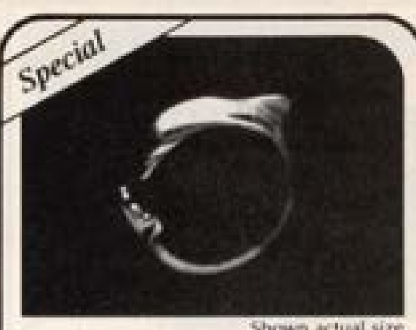
1. The names and addresses of the publisher, editor and executive director are: Publisher: Sierra Club, 530 Bush Street, San Francisco, California; Editor: Frances Gendlin; Executive Director: Michael McCloskey.

2. The owner is the Sierra Club, an incorporated nonprofit membership organization, not issuing stock; Denny Shaffer, President, 2910 Skye Drive, Fayetteville, North Carolina 28303; Philip Hocker, Treasurer, Box 458, Wilson, Wyoming 83014.

3. The known bondholders, mortgagees and other security holders owning or holding one percent or more of total amounts of bonds, mortgages or other securities are: NONE.

The average number of copies of each issue of the publication sold or distributed, through the mails or otherwise, to paid subscribers during the twelve months preceding the date shown was 292,231.

(signed) Frances Gendlin



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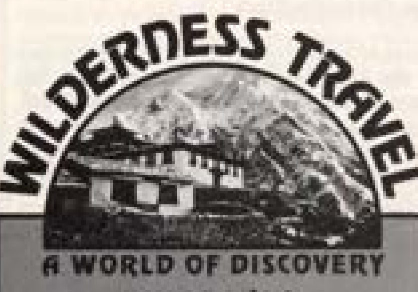

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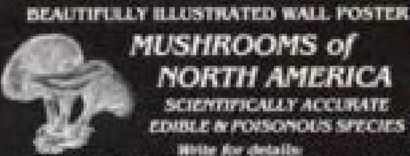

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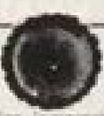

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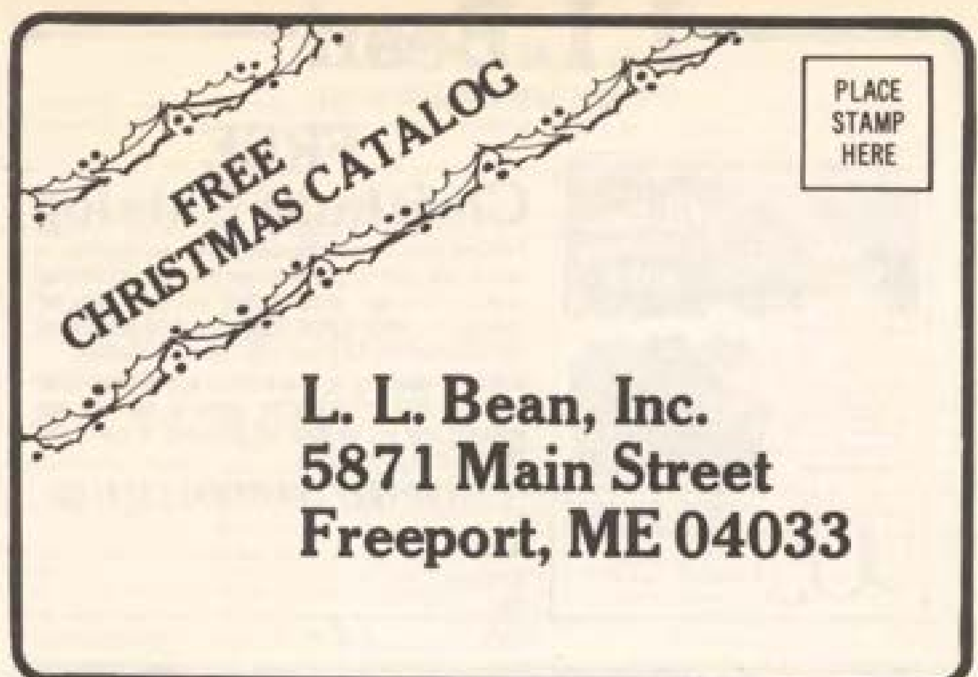
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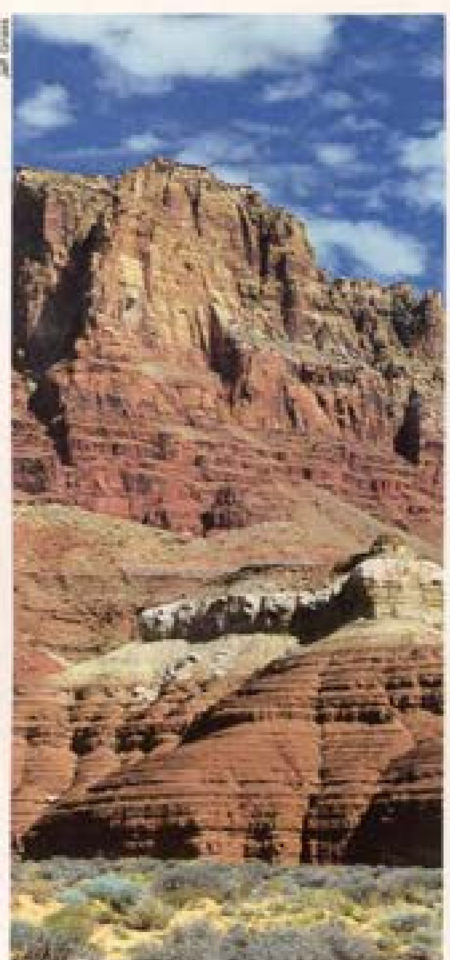

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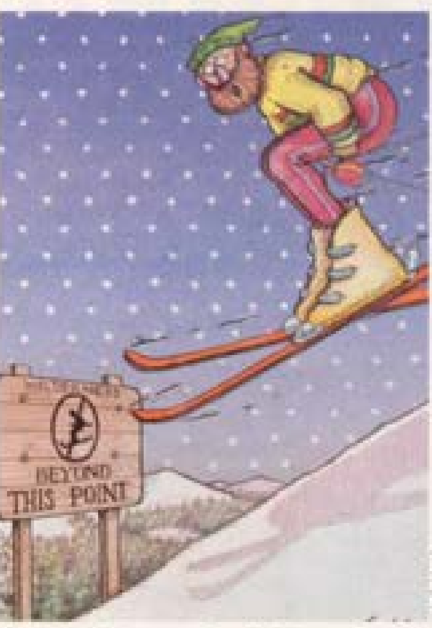

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QUESTIONS & ANSWERS

Q *What is the Sierra Club doing to stop the ruination of our wilderness and open country by the spread of motorcycles and other off-road vehicles?* (JOHN AND LOIS COWLEY, ROSAMOND, CALIF.)

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

A The Club's Board of Directors adopted an off-road-vehicle policy in 1972 that includes the following provisions: ORVs should be restricted to areas designated and constructed for their use; their operation should be considered environmentally detrimental until proven otherwise, and thus should be prohibited on public lands; no area should be opened to ORVs until a public hearing is held and an environmental impact statement prepared; development of ORV areas should be prohibited in wilderness, scenic, and wildlife-refuge areas, and in areas where ORVs would compete with multiple recreational uses; and the installation of mufflers and air-pollution-control devices should be made mandatory.

According to Russ Shay, the Club's public-lands representative in the Northern California/Nevada office, the Sierra Club is working to help solve the problem through legislative, administrative, and judicial channels. The Club is lobbying for state-wilderness bills that will include provisions to protect unspoiled lands from ORV disturbance. Local Club volunteers and staff are working with land-management agencies to develop plans restricting ORVs to areas where their impacts can be controlled. And where agencies have not been living up to their responsibilities to provide protection for the lands in their charge, the Sierra Club has used and will continue to use every means possible to get them to do so, including going to court.

For example, last year a federal district court in Los Angeles ordered the Bureau of Land Management to rewrite the California Desert Conservation Energy Plan to make it consistent with federal requirements that areas be opened to ORV use only where minimal resource damage would occur. This ruling came in response to a lawsuit brought by the Sierra Club and other conservation groups.

Illustration by Kirk Caldwell

The Club has also filed suit to stop the Barstow-to-Las Vegas cross-country motorcycle race scheduled for November. The BLM issued its first permit in nine years for the event, which has caused extensive damage in the past.

Q: Several citizens' groups are working to establish nude-recreation areas in state and federal parks. What is the Sierra Club's policy on creating "clothes-optional" sites on public land? (JUDY PARRAGAUX, BOSTON, MASS.)

A: Because the Club considers such things as skinnydipping and nudity to be purely personal concerns, it has no published policy for or against those activities—so long, of course, as you leave only footprints and take only pictures. A spokesperson for the National Forest Service told us that they have no policy, but that they will enforce local ordinances; the National Park Service has an informal policy to follow local custom. On Sierra Club outings, decisions about whether skinnydipping will be allowed are made informally, depending on the group's preferences and the area in which the outing takes place.

Q: I'm looking to invest in companies that are environmentally conscious and that work toward positive social goals (for example, that decline to invest in South Africa). Can you tell me of any that meet these qualifications? (ENID GRIFFIN, AGOURA, CALIF.)

A: The Calvert Social Investment Fund (1700 Pennsylvania Ave., Washington, DC 20006) applies social criteria to the management of its money-market portfolio (based on U.S.-government-agency securities) and its managed-growth portfolio (stocks, bonds, and mortgages). Calvert claims that it does not invest in companies that have been cited for pollution or occupational-health-and-safety violations, that manufacture nuclear-power or weapons systems, or that are active in South Africa.

Working Assets Money Fund (230 California Street, San Francisco, CA 94111) invests in companies that aggressively pursue affirmative-action and environmental-protection programs. Counseled in its investment decisions by an advisory board that includes principals of environmental groups and labor unions, the fund—according to its prospectus—"will not knowingly invest in corporations that engage in the manufacture of weapons as a principal business activity, that generate nuclear power, or that assist in the defense of or are part of a strategic industry of repressive foreign regimes."

New Alternatives Fund, Inc. (295 Northern Blvd., Great Neck, NY 11021) invests in companies with an interest in solar and alternative-energy development. The fund does not invest in oil or atomic energy, both of which it "perceives to be politically and actually vulnerable."

All of the above funds will send you a prospectus on request. In addition, information concerning developments in the field of so-called ethical investment can be gleaned from the following publications: *Council on Economic Priorities Newsletter* (84 Fifth Ave., New York, NY 10011); *Insight* (Franklin Research and Development Corp., 222 Lewis Wharf, Boston, MA 02110); and *Good Money* (Center for Economic Revitalization, Box 363, Worcester, VT 05682).

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