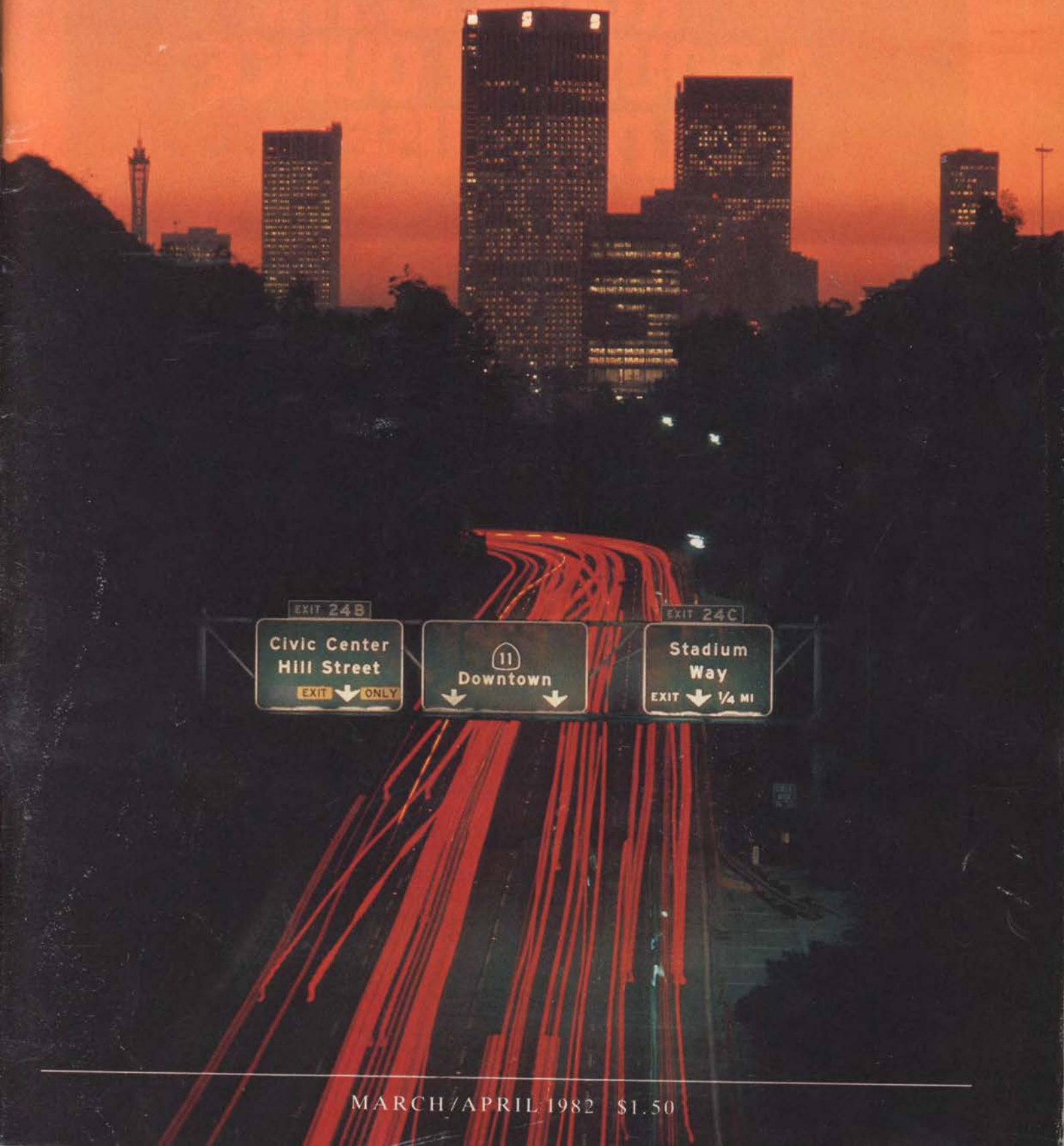
TRANSPORTATION IN THE '80s/CLUB PRIORITIES FOR 1982

SIERRA



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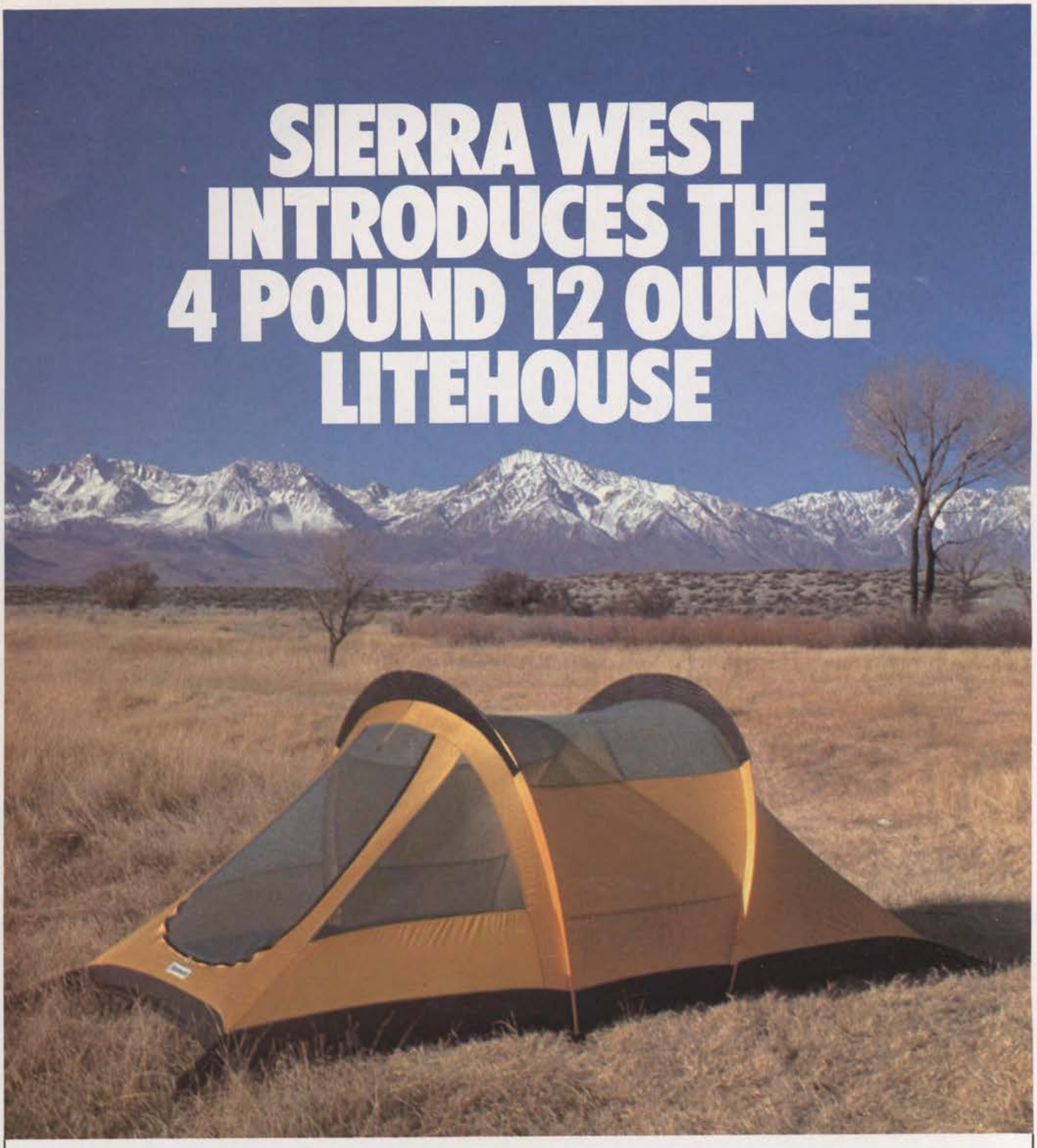

Continuing its development of ultra-lightweight shelters, Sierra West now offers a complete line of backpacking tents. The Litehouse is an unusually roomy two-person tent which features no-see-um mosquito netting for fair weather views, and a rain fly for foul weather protection. Check out our other shelters also, the one-person Bivy Sack, two-person Gimme Shelter and Skylite, and our three-person Trilite. *Worth their weight in protection.*

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SIERRA

THE SIERRA CLUB BULLETIN MARCH/APRIL 1982 VOLUME 67/NUMBER 2

DEPARTMENTS

COVER Los Angeles and its freeways are symbols of a culture built on cars. But there are nationwide problems maintaining roads; and important questions about energy and resources can be answered in favor of mass transit. Photo by Mike Stathatos/Tom Stack & Associates.

Three Mile Island, page 20.

Transportation, page 26.

Mike McCloskey, page 36.

Low-Impact Camping, page 57.

Founded in 1892, the Sierra Club works to restore the quality of the natural environment and to maintain the integrity of ecosystems. Educating the public to understand and support these objectives is basic to the Club's program. All are invited to participate in its activities, to ". . . study, explore, and enjoy wildlands."

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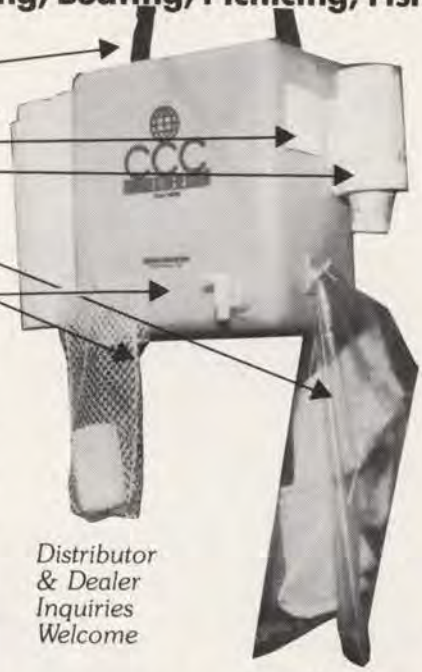

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PURPA

The utility reforms discussed in your November/December article on the Public Utility Regulatory Policies Act have, indeed, provided a welcome boost to alternative energy producers. But your readers should be aware of one negative impact unforeseen by conservationists at the time the bill was passed.

The mandated utility purchase of electricity at the high "avoided cost" rate has spawned an unprecedented flood of applications for the construction of small hydroelectric projects. Although many plans are to retrofit existing dams and diversion structures for electrical generation—a move most conservationists support—many more are for new dams and diversions. In the West, particularly, proposals are being made for new dams and diversions on virtually every small mountain stream, with potentially devastating effects on fisheries, wildlife, wilderness, recreation and water quality. Building any large proportion of these new projects would drastically alter the face of the West.

Conservationists are now working to find solutions to this problem that protect our streams and their important resources, while at the same time allowing sensible hydroelectric development and preserving the effectiveness of PURPA in promoting alternative energy development.

I urge people concerned with fisheries in particular and with conservation in general to join us in this effort. For more information, write to me at the Sierra Club, 6014 College Avenue, Oakland, CA 94618.

Russ Shay
Sierra Club California-Nevada Representative
Oakland, California

Paul Gipe's article on PURPA in the November/December issue has a special meaning for conservationists in northern California. The article highlighted the economic provisions of the Public Utility Regulatory Policies Act (PURPA), which let small-scale power-plant entrepreneurs sell electricity to utilities at top rates.

But the same provisions that make small-scale wind generation feasible also make small-scale hydroelectric development feasible, and a modern version of the 1849 gold rush is on in California's foothills and mountains; this time the precious commodity is water. Private speculators and governmental entities are staking their claims to hundreds of undeveloped small creeks and streams. They are not small farmers, as Mr. Gipe pictures them. For example, Consolidated Hydroelectric Inc. of Houston, a subsidiary of Consolidated Petroleum Industries, intends to spend an initial $25 million on a hundred small-hydro projects in northern California.

The potential impacts of the small-hydro boom on fish, wildlife, recreation and other amenities are tremendous. As of December 1, 1981, 44 small-hydro projects were even proposed for 17 roadless areas on national forests in the state, and the numbers were increasing every week.

Like most legislation, PURPA has its good and bad points. The Club's lobbyists think amending PURPA to eliminate the small-hydro boom would endanger the positive aspects of the law. Meanwhile, state and federal conservation agencies are inundated by the sheer number of proposals. The method of solving the problem has yet to be discovered.

Steven L. Evans
Chair, Yahi Group
Chico, California

In his PURPA article, Paul Gipe suggests that future agronomists might soon be producing a profitable secondary cash crop from harvested wind. To follow up, I suggest there is one type of site for wind-farming that is clearly superior to all others: up and down the four corners of setoff highrise buildings in windy areas. There are several reasons why this is a good idea:

- The cost of a tower structure would be eliminated.
- The buildings' walls would raise the velocity of the wind that they concentrate and direct toward the blades by more than a factor of two (being conservative), which means the force of the wind would be raised by more than a factor of eight (for two of the four corners, on a four-cornered building, at any one time).
- This approach would convert the wind to usable energy within inches of where the energy could be marketed, eliminating power-losing distribution systems.
- The energy could be stored as compressed air within the buildings' hollow support columns, or as liquefied air.
- This approach could reach into the really strong winds aloft.
- Builders of highrises now sometimes notch or otherwise encumber their build-

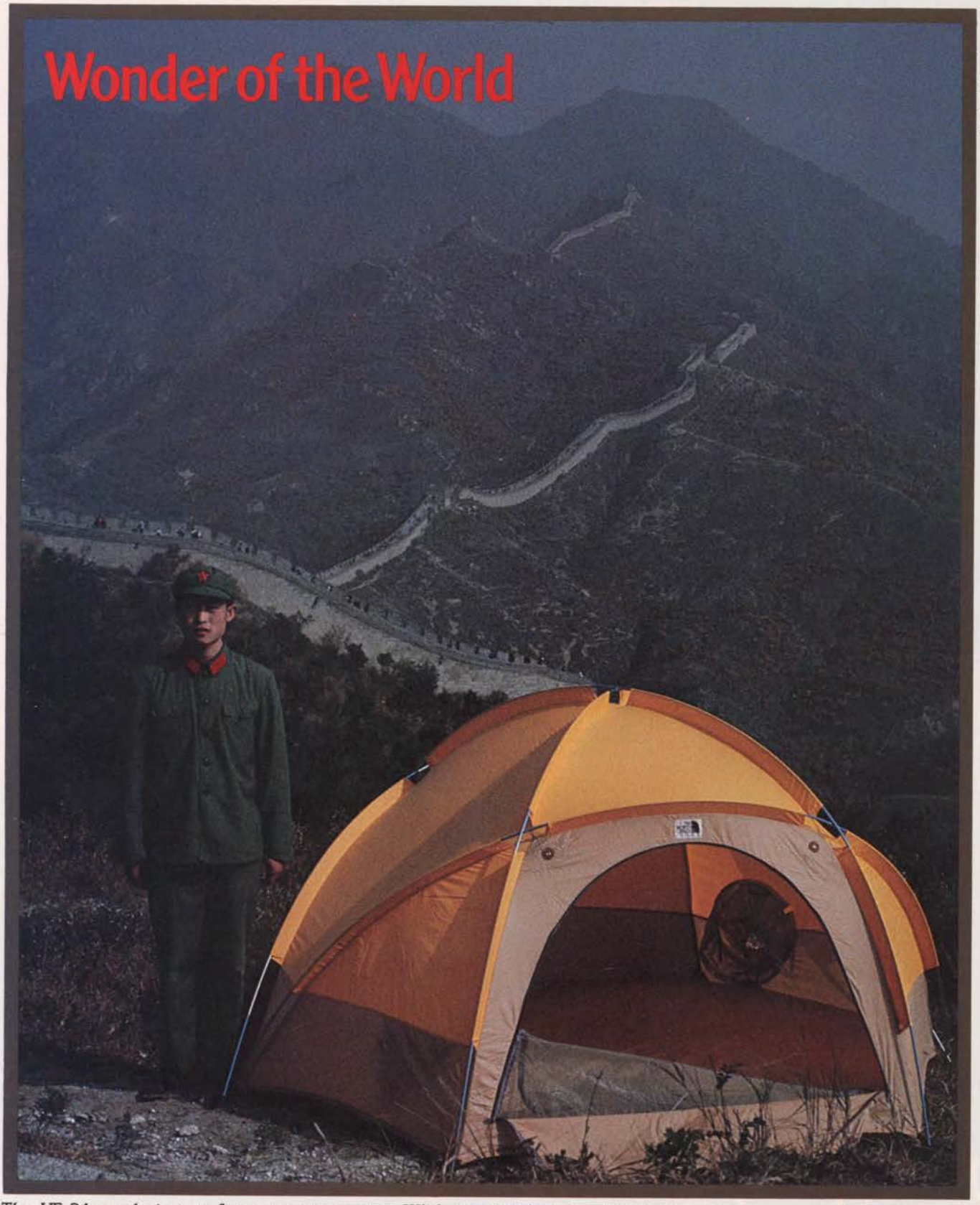

Photo: Hans Jones

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THE NORTH FACE

ings' corners to dampen winds accelerated by the walls; the wind generators would accomplish the same thing while producing energy.

Tony Butler
Houston, Texas

Endrin In Montana

In regard to your article on endrin in the November/December issue, I would like to add some information based on my personal experience.

During September and October I worked as an archaeologist in southeastern Montana in the fields that were sprayed with endrin in the spring of 1981. I became acquainted with Shelley Mackay, one of the few ranchers in the area who did not use the pesticide. She said that at the time of the spraying, all of the ranchers were aware of endrin's adverse effects on humans and animals. But despite the ban on letting cattle graze in the endrin-sprayed fields for a year after spraying, all the ranchers let their cattle graze on the contaminated wheat stubble.

Also, the government requires that every 25th head of cattle be examined for endrin contamination when it is brought to market. To circumvent inspection, the ranchers brought their cattle in lots of 18 or 19 head.

Shelley says all the ranchers she has talked to say they would use endrin again.

Gail M. Anderson
Cleveland Heights, Ohio

Service Trips' Purpose

Paul Hart's account of Club service trips ("The Case of the Disappearing Trail," November/December 1981) features the rewards to participants and the specific project accomplishments, but it passes over the value to public education and the influence on public policy.

The original back-country work parties we led were designed less as can-cleanup expeditions and more as demonstrations of how to live with wilderness. The Park Service and Forest Service gave us permission to gather and haul out the cans scattered around some lakes; they considered the operation a garbage detail. We took it as an opportunity to spread the message that individual campers should take out and recycle the containers they brought in.

We spread the message far and wide in news releases after each trip. Three tons of tin from Bullfrog Lake or four tons from Mount Whitney were front-page copy, worth editorials the same day in both the *Los Angeles Times* and the San Francisco *Examiner*.

The principal spinoff is the worldwide requirement on fire and other permits from

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park and forest agencies to carry out unburnable trash. It is directly attributable to the strategy of setting up work parties, a kind of peaceful picketing-by-example in the mountains.

Fred Eissler
Santa Barbara, California

San Francisco's Waterfront

I was delighted with "On the Urban Waterfront" (November/December 1981). The challenges of orchestrating waterfront development that is pleasant, usable and feasible were outlined well.

San Francisco is currently involved in developing the Rincon Point-South Beach Redevelopment Project Area. The project includes: between 2000 and 3000 units of mixed-income housing; historic restoration and commercial reuse of five existing buildings; two major waterfront parks; a hotel complex; a small boat harbor; and reconstruction of the Embarcadero Roadway.

We expect that when this plan is completed, the public will have access to a richly textured and revitalized environment focusing on the San Francisco Bay.

Frank T. Cannizzaro, Project Director
San Francisco Redevelopment Agency
San Francisco, California

Too Close To The Stream

Since it is a Sierra Club policy to foster sound conservation practices on outings, I was dismayed to see the cover photograph on the November/December 1981 *Sierra*, which shows a campsite within fifteen feet of a stream. Setting up a campsite so close to a stream violates Club practice; indeed, for wilderness areas federal regulations prohibit camping within 100 feet of streams. This mistake is repeated with the photo on page 58.

Edward M. Kimura
San Diego, California

The editor replies:

Right you are. In our delight over the excellence of the photos, the infractions escaped our attention. (The photo was not taken on a Sierra Club outing, by the way.) Also, the 100-foot rule is now 150 feet in many areas, and 200 in some. Please see "Ten Tips on Low-Impact Camping" in this issue for information on good procedures.

Erratum

In the January/February *Sierra*, the following credits for photographs were inadvertently omitted: page 49, Judith Calson, San Francisco *Examiner*; page 77, Bruce Straits; page 79, Philip Dangel; page 86, Snap-shot.

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Apple Slices	8	$2.60		$
Banana Slices	7	2.30		
Cheese, Cheddar	25 tbsp.	4.25		
Peanut Butter Powder	32 tbsp.	3.70		
GOURMET FOODS:				
Apricot Slices	9	8.75		$
Bacon T.V.P. Bits	30 tbsp.	2.15		
Fruit, Cocktail Mix	10	4.60		
Celery, Sliced	11	3.25		
Onions, Chopped	28	2.85		
Peppers, Green Bell	50 tbsp.	4.20		
Tomato Powder	32	5.10		
SOUPS & STEWS:				
Bouillon, Instant Beef	200	3.10		$
Bouillon, Instant Chicken	200	3.10		
Soup Blend, Vegetable	24	3.40		
Stew Blend, Vegetable	12	2.95		
INSTANT FOODS:				
Bouillon, Instant Beef	200	3.10		$
Bouillon, Instant Chicken	200	3.10		
Butter Powder	42 tbsp.	4.25		
Cereal, Fruit & Nut	8	2.50		
Cheese, Cheddar	25 tbsp.	4.25		
Cream, Sour, Powder	12	3.90		
Cream, Sweet, Powder	12	4.05		
Drink Mix, Orange	36	4.45		
Margarine Powder	42 tbsp.	2.70		
Peanut Butter Powder	32 tbsp.	3.70		
Potatoes, Mashed, Instant	36	3.30		
PRE-MIXED FOODS:				
Vanilla Pudding	16	2.40		$
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Applesauce	30	4.75		
Banana Slices	7	2.30		
Dates, Diced	8	3.95		
Fruit, Cocktail Mix	10	4.60		
Peach Slices	11	4.85		
Prunes, Whole Pitted	9	3.25		
VEGETABLES:				
Beans, Green	10	3.95		$
Carrots, Diced	14	2.95		
Corn, Sweet	14	4.85		
Peas, Green Garden	15	4.60		
Potatoes, Diced	11	2.25		
Potatoes, Mashed, Instant	36	3.30		
COOKING & BAKING ITEMS:				
Baking Powder	50 tbsp.	2.70		$
Butter Powder	42 tbsp.	4.25		
Cornmeal	39	2.10		
Margarine Powder	42 tbsp.	2.70		
Yeast, Active Dry	1 lb.	3.65		
HIGH PROTEIN FOODS:				
Eggs, Scrambling	24 eggs	3.65		$
Eggs, Whole Solids	33 eggs	4.40		
Milk, Regular Nonfat	44	3.95		
Beef, T.V.P. Granules	10	2.05		
Chicken, T.V.P. Granules	8	2.05		
Ham, T.V.P. Granules	9	2.05		
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Sampler Case (six #2½ cans)	per unit	17.95		
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A showdown over the future of the Clean Air Act will occur soon in both the House of Representatives and the Senate. Regardless of the outcome of committee discussions now underway, efforts by the Reagan administration and polluting industries to destroy the act's effectiveness are on a collision course with efforts by environmental, public health, and labor groups to continue the nation's progress toward clean air.

Environmentalists are extraordinarily fortunate in having two strong champions in this battle. On the Senate side, Republican Robert Stafford of Vermont will be bucking the President and, at least on auto issues, bucking Republican Majority Leader Howard Baker of Tennessee. In the House, Representative Henry Waxman of Los Angeles will be leading the floor fight for clean air, standing up against fellow Democrat John Dingell of Michigan.

Stafford and Waxman and environmentalist allies in both parties need strong public support. It is critical that all members of the House and Senate hear over the next few weeks—by mail, by mailgram and by phone—that constituents are committed to the preservation of healthy air.

The basic message for senators and representatives is this:

- Support Senator Stafford and Representative Waxman on the floor votes on the Clean Air Act.
- Oppose weakening of the auto-emission standards.
- Prevent damage to the air quality, not only of parks and wilderness areas, but also of rural and other areas that currently enjoy clean air.
- Ensure that the Environmental Protection Agency moves ahead to regulate toxic air pollutants, now implicated in more than 10% of the nation's cancer deaths.
- Adopt aggressive programs to diminish acid rain.
- Reject efforts to weaken or delay clean up efforts in polluted cities.
- Require new coal-fired power plants to install the "best available pollution control equipment."

The addresses: House Office Building, Washington, D.C. 20515; Senate Office Building, Washington, D.C., 20510. Capitol Switchboard: (202) 224-3121; Sierra Club 24-hour hotline: (202) 547-5550; Sierra Club Campaign Desk in San Francisco: (415) 981-8634.

THE 1983 FEDERAL BUDGET: BAD NEWS

President Reagan's new budget is bad news for the environment and further confirms the anti-environmental leanings of his administration.

Senator Robert Stafford (R-VT)

Representative Henry Waxman (D-CA)

Worrying About Our Environment Won't Help!

Never have the challenges to wilderness, clean air and water, and a more healthy, liveable environment been so great. The present administration seems determined to lead us back to the environmental Dark Ages.

Thousands of Americans are responding to that challenge by joining the Sierra Club.

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The budget for the Environmental Protection Agency would be cut by an additional 12%; the research programs of grants to states would suffer the most. Environmentalists have noted that the EPA's workload has increased tremendously over the past few years; the agency is already in the position of having to do twice the job on half the resources. The Department of Energy's total budget remains about the same, but nuclear weapons spending will rise by more than 56%. Funds for energy conservation are to be cut 95%; solar research would be cut 78%; and programs to insulate the houses of poor families, schools and hospitals would be eliminated completely. On the other hand, spending for civilian nuclear power programs remains intact.

In the Department of the Interior, the White House proposes increasing spending for dam construction by 22%. Funds for the acquisition of park lands would be cut by half. Revenues are to be increased by speeding the pace of offshore oil development and raising fees charged for use of national parks and refuges by the general public.

In the Department of Agriculture, money to subsidize timber sales programs is to rise, allowing sales of 12.3 billion board feet (bbf). The total for 1982 is expected to be 11.0 bbf, but funds for forest research and other programs that do not produce revenue are to drop. The administration would like to begin charging entrance fees for recreational use of national forest lands.

The National Oceanic & Atmospheric Administration is also slated to suffer cuts, with an accelerated phase-out of coastal zone management grants and termination of the sea grant program to colleges.

WHAT YOU CAN DO: Concerned readers should write to their representatives (House Office Building, Washington, D.C. 20515) and to their two senators (Senate Office Building, Washington, D.C. 20510) to tell them what they think of the administration's anti-environmental budget. Telephone calls are also in order (Capitol: 202-224-3121).

COURT "SHUTS OUT" WATT

James Watt and mining interests recently suffered a setback in federal court over strip-mining near Bryce Canyon National Park. In 1979, a group of mining companies wanted to begin operations in the area; the Sierra Club Legal Defense Fund (SCLDF) petitioned to have the Alton coal fields, which are visible from the park, declared "unsuitable for mining." Then-Secretary of the Interior Cecil Andrus suggested a compromise that declared two thirds of the disputed area off-limits to mining. The decision pleased no one; lawsuits were brought by mining interests, the Sierra Club and the state of Utah. In September, 1981, Interior Secretary James Watt offered to reconsider the Andrus compromise and to submit a new decision. After hearing the Interior Department's arguments, however, Federal District Court Judge David Winder decided not to allow a new decision. His decision, to everyone's surprise, was delivered immediately from the bench rather than in the form of a written opinion. It amounted, then, to a peremptory dismissal of Watt's arguments. William Curtiss, an attorney for SCLDF, characterized Winder's decision as a "shut-out" for Watt. Andrus's compromise will still face judicial review, but Curtiss believes it is likely that the environmentalists' victory will be upheld.

WILDERNESS NEWS

In early February, Secretary Watt issued a statement that he would not issue any new leases in designated wilderness areas until after the November elections. Conservationists called the announcement a "stay of execution, not a reprieve" and attributed the move to political motives.

In two legal cases involving oil development in wilderness areas, the Sierra Club achieved one clear victory and one qualified

success. In *Learned vs Watt*, applicants petitioned the Interior Department to issue oil leases in the Grand Tetons. As long ago as 1947, then-Interior Secretary Julius Krug had withdrawn the area from leasing, but mining interests claimed that the Wilderness Act, passed 17 years later, nullified the withdrawal order, thus giving them the right to obtain leases. The Sierra Club Legal Defense Fund intervened on the side of the Interior Department, fearing that Interior would not defend itself adequately against the lawsuit. Judge Ewing Kerr decided that Krug's order should remain in force.

Two cases, *Mountain States Legal Foundation vs Watt* and *Pacific Legal Foundation vs Watt*, were consolidated and tried as one case; the plaintiffs in each challenged the withdrawal of the Bob Marshall, Great Bear and Scapegoat wilderness areas from oil and gas leasing. In May 1981, a House Interior Committee resolution directed the Interior Secretary to withdraw the lands from leasing. Secretary Watt complied with the order reluctantly but publicly questioned its constitutionality. The two legal foundations, one of which Watt had previously headed, then sued. When the Department of Justice decided not to defend the withdrawals against the lawsuits, Congress and the SCLDF intervened.

In a ruling described as "something for everyone," Judge W. J. Jameson decided that the Interior Committee does have the authority to order land lease withdrawals and to declare emergencies—but also decided that only the Interior Secretary can set the "scope and duration" of such withdrawals.

TO THE DEFENSE OF RECREATION AREAS

The Sierra Club has joined forces with the North Cascades Conservation Council, to sue the Department of the Interior over new regulations that would allow mineral leasing in five national recreation areas. The suit charges that the Interior Department usurped Congress' power to decide on permissible activities within the areas and that the public was not given sufficient opportunity to comment on the changes. The regulations stipulate that the Interior Department is allowed to take measures to protect the area and to avoid conflicts between mining and recreation. But the burden of proving that mining activities would insure the environment now would fall on groups that oppose mining. Although national recreation areas are established for recreation, with less emphasis placed on the conservation of natural conditions than in other types of conservation units, the five areas involved would suffer major environmental damage if leasing occurs. The areas are: Glen Canyon (Utah), Lake Mead (Nevada and Arizona), Whiskeytown (California), Ross Lake (Washington) and Lake Chelan (Washington). The lawsuit was brought by the Sierra Club Legal Defense Fund's Denver office.

SCCOPE LAUNCHES PROGRAMS

The Sierra Club Committee on Political Education (SCCOPE) has been conducting a series of training sessions to teach environmentalists how to get involved in electoral politics. By mobilizing the Club's grassroots structure, SCCOPE will make the environment a major national issue. In the months before the November elections, SCCOPE will help define environmental issues, recruit activists, educate the public, and persuade public officials to take environmental stands. Candidates backed by SCCOPE will gain from the endorsements; SCCOPE can provide volunteer workers to those campaigns. Members interested in becoming involved with SCCOPE can contact Rob Kutler at the San Francisco headquarters. The booklet, "The Green Vote Handbook," a more thorough description of SCCOPE's role, is available for $1.50 from: Information Services, Sierra Club, 530 Bush St., San Francisco, CA 94108. □

VALHALLA

Now or Never

MAGGIE NORRIS

IN APRIL OR MAY, the British Columbia Cabinet will decide the fate of the Valhalla Wilderness Park proposed for the southeastern corner of this Canadian province.

The Valhalla proposal was the subject of an article in the *Sierra Club Bulletin* in June 1976. Since then the Valhalla Wilderness Society, an organization mainly of local residents, and the Western Canada Chapter of the Sierra Club have continued their campaign against logging the slopes of the Valhalla Range and in favor of the provincial government's designating 51,000 hectares (125,000 acres) of the western shore of Slocan Lake as a Class A wilderness park.

They achieved successive moratoria on logging, but the final one expired in December 1981. Then the provincial government initiated a planning process for the development of the entire Slocan Valley, of which the Valhalla Proposal is a small part. Whether or not to log the slopes of the Valhalla Range will be decided in the atmosphere of tradeoff and compromise inherent in such a planning process.

Establishing the park would not only preserve the beauty of a valley unsurpassed even by the great national parks of the United States and Canada, it would also protect the economy of the area from the painful effects—being felt keenly this year in several other parts of B.C.—of being too dependent on logging. A year-round tourist industry has been growing for years and would certainly continue to grow around the park. Ironically, the same B.C. government that has so far failed to protect the Valhallas has featured the area prominently in its tourism promotions in the United States, England, Germany and Japan.

There is considerable question whether the Valhallas are very important to the local logging industry. They are no more than 3.6% of the forestland available in the area, and due to steep slopes and decaying and unloggable timber, the proposed park includes only 1.5% of the available timber. Logging in the Kootenays will certainly not proceed or stop based on permission to log the Valhallas. The local logging companies have reputations among conservationists and industry people alike for wasteful forestry practices, and park proponents insist that a better standard of forestry would save at least the equivalent of the timber available in the Valhallas. (One local company, Slocan Forest Products, already has a mill at Slocan Lake and is widely regarded as the most likely company to log the slopes, but there are no formal agreements yet.)

The potential loss is dramatic; even in an area world-famous for wild and magnificent mountain ranges, the Valhallas are spectacular. From the shores of Slocan Lake, 23 miles long and pure enough to drink, steep slopes of climax cedar-hemlock forest rise to hanging valleys seamed with waterfalls, and on up to 10,000-foot peaks shining with glaciers and snow. Unspoiled yet accessible, the Valhallas can be reached relatively easily from national and provincial highways.

Loggers and foresters insist that the decline of the forest industry in B.C. is largely attributable to "too many parks." But provincial government statistics show that provincial park acreage in the Kootenay area (as the entire southeastern portion of the province is called) has been reduced by 72% since 1960. Many parks created within the last 20 years are alpine parks appealing

The Valhalla Range near the Slocan River is both accessible and wild. Canadian environmentalists want 125,000 acres designated a wilderness park.

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chiefly to climbers; less than 1% of current park area lies below 3000 feet.

A lakeshore-to-mountain-peaks park, such as the Valhalla proposal, is necessary because no such parks exist in the Kootenays, and this one is accessible by good roads. The park would provide recreational opportunities for fishermen, canoeists, hikers, climbers, ski mountaineers and cross-country skiers. In addition, the immediate area has historic significance: the towns of New Denver and Silverton were created during a short-lived silver rush at the turn of the century, and some of the old buildings still remain.

What the proponents of the park fear most is compromise and the application of a multiple-use policy. Wayne McCrory, a wildlife biologist and a director of the Valhalla Wilderness Society, explains: "The implementation of multiple-use approaches usually ends in chiefly satisfying the industries involved, while the other interests such as parks, wildlife and tourism get little or nothing. When areas proposed for parks have been subjected to multiple use, logging has been permitted up to the tree line and an alpine park created, which vacationers must reach by traveling through miles of logging devastation and over collapsing roads to reach vistas that look out over slopes of logging debris."

The other fear is that the provincial government will pass the buck to the regional district under the guise of local control of local issues. Since the area is heavily dominated economically by logging, very few local politicians can risk coming out against the industry. "Local control" denies the legitimate interest of thousands of other B.C. residents who are potential users of the recreational facilities offered by the park. It also destroys the possibility of planning a provincewide network of parks to satisfy the recreational needs of B.C.'s residents and visitors.

The members of the Valhalla Wilderness Society have been working for ten years to preserve their valley, and they must work even harder in the next few months to maintain pressure on the provincial government. *Sierra*'s readers can help by writing letters supporting the establishment of a Class A park on the site of the Valhalla Wilderness Park Proposal to: the Honorable Stephen Rogers, Minister of the Environment; the Honorable James Chabot, Minister of Lands, Parks and Housing; and the Honorable Tom Waterland, Minister of Forests, all at Parliament Buildings, Victoria, B.C., Canada, V8V 1X4. □

Maggie Norris, a biologist and freelance writer, is the volunteer coordinator and office manager for the Sierra Club of Western Canada.

Sierra Club Conservation Priorities for 1982

STAFF REPORT

THE SIERRA CLUB as a whole is involved with a great number of conservation issues locally, regionally and nationally. To be effective, though, the Club's efforts require focus. Accordingly, the board of directors periodically adopts a number of topics as the top-priority national conservation campaigns. For 1982, these are:

- CLEAN AIR ACT REAUTHORIZATION. This is one of the key fights in the 97th Congress; industry—aided by the Reagan administration—is trying to gut the key features of the Clean Air Act. Public opinion polls, however, indicate widespread public support for a strong Clean Air Act.
- NATIONAL FOREST WILDERNESS. The Club will continue its support for wilderness bills for individual forest areas as well as for statewide wilderness packages. The Club continues to resist the timber industry's efforts to pass legislation that would prevent future designation of wilderness in important areas.
- WATER RESOURCES PLANNING AND MANAGEMENT. A three-pronged campaign focuses on: 1) how proposed federal water-resource projects are evaluated and financed; 2) extending wetlands and floodplain protection provisions of the Clean Water Act, the federal Flood Insurance Act and other laws; and 3) analyzing and sometimes opposing a flurry of new bills intended to expedite environmentally damaging dredging of harbors and ports to accommodate increased coal exports using huge new "super colliers."
- URBAN TRANSPORTATION. This campaign focuses on increasing the funding for railroads and urban mass transit rather than for further freeway construction.
- NUCLEAR LEGISLATION. This campaign primarily focuses on legislation that deals with the problems of nuclear-waste disposal, with proposed speedups of nuclear-plant licensing and assorted other subsidies to the nuclear industry, including attempts to bail out the owners of Three Mile Island.
- PUBLIC LANDS LEASING AND PERMITS. This campaign monitors federal policies for oil,

gas, coal and geothermal leasing and how they affect public lands. Particular leases and permits are opposed, where necessary, both administratively and in the courts.

• NATIONAL FOREST PLANNING. This campaign aims at assuring effective citizen involvement in the development of management plans for regions and forests developed under the National Forest Management Act.

• BUREAU OF LAND MANAGEMENT WILDERNESS. This campaign continues the Club's involvement in encouraging public participation in inventory, study and decision-making on BLM-administered roadless lands. This process will eventually lead to congressional review and wilderness designation.

• SAGEBRUSH REBELLION. This campaign monitors and responds to proposals for the public-land giveaways and the regulation-weakening efforts of the so-called sagebrush rebellion.

• COMMUNITY ENERGY. This campaign helps Sierra Club groups study local energy-use patterns and assess the potential for conservation and the renewable energy resource use. The goal is to promote local energy-saving measures that are appropriate to each community. The campaign encourages action at the local—rather than the federal—level and calls for decentralized, environmentally sound solutions to our national problems.

• ENVIRONMENTAL BUDGETS AND APPROPRIATIONS. Since the budgets for the Environmental Protection Agency's pollution-control programs, parks and mass transit are of critical importance, the board also considered this a matter of high priority.

Doug Scott, the Club's director of federal affairs, recently assessed the probable future course of events. He wrote, "Our legislative campaigns, which were largely in a preparatory, buildup phase during the first session of the 97th Congress, will become extremely active. Most immediately, this will be seen in the Clean Air Act, the nuclear waste and the budget appropriations campaigns. We also anticipate a major surge of activity across the whole sweep of our public-land campaigns—and an increasingly amalgamated political brew of issues involving national forests, the BLM, oil and gas leasing and minerals on public lands."

Club members who would like to help with the massive work to be done on these campaigns or on more locally focused issues should ask for information on how to become an activist from the Information Services Department, Sierra Club, 530 Bush Street, San Francisco, CA 94108. □

THREE MILE ISLAND

Three Years After

JIM HARDING

ON MARCH 29, 1979, at 4 a.m., unit 2 at Three Mile Island in Pennsylvania suffered the worst commercial reactor accident in U.S. history. Three years later, the plant is a pot of radioactive broken parts, too expensive for its debt-ridden owner to repair. There is no more dramatic monument to the industry's morass of financial, technical and political problems than this one, and no more important battlefield for the future of nuclear power.

This unusual piece of real estate is filled chest-deep with 1,040,000 gallons of contaminated water in the containment and auxiliary buildings. Cleanup is progressing very slowly despite a recent offer of $123 million from the Department of Energy and tentative offers from the Edison Electric

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Institute and the Edison Power Research Institute, two industry organizations. Their offer would depend on voluntary contributions from member utilities, which would want their ratepayers to pick up the tab.

In Congress, several bills have been proposed to bail out the plant's owner, General Public Utilities (GPU), using either taxpayers' money or contributions from national utilities' ratepayers. Generally the nuclear industry has supported these bailout ideas, although some utilities are lukewarm to the prospect of passing the costs through to their ratepayers.

At the same time, GPU claims to be teetering on the edge of bankruptcy and has brought a $4-billion damage suit against the federal Nuclear Regulatory Commission (NRC), claiming the agency was not a tough enough regulator.

There is irony in GPU suing for stiffer regulation while the industry campaigns for less of it, as it is doing, and in asking for public bailouts while preaching the wisdom of the free market. But these contradictions apparently do not trouble the Reagan administration. One observer has written that the nuclear industry has not seen such a friend in the capital since 1973 and is using this leverage to prevent a repeat of TMI. Although it doesn't get quite everything it wants, when it comes to cash from the Treasury, this industry more than any other can depend on the administration to finance pet projects.

Cash aside, it is still too early to tell whether the NRC will be more influenced by the impacts from Three Mile Island or by pressure from the administration and industry to deregulate. For example, the Energy and Water Subcommittee of the House Appropriations Committee is pressing to "streamline" the licensing process.

Also, it was not long after the accident that the NRC suggested college graduates be present at all times in reactor control rooms. The industry beat back this proposal, arguing that it would deplete personnel, "negatively impact staff morale," and force bright high-school graduates into classrooms when they could be learning their trade on the job.

At Three Mile Island, where wholesale housecleaning should have come first, 15 of 33 already-employed reactor operators failed operator training tests late in 1980. Five of the failed candidates held Senior Reactor Operator licenses, which require four years of experience as reactor operators. Two candidates were caught cheating on the tests, and the utility charged the NRC with "unreliable proctoring."

The NRC's determination to shut down faulty reactors also shows signs of flagging. Several years ago, when a major design flaw was uncovered at operating reactors, standard NRC practice would dictate a "generic" shutdown for testing. But the situation is different now; in 1981 new evidence brought grave concern that older reactor vessels could crack in a rapid cooldown, leading to "50-50 chances of a meltdown" in the eyes of one senior NRC official. Shutdowns were postponed until required by refuelling.

Constant pressure from Congress and the industry is difficult to resist. Nuclear critics have fewer people and dollars to use than industry for work on NRC policies and regulations. The industry asserts that TMI killed no one and that new NRC regulations are too costly. The administration urges fewer reactor-safety regulations and associated hearings. For an NRC staff member, the pressure for leniency begins to build like Chinese water torture. But unexpected support for an independent NRC came from President Reagan's first appointment to (and chair of) the commission, Nunzio Palladino. Last November Dr. Palladino castigated the industry for "inexcusable lapses" in quality control at nine nuclear plants under construction, some of which had previously received clean bills of health from

the commission. Later, Palladino told a House subcommittee that failures such as those at the Diablo Canyon nuclear plant "becloud[ed] the high degree of confidence [he had] . . . that the plants we licensed were adequate."

Ironically, the process designed by the NRC to make sure all safety questions would be resolved in a public forum—that is, holding hearings on operating licenses—is the very one the administration has proposed to restrict severely. Proposed restrictions would affect the public's right to ask questions regarding safety; the licensing board's right to ask its own questions about safety, instead having to rely on questions that were previously asked; and the structure of the hearing itself, which would become more legislative in style and would eliminate the public's right to cross-examination and discovery. There could be a conflict between Palladino's concerns and White House policy that may make these proposals difficult to sell to Congress.

Nuclear power has plenty of sales problems outside of Washington and Pennsylvania. There is no forgetting nuclear power's dismal economic condition: in the early '70s the industry stated that it would need 250 orders over the next decade to prosper, but it has received more cancellations than orders over the last eight years. One industry publication, *Electrical World*, warns that there is little the President can do to sell reactors. Such Wall Street firms as Merrill Lynch and Standard & Poor's now publicly urge utilities to undertake energy efficiency programs (and, in some cases, nuclear cancellations) rather than construct new power plants.

Meanwhile, the public shows increasing distaste for nuclear power. An AP Wire Service-NBC News poll taken in November 1981 found 56% of its sample opposed to new reactors, more than double the level found in a similar poll four years earlier. Sixty-three percent preferred conservation and renewable energy sources to expanded nuclear power.

These problems are partly the legacy of Three Mile Island, and it is an inheritance that will outlast the decade. The utility faces a billion-dollar repair job to clean up the

LIONEL J-M DELEVIGNE

Three Mile Island, in the Susquehanna River, is a familiar neighbor to people in Gouldsboro.

reactor, and several NRC officials doubt the plant will ever operate again. The immediate issue at TMI is what to do with a million gallons of contaminated water. New decontamination devices have been installed, but local residents are concerned about the reliability and safety of the untested equipment. Once decontaminated, as a practical matter it's hard to see how to dispose of this water other than by dumping it in the Susquehanna. Pennsylvania legislators are interested in prohibiting that action legislatively; one such prohibition has already been approved on the House floor as an amendment to the NRC authorization for fiscal year 1982-1983. Consequently, it is not clear what will become of the water. Also, some of the sludge in the demineralizing system is expected to require disposal in a geologic formation for hundreds of years. Understandably, local residents do not want such wastes stored on the island while a geologic repository is found.

But the real test will come with the opening of the reactor core. Inside the reactor pressure vessel are nearly 40,000 nuclear fuel rods, all twelve-foot-tall zirconium tubes filled with uranium pellets. The NRC estimates that nearly half the zirconium and some steel supports have melted, leaving the towers of tiny, unsupported pellets to slump together, fall to the vessel floor or migrate throughout the reactor. Normally, a remotely operated crane removes hot spent fuel with great care, but no such operation is possible here. When it comes to cleaning up this pile, no one can say how it will be done, but everyone will be watching. □

Jim Harding is the energy projects director of Friends of the Earth and is director of the International Project for Soft Energy Paths.

Saving the Rest of CALIFORNIA'S LOST COAST

JULIE VERRAN

FOR SEVERAL YEARS northern California's Redwood Chapter of the Sierra Club has been working to expand the Sinkyone Wilderness State Park, and the state made some promising noises; but unless help arrives soon, a significant part of the proposed area may be logged off this year. Although the area does not qualify for federal protection as wilderness, it is important nationally because it is the principal home of the osprey north of Mexico and because it is one of the diminishing number of areas along the Pacific Coast that can still provide a satisfying wilderness experience.

The area in danger is a stretch along the route of the proposed Lost Coast Trail. The trail would wind south along the coast of northern California, starting near the mouth of the Eel River and following the beaches of the Bureau of Land Management's King Range National Conservation Area to the small community of Shelter Cove. Then it would go up over Chemise Mountain, down across Whale Gulch and into Sinkyone Wilderness State Park on the Mendocino County coast. It would eventually meet the paved coastal highway south of Usal; it would be the wildest part of the projected California Coastal Trail.

The coastline the trail passes along is indisputably beautiful, remote and rugged, with black sand beaches. The trail would also climb to forested points from which 40 or 50 miles of receding headlands are visible, some of the wildest American coastline outside Alaska or Hawaii.

KEN DYLESKI

Bear Harbor, Sinkyone Wilderness State Park.

Just south of Sinkyone park, however, the most scenic and unvisited eight miles of the Lost Coast—with about fifteen miles of the winding trail's route—are still in the hands of Georgia-Pacific Corporation (G-P). In 1977 the state slated the parcel for addition to the park but has not acquired the lands; the timber company has been aggressively logging the proposed addition since 1974 and will continue this year in one of the most sensitive areas.

G-P has been cutting old-growth redwood and Douglas fir, which grow on very steep slopes; many are affected by salt and wind. They are not majestic giants, but without them the steep slopes erode severely, and regrowth on old cuts has been slow.

While much of the uplands has been heavily logged and will need 40 to 50 years to recover, enough forest, grassland and beach remain to create a satisfying wilderness experience. But the company plans to log next to the trail route soon and, because its timber plan has been approved, may have started by the time this magazine reaches readers. The California Department of Forestry oversees timber harvesting on private lands and, although the department can ask for improvements, it rarely denies permission to implement plans. Other state agencies that reviewed the plans, especially the Department of Fish and Game and the Water Quality Control Board, recommended denying the plan. But the Department of Forestry did not follow the recommendations, and the California Coastal Commission, which might have been more forceful, has only limited jurisdiction over coastal logging.

Now there are only two ways the remaining forests on the Sinkyone coast can be preserved. One is by acquiring the land as part of the park. The Sierra Club has strongly supported every acquisition proposal for these lands that California's Department of Parks and Recreation has put forward. The most recent one, made in January 1981, called for adding a coastal strip eight miles long and a half-mile wide to the trail route. The Sierra Club and other organizations worked to get this proposed addition funded by money available from the State Parks Bond Act that California voters passed in 1980. Local legislators did include $3.2 million in the parks department's budget for the purchase, but legislative aides say the funds are tied to a provision of a 1980 law that allows the state to swap some land with G-P.

The exchange would add to the park overall, but the locations and sizes of the traded parcels are a problem. Under a plan G-P has outlined, the state would give up 48 acres of land already in the park near Jackson Point, a spectacular overlook 1000 feet above the sea. G-P wants the land so it can build a logging road through it; the timber the company would cut is visible from the trail route. The Sierra Club opposes this trade.

The other way to protect the forests along the trail route is for Georgia-Pacific to preserve them under a long-term agreement with the state. The company and the parks department are discussing this idea. But such voluntary preservation could leave the route vulnerable to logging after the agreement runs out, whereas state purchase would not.

At press time, the Department of Parks and Recreation was preparing another proposal; the Club will have seen a copy by the time this magazine is in readers' hands.

The situation calls for strong public pressure, which is the only force that will assure that the state will fully protect the proposed additions to the park. Readers from across the country are urged to write to Edmund G. Brown Jr., Governor of California, State Capitol, Sacramento, California 95814 to request that the state expand the Sinkyone park to include an aesthetically complete coastal wilderness trail. □

Julie Verran is a vice-chair of the Northern California Regional Conservation Committee.

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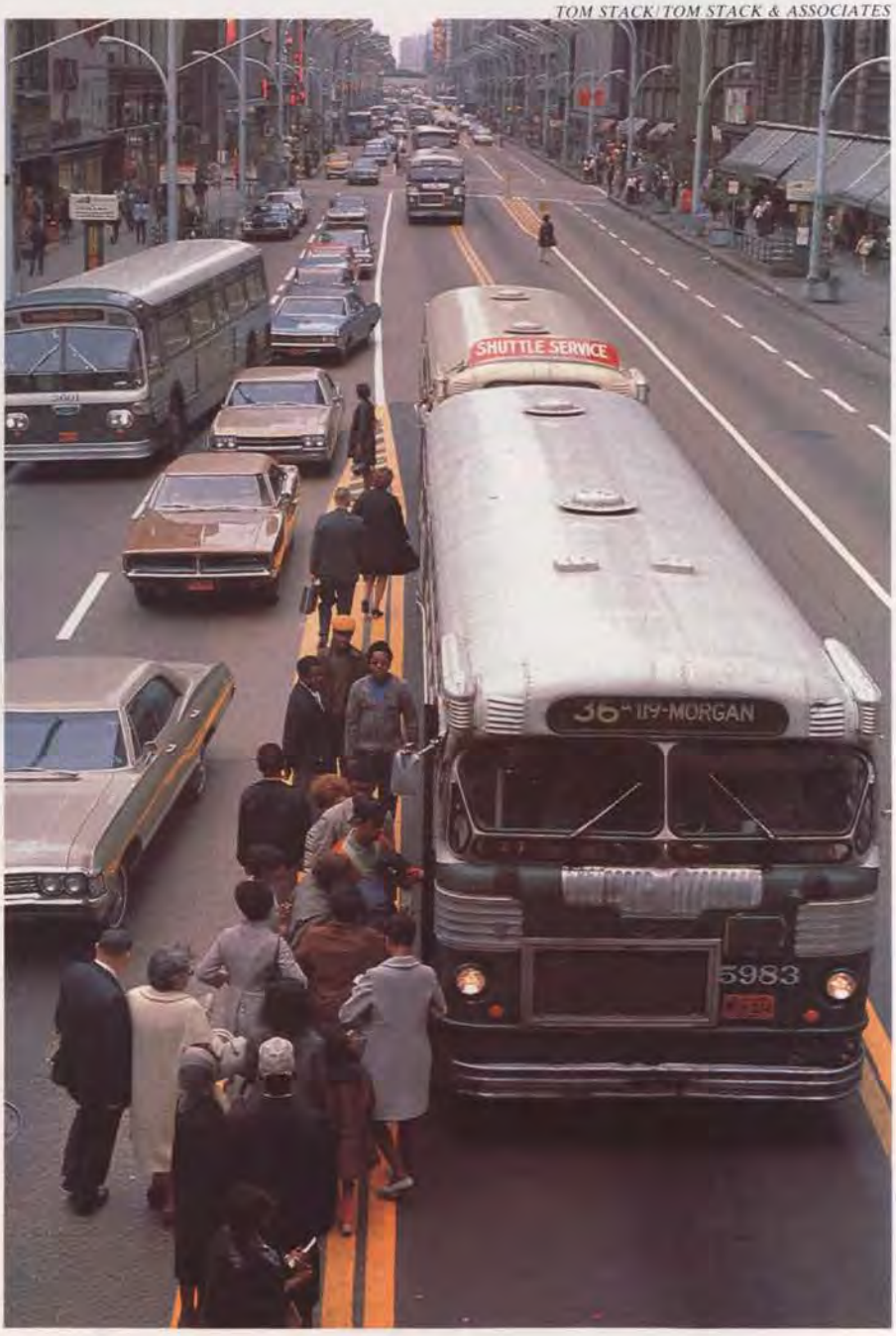
Transportation: The Roads (and Buses and Trains) from Here

TOM DOWNS
and NEIL GOLDSTEIN



TOM STACK/TOM STACK & ASSOCIATES

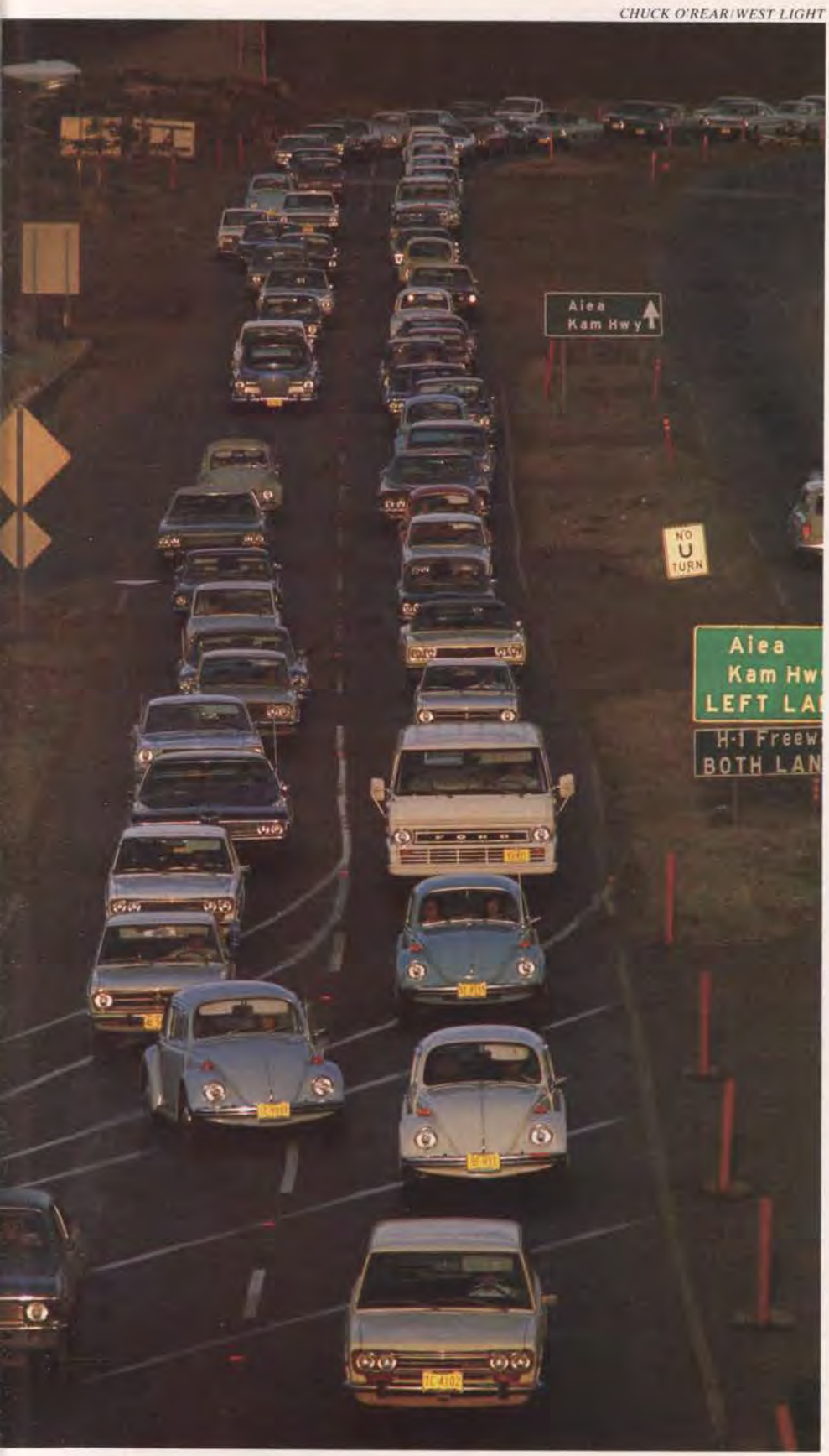
THERE IS ONE basic fact that anyone should know about transportation systems in the United States, and that is that they are falling apart. Almost three decades of building roads and bridges, coupled with drastic losses in mass transit ridership, allowed us to ignore one question: how were we going to maintain and replace those roads and bridges, those massive public works investments? We could build them because revenues were increasing faster than costs and because there seemed to be a limitless demand for new construction. We are now in a decade of both declining revenues and declining expectations.

The transportation question of the '80s is how much to spend for new construction and equipment, compared to the amount we spend to maintain and replace those previously invested in.

The Council of State Planning Agencies documented the current extent of neglect in its book *America in Ruins*. It says the interstate highway system "is deteriorating at a rate requiring reconstruction of 2000 miles of road per year." According to the report, reconstructing roads and bridges will probably cost more than $250 billion during the 1980s. On the transit side, bus fleets are not being replaced at a reasonable rate, many maintenance facilities are falling down, and some of our rail systems are in the worst shape of any in the world.

This debate over what type of investment is best for transit and highways is not an academic exercise. In recent years both Boston and Chicago shut down their rail systems temporarily, each when the money had run out. Both managed to get emergency appropriations from their state legislatures to keep going, but their long-term financial futures continue to look dim, and in both cities the transit systems as a whole are

CHUCK O'REAR/WEST LIGHT



On State Street, "that great street" in Chicago (opposite), bus riders share fuel costs and space by using energy-efficient mass transit. On Oahu, however, drivers crowd cars onto a highway (left), using the maximum energy possible to reach their destinations. All the people in these cars could fit into two buses.

financial basket cases. In Birmingham, Alabama, the transit system closed entirely for an extended period of time, and when it reopened, it had reduced its fleet and routes considerably.

Clearly, unless revenues are increased there will be insufficient funds in the Highway Trust Fund both to build new highways and to rehabilitate existing roads. In its drive to reduce the burden on the federal taxpayer, the administration also has indicated its desire to reduce federal assistance from general tax revenues for mass transit. Together, these factors pose a serious dilemma for the administration's transportation policymakers concerned about the decayed state of our transportation system. So serious was this concern that Transportation Secretary Drew Lewis explored a proposal to add five cents per gallon to gasoline taxes to raise revenues. (The current tax is four cents per gallon; it has not changed in 20 years.) Each cent of gasoline tax is worth approximately $1.1 billion in total revenues, so the proposal, had it been accepted by President Reagan and Congress, could have raised an additional $5.5 billion for transportation rehabilitation and construction.

In addition to revenue shortages creating pressure for reanalysis of transportation priorities, the legislative process creates more pressures of its own. The legislative authorization of both the mass transit program and the highway program expire in 1982. New national legislation will have to be passed defining the future direction and size of the programs. The administration

plans to make significant changes in both programs. Last year the administration and Congress redefined allowable costs for highway construction; they also reduced the total size of the proposed interstate highway system. But the approved "no frills" highway bill did not incorporate the administration's proposal to eliminate aid for urban systems and rural roads. Nor has Congress accepted the administration's proposal to eliminate federal operating assistance for public transit.

Previous experience indicates that the new legislation will be a combined bill covering both transit and highways. In the House of Representatives this arrangement makes sense, since the Public Works Committee has jurisdiction over both highway and transit legislation. But in the Senate, jurisdiction is divided; the Environment and Public Works Committee has the highway program, and the Banking Committee has the transit program.

Currently the highway program is financed by a trust fund established in 1956 to provide a system of highways to improve our national defense. The fund is generated by the previously mentioned four-cent-per-gallon gas tax. The tax is categorized as a user charge, providing the traditional legislative rationale to retain the fund—the users pay for the facilities. The major highway programs and their funding levels for fiscal year 1982 (the current year) are:

INTERSTATE HIGHWAY CONSTRUCTION: This is the program that funds major construction on this road system. Its 1982 appropriation level is $3.1 billion.

INTERSTATE RECONSTRUCTION (called 4R): This fund allows states to rebuild and repair existing interstate highways. It is allocated $800 million for 1982.

PRIMARY ROADS: This is also a major construction fund for the old U.S. highway system's numbered routes. It is funded at $1.5 billion for 1982.

SECONDARY ROADS: Generally speaking, these funds are for major country roads. The allocation is $400 million for 1982.

URBAN ROADS: This program funds major urban streets and can also be used for transit projects. Its appropriation is $800 million for 1982.

BRIDGES: The bridge program provides funds for reconstructing bridges, both on and off the federal system. It is allocated $900 million for 1982.

The total spending authority for the highway program is $8 billion for fiscal 1982. But the fund's revenues are now at least a billion dollars a year below expenditures, so the fund is drawing on its reserves; the current balance is about $9 billion.

The most controversial highway program by far is the interstate construction program. The most controversial, expensive and environmentally damaging projects have been postponed to the very end; some are still to come. They carry enormous price tags and drain funds from areas that desperately need to reconstruct crumbling roads and bridges. Some of these projects, such as I-478 in New York (known as Westway) and I-105 in Los Angeles (known as the Century Freeway addition), have enormous price tags and are being criticized by other states that have to be content with less funding for reconstruction while these projects use scarce dollars.

Environmentalists have also criticized these projects for using money that could be spent on mass transit projects. When a state decides to forego a previously planned segment of the interstate highway system, the funds allocated to the project are turned into an entitlement for the state that can be used to assist mass transit. To show how expensive these projects are, the combined cost of Westway and the Century addition is more than $4 billion for 21.5 miles of roadway.

To eliminate some costs in the interstate construction program, in the fall of 1981 Congress limited the types of projects that could be built with interstate construction funds; but these large-scale projects still receive priority funding because they are classified as "gaps" in the interstate highway system.

If the picture for highways is dim, however, the picture for mass transit is dark. In fiscal 1981, the Urban Mass Transit Administration had authority to spend $4.6 billion on transit nationwide. In fiscal 1982, the program will be funded at $3.7 billion. This is a reduction of almost 20%.

The transit-funding program has two major components, capital development and operating assistance. The capital development program provides federal funding for 80% of a local program, with the other 20% coming from the locality, to purchase new buses, bus garages or rail transit facilities. The operating assistance program helps transit systems meet operating costs while keeping fares low to encourage ridership. The Reagan administration's position is that the operating assistance program is not effective, so this program will be phased out over the next three years. This phaseout would reduce the funds by a third each year

This freeway interchange in Atlanta illustrates one of the biggest problems with limited-access highways: wasteful use of land. Here, the land the highways have left would be difficult to use for agriculture, housing or commerce. Nationally, it would be difficult to count the acres of prime agricultural land paved over or made useless by highways, while worldwide food shortages grow. Land-use issues will grow in importance soon.

WILLIAM S. WEEMS/THE PHELPS AGENCY

What's Wrong with More Highways

JO JONES

PEOPLE ACROSS THE NATION are fighting the expansion of the highway system, and they have many good reasons; some are particular to the project, and some are common to many fights. There are even fights that could be avoided altogether by properly amending some upcoming legislation.

Some highways, such as the one proposed to run through Overton Park in Memphis more than ten years ago, would take the land they need from existing parklands.

Others, such as I-485 (stopped in Atlanta), would destroy many neighborhood homes and make the surrounding area unpleasant to live in because of noise, vibration, pollution, rainfall runoff (which can cause local flooding) and division of the neighborhood. Furthermore, the purpose of I-485—and most urban highways—was to get more people and business into the downtown business district more quickly during rush hours. But I-485 would have saved commuters only five to ten minutes and would have competed with Atlanta's new rapid transit system.

Some bitterly opposed construction would dramatically affect natural areas such as wilderness or national parks. For example, a major widening is proposed for a stretch of highway near Hungry Horse, Montana, which leads to the entrance to Glacier National Park.

Although each battle is different, many have features in common. One trouble with a large number of highway projects is that they are unnecessary; real needs could often be filled using solutions other than highway construction. Some situations could be helped by safety improvements, better mass transit systems or more efficient use of existing roads by designating car-pool lanes and bus lanes. Often, ill-conceived highway projects result when politicians, planners, special interests and land speculators look for increased tax revenues from commercial development, or for profit from taxes. But the projects may not be justified by actual demand.

Money is often a motive. The easy construction funds available from the federal Highway Trust Fund are almost irresistible to local and state governments. The fund often requires matching money at only ten to twenty cents on the federal dollar.

Local and state governments rationalize road construction to avoid losing their "share" of the funds, but they often neglect to examine the complete financial picture. They really pay for many of the roads' costs from their own treasuries, because they have to maintain the roads, do construction and repairs, provide police services, lighting, storm sewers, cleaning, flood control and other services. At the same time, local areas receive more pollution from the increased traffic, and the costs associated with the pollution may offset the increased revenues for local businesses. In some cases, local businesses may even lose revenues.

The Highway Trust Fund is popular, though, largely because it is a user's tax. But some users of the roads contribute more to the fund than they receive in services, while others receive more. Heavy trucks, for instance, pay high fees—but cause rapid, expensive deterioration of roads. The Sierra Club believes that trucks should pay fees more appropriate to their use.

Also, to provide the most appropriate spending of the fund's dollars, the Club favors adding flexibility to upcoming legislation on the fund. Perhaps the provisions could take the form of block grants to state and local governments, to be spent according to the needs of the situation. The purpose would be to let hard-pressed local governments use their share of highway monies for road maintenance, repairs and other pressing work that must now be funded by already-strapped state and local treasuries, while the fund money goes to build new roads. Local people would also be able to select the categories of roads to be worked on from the many levels existing, including primary roads, county roads and interstate highways.

This kind of flexibility has the political advantage of promoting the Reagan administration's goals of "cutting out the fat," providing "local control" over expenditures and "cutting red tape and regulations." State and local governments could also benefit by satisfying their local needs more efficiently while freeing up local funds. Finally, the flexibility might diminish the pressure to build unwanted, unnecessary porkbarrel highways.

Sierra readers who would like information on becoming activists on transportation issues can write to the Information Services Department, Sierra Club, 530 Bush Street, San Francisco, CA 94108. □

Freeway construction, shown here south of San Francisco, can create devastating erosion.

STEPHEN FRISCH/PHOTO RESEARCHERS, INC.

Jo Jones is the chair of the Sierra Club's national Transportation Committee.

and would terminate the program at the end of the third year. Currently one billion dollars a year in federal operating assistance go to transit systems, so the impact of eliminating this program would be to reduce funding by another billion dollars; that is, the annual funding level would be about $2.7 billion dollars a year for transit, if nothing else changed. The transit program would be cut in half, a disaster for the transit systems of the nation.

The cut would come in hard times. Transit ridership has decreased again because of escalating fares and minor reductions in gasoline prices. In October 1981, transit ridership nationally was down 7.3% compared to the same period in 1980, a sign that transit continues to need assistance, not starvation, from the federal government.

The issues raised by the administration's legislative proposals and the President's rejection of Secretary Lewis's proposed increases in gasoline and excise tax revenues continued to confront Congress and transportation policy makers. First, the federal highway program currently spends $1.5 billion per year more than it takes in because gasoline consumption is down nationwide. To make matters worse, in addition to the substantial costs of new highway construction borne by the Highway Trust Fund, many interstate highways are now approaching their 30-year design lifetimes. While past programs of resurfacing, restoration and rehabilitation have maintained roadways during their design lifetimes, ordinary maintenance measures can no longer suffice; reconstruction work in many cases will be required. This expansion of the program by increasing funding will add many billions of dollars of costs when revenues can't even pay for the current program.

While this revenue shortage poses a dilemma, the Sierra Club's transportation activists have seized upon it as an opportunity to encourage a reevaluation of highway spending. As an alternative to spending limited funds on the new construction, Club leaders have proposed a reduction in highway spending for such projects and a redirection of funds to an expanded reconstruction program. In meetings with Transportation Secretary Drew Lewis and Federal Highway Adminstrator Barnhart, in congressional testimony and in discussions with local goverment officials, Club representatives have urged this change in policy.

A second major transportation issue also concerns financing. Currently trucks cause a disproportionate amount of highway dam-

The Energy Dimension

CHRISTOPHER WASIUTYNSKI

TODAY THIS COUNTRY is more conscious of energy use than it was in decades past, so when it chooses transportation systems to develop, it should seriously consider the impacts of various options on energy use. After thorough analysis, policymakers will find that mass transportation conserves both energy and other resources.

There are several factors to consider when evaluating overall energy efficiency: direct and indirect consumption of energy, and direct and indirect effect on land use.

First, direct consumption of energy is lower for mass transit: subways, buses and streetcars typically consume between a half and a third as much energy as a car to carry a passenger a given distance. Therefore, subways, buses and streetcars are two to three times more energy-efficient than automobiles.

Second, the indirect consumption of energy and other resources used to build vehicles, construct roads, lay tracks and so on is also lower for mass transit. Durability is one big consideration. For example, while an automobile typically wears out in about 100,000 miles, the service life of a rail car is often more than a million miles—at least ten times greater. Although the energy and materials used to build tracks and tunnels must be counted, so must the energy and materials that go into highways, and a well-used mass transit system is more economical in that respect, too.

Third, mass transit is far more economical in its use of land than urban highways. A single track of subway can carry more seated passengers in a rush hour than six lanes of urban highways, which cut block-wide swaths through settled areas; counting standees, a double-track subway line can perform a task that would otherwise require between twelve and twenty highway lanes.

Finally, and perhaps most important, mass transportation encourages land-use patterns that reduce overall energy use. Automobiles encourage sprawl development, but where transit is available, development tends to cluster around transit corridors. Automobile trips become unnecessary to reach stores and offices, which are within walking distance. By sharing walls, apartments reduce the heating and cooling energy needed. In New York City, which grew up around its transit system, per-capita consumption of energy for all purposes (including bright lights, heating and air conditioning as well as transportation) averages 180 million BTUs annually; this is roughly half of the U.S. national average of 346 million BTUs per capita (1979 figures). Similarly, a Toronto study concluded that the neighborhoods that used transit most also consumed less energy for all purposes. Compared with neighborhoods where 95% of trips are made by automobiles, neighborhoods where 35% of trips are made by mass transit used roughly half the energy overall, both for travel and for residential use. □

Christopher Wasiutynski, a transportation planner for New York City, is on the Sierra Club's national Transportation Committee.

Such modern systems as the San Francisco Bay Area's BART are popular and reduce auto use.

LEE FOSTER

age. As a vehicle's weight doubles, highway wear and tear increases eightfold. Since the administration has rejected tax increases, it would appear sensible therefore to redistribute the existing tax burden so trucks pay their fair share. The American Association of Railroads, the Sierra Club, the National Wildlife Federation, the Environmental Policy Center and many other groups have spoken out forcefully in favor of this equity. Moreover [Mr. Goldstein notes], the subsidy that auto drivers provide to trucks by paying a disproportionate share of gasoline taxes to support highways has important environmental consequences: subsidizing trucks encourages using trucks instead of more energy-efficient and less-polluting rail freight systems.

The administration's proposals to eliminate urban and rural aid raise another issue of fairness. Currently, mile for mile, rural roads and local city streets are used far more than interstate highways. But most gasoline taxes derived from this ridership pay for the interstate system. The result of this subsidy of interstate highways [Mr. Goldstein points out] is the construction of environmentally damaging new interstate roadways. Rather than reduced aid to urban systems or rural roads, environmentalists have urged that money be redirected from the interstate system back to localities.

Transit systems are going to face a very traumatic future, with the phaseout of operating assistance, increasing fares and declining ridership. Transit almost died out in the United States before we discovered that we had to have it. Mass transit now needs not only a financial and philosophical commitment from the federal government, but also greater flexibility for local governments and agencies to use in allocating funds. In the past, for example, local officials have been restricted from applying funds to some kinds of transit systems, thus limiting their choices. In addition, operating-assistance funds have been disbursed according to fixed formulas, leaving big systems with few dollars per rider and small systems with more per rider. But needs vary from system to system, and local officials should have more flexibility in allocating funds according to what their systems need.

The administration's proposals raise serious issues regarding starting new rail projects, too. In the budget documents justifying its freeze on such projects, the administration argued that mass transit systems save little energy in the short run, when the energy needed for construction is considered. This analysis may be in error because it relies on studies that do not fully consider the energy required to build the alternative, highways for cars; but it *certainly* misses the essential point named by mass-transit advocates regarding the energy and environmental advantages of transit. When mass transit systems are planned in conjunction with other sensible urban-development policies and land-use (zoning) practices, and when the most appropriate system is chosen for the circumstances (light rail where it makes sense, heavy rail where that is justified, buses where they work best, and so on), mass transit systems are important factors in encouraging compact development.

Mass transit encourages compact development. It can reduce people's need to make trips in *any* vehicle, since people in cities with mass transit systems can walk rather than drive, as they must do in sprawling, auto-dependent developments. It can mean that energy efficient high-density housing could be built rather than less efficient low-density residences. Of course, mass transit also pollutes less than massive use of individual cars.

In summary, the highway and mass transit programs both suffer from years of neglect of existing facilities and equipment. As a nation we have yet to demonstrate that we are able and willing to maintain what we have already built. Until we do, there is little reason continually to expand. Rehabilitating existing systems uses fewer resources per dollar than new construction. The new authorization for the highway and transit programs should direct more money to maintenance and reconstruction before expanding the systems.

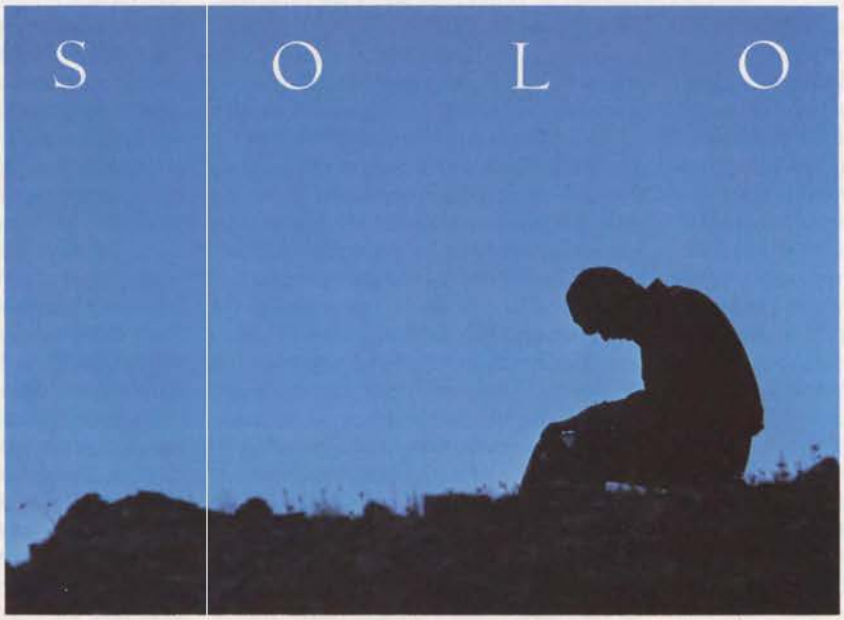
Also, the administration's proposals for transportation systems do not handle the crisis of decaying and financially distressed systems in many major cities. Nor do these proposals appear to satisfy the nation's energy needs. These are matters that must be clearly dealt with in this year's legislative proposals for transportation. These issues are essential items for this year's congressional consideration of transportation; the results of the debate may establish the direction transportation systems will go for decades. □

Many components of today's transportation systems, including subway trains (such as this graffiti-scarred car in the Bronx), buses, highways and bridges were built years ago. As they age and decay, maintenance costs rise and reconstruction or major repair seems inevitable. But funds for transportation concentrate on building new highways and allow little flexibility for local officials to use the money according to local need for mass transit or road repair.

ROBERT BORNEMANN/PHOTO RESEARCHERS, INC.

Tom Downs is the director of the Department of Transportation of the District of Columbia and has served as executive director of the Urban Mass Transit Administration. Neil Goldstein is the Sierra Club's New York representative.

EXPLORING THE INNER WILDERNESS



Text and Photographs by DAVID SUMNER

Wetterhorn Peak, Colorado.

THE FIRST TIME I visited Wetterhorn Basin, it was in a cold, Colorado mountain rain fortified with hail. I didn't see the angular, 14,017-foot summit of the Wetterhorn, only clouds yanked down tight around its base. I was wet. A herd of domestic sheep had recently grazed through the basin, and the place stank of manure.

Slogging along the West Fork pack trail, I wanted only to get out of that high hole and back to my car below.

I was in Wetterhorn Basin for two hours.

Four years later I returned to the same place for four days. This time it became a glorious dreamscape. Clouds, a resident hawk, marmots whistling, krummholz, the clatter of rockfall, a hummingbird, two surreal sunsets, dew on grass, water pipits, nutcrackers, coyotes, paintbrush, wind, cold, warmth, sky, sun, stars. All this and more. But then, my second visit to Wetterhorn Basin was not a usual mountain sojourn.

For three of those four days I stayed at a simple encampment in a high, protecting alcove of dwarfed Engelmann spruce. I ate no food. I talked to no one, saw no one. Except to get water and watch a sunset, I stayed within a 30-yard radius of my camp. In more than a decade of backpacking, I'd never spent so much time in such a small space. I had been alone, but I'd never fasted.

The occasion was a 23-day "standard" course given by the Colorado Outward Bound School, one of three run in the north San Juan Range each summer. The three-day solitary fast in Wetterhorn Basin was the well known Outward Bound "solo."

I let our instructor, Britisher Alan Roberts, choose my site with one proviso: "Put me up high where I can see around, not down in those trees. I'm not a forest person. I don't want to be enclosed."

"All right, Dave," he pointed out in his Liverpool twang. "See that finger of trees running up the ridge below Coxcomb?" Next to the Wetterhorn, the 13,656-foot Coxcomb was the dominant mountain above the basin. The Wetterhorn was graceful and fine like a pyramid, Coxcomb blocky and squared off like a stump. "That's plenty high. See what you can find. I'll be checkin' on you daily."

At 8:30 a.m. that first day I hunched into my pack at our temporary base camp and headed up. For a while up on the ridge, I wasn't sure I'd find a site because there was no level ground. But I poked around, still buzzing with the activity of the preceding days, until I found a passable spot.

That was the first challenge of solo: getting into it. The experience was as abrupt a change of pace as I've ever experienced in the wilds. Until the morning when the ten of us scattered to our solo sites, the course had been exciting, active and non-stop. The day before solo we'd climbed the Wetterhorn in chilly murk. Prior to that we'd backpacked 55 miles, topped 11 other summits, descended one steep canyon, climbed another and run an orienteering course. It was a superb expedition. Now, all of a sudden it stopped.

The first day on solo I stayed busy, very busy. The first order of business was shelter. Wedged against a small, dense wall of krummholz was an almost level patch of ground. With a little scraping and building of the duff I made a narrow flat for plastic groundsheet, foam pad and bag.

Then I set to work rigging my tarp. I wanted to stay dry. This was our fourteenth day out and it had rained on all but two of them. The first time I pitched the tarp as a lean-to, using the krummholz as a windbreak and rain-block to the southwest. Not enough protection. So I rerigged. From dead spruce branches I whittled two eighteen-inch tent poles and used them to form a squashed-down A-frame. I crawled underneath and tested, crawled back out and modified. Two inches here, four there, tie a rope a little tighter somewhere else. Busy, busy, busy.

I needed a clothesline, too, so I found a tree with dead branches to hang things on to dry. Socks, ace bandage, T-shirt, denim shirt, wind parka, rain parka. All went up to catch the sun I knew wouldn't last. I set out my boots, too. Not a dry spot on them; they must have weighed five pounds each.

DAY ONE of solo was like that. Either I stayed busy or I slept. Around camp I did little inventories—noted the wildflowers, kept a mental list of animals and birds seen or heard. Above the foot of the tarp I found "The Guardian," a weathered flange of dead spruce trunk with two knots that had popped out, leaving eyelike holes. It looked like a ghost, and I conversed with it. I conferred spirit on this, conversed with it, gave it an assignment. "Watch over me, Thing," I said. "Be my totem."

In the afternoon I slept, woke, continued nitpicking with the tarp. I found a prop stick for my pack and covered it with a garbage bag to keep off the rain. I photographed my site and The Guardian, but resolved to hold myself to one 36-exposure roll of film daily. It seemed important to set limits on being busy. I did the same with my writing; each day I'd do a letter to a friend, plus three pages in the notebook for myself.

Fasting has various documented effects that are no mystery. Basal metabolism slows, and chemical changes occur as the body turns to feeding off its own food reserves, starting with fat. As in hibernation, the body goes into physiological rest. Inertia sets in, sleep increases and temperature may drop. Breath becomes bad, the tongue coated. Psychological effects often include mild euphoria, heightened sensory awareness and mental alertness, more than usual irritability and what one manual calls "pronounced childlike behavior."

My fussiness about my surroundings seemed an extension of the latter two psychological effects, and others fell similarly into line. I presume my body temperature fell because I was chilled all three days. Only vigorous exercise and the sun could warm me. Hunger that first day was less fact than anticipation; I kept waiting for it, kept expecting dreadful gnawings and an agonizing emptiness. I experienced actual pangs only in light waves. Per Roberts' instructions I drank three liters of water daily, which felt like too much.

Only toward the end of the first day did I begin to slow down. I was established. An afternoon rain had come and gone without mishap, and I knew I'd stay dry. The shelter was too confining, but that was only an irritation. I was oriented. I'd established an easy walking route to a nearby streamlet for my water.

Knowing my temporary home helped relax me, and my body was slowing down anyway. Toward midafternoon I experienced my first wave of overall weakness. That was when I took my first nap, and when I woke I lay in the bag for a long time just thinking. It seemed as if I couldn't move, as if my brain had stopped transmitting instructions to the rest of me. From then on, long gaps between thought and action were the general rule.

Yet I was far from dull.

As I slowed down, I began to discover Wetterhorn Basin as I certainly had not four years earlier. First came the weather patterns, and particularly the cloud movements. Part of this attention was sheer prudence, for I was dependent on the elements—not just the rain, but also the warm sun that dispelled my chills. But my observations went beyond that.

"The wind is from the northeast, but the clouds are coming in from the south," I wrote in my notebook. "Gray clouds in many tones. They billow over the ridge like smoke. A volcanic quality. Rapid motion, much swirl, layers and shreds of gray. The clouds seem to explode. Better retreat to the tarp."

There was no sunset that first night, but for half an hour an airy, rhythmic process repeated itself. It began with low clouds surging out of Wetterhorn Gorge in the west. The mass boiled up into the basin, and for a moment I thought it would envelop the entire area. But just as suddenly the clouds

stopped, hung for a moment, then withdrew back down into the gorge. Up, up they puffed again, then back. The rhythm was regular and measured, as if a live, breathing presence were down in that gorge calmly exhaling and inhaling. A dragon?

I went to bed before dark with wool socks on, wool pants and wool shirt inside a good down bag, but I never was comfortably warm. Sleep was intermittent and dreamless. Coyotes howled before dawn on morning two, and a pair of planets rose to the east. Then the birds began to sing; rosy finches made the most noise. I dozed off and didn't leave my bag until the sun hit the tarp.

Day two was a hodgepodge, a jumble. My body was slowed, but my mind still jittered. Lacking the definite housekeeping tasks of the first day, it fluttered. The isolation wasn't a problem; I'd done plenty of solitary backpacking before. But I felt half into and half outside the fast—resisting going all the way. Being weak and lethargic bothered me, since it was the same feeling I have when I'm down with a cold, so I fought it.

Soon after I was up, I had my drying operation going in a good morning sun. Busy, busy. Clothes were draped all over the krummholz and boots perched on rocks so the sun would shine directly down in. I had a brief chat with The Guardian, told him I liked his eyes. I established a sunning area 20 feet from my tarp and a whittling area six feet away, where I started notching Indianlike geometric designs in a stick of krummholz spruce with a pitchy root burl on the end. I could whittle very intently, but not for long.

So then I'd rest and sun. In retrospect, it seems these moments of lying around were the closest I came to any visionary state. I didn't sleep, and the world of Wetterhorn Basin poured in on me as in a waking dream. The more passive I became, the more receptive, too.

While I was sunning, flies buzzed and landed on my back, arms and legs. I was too lethargic to crawl to my pack and get the Cutter's. Let the bugs do what they want, but what did they want? What were they getting from me and my sweat? Soon I was wishing a hawk would circle overhead, or a coyote wander by and sniff my arm.

The hawk came as I wished. It went down the basin directly in a hard, slanting glide and flew back up more slowly. Down where the creek begins to cascade into the gorge, it folded wings and dove but came up with nothing. Drifting back, it rose in a series of upward spirals until it was a dark dot against excessively bright clouds. It veered off over the southeast ridge and was gone.

Lying face down, lying on my back.

I didn't identify the hawk, only that it was a buteo with white under-wings trimmed in black. But when the Clark's nutcrackers came, I knew them at once. Raucous, black, gray and white, large members of the jay family, almost crows in spirit. First one came, perched on a spruce point above my tarp and made sounds as though he was clearing his throat of something he'd eaten too fast and discovered too late he didn't like. He called four times, and another nutcracker came. I heard their wingbeats as they moved to another spruce but couldn't muster the oomph to roll over and look that way. The two of them made rasping sounds. I dozed off.

WHEN I WOKE, clouds were billowing and swirling around the Wetterhorn; spots of sunlight played over the basin. The world around me was taking on kaleidoscopic qualities. A broad-tailed hummingbird whistled in and checked the red zippers on my pack for nectar. A little later the clouds were moving in three directions at once. Marmots whistled, pikas squeaked.

Sometime in the afternoon the waking reverie broke, and I had a hunger fit. I really wanted to eat, to taste something, anything. I nibbled grass stems and then a spruce twig. No luck, no relief. My stomach felt less empty than flat. Apparently I craved the activity of eating more than food itself. Chewing wasn't enough.

I pulled out of the fit by walking down to the streamlet for water, which I disinfected with iodine drops, as I had for most of the trip. Usually it tasted vaguely like a hospital, but today I was reminded of chicken bouillon. But by then I was too wearied to bother with either hunger or taste; all I wanted to do was get back to camp and sleep.

Naps now occurred regularly after each water trip; most of the rest of the time I either sunned or whittled. Order, a pattern was emerging from the jitteriness. Busyness. The whittling, something I'd never done before, was helping to settle me.

Krummholz spruce is hard and dense like oak, so progress with the jacknife was slow; each cut turned up only a small, thin curl of wood. In contrast to my loose, sensory reveries in the sun, the whittling was focused. All my attention went to moving knife blade against wood, just so. At first I thought I was just filling time, but the more I carved, the more intent I became, the more disciplined and precise. That second afternoon I decided that my stick was magic and that anyone who carried it would have good luck.

Toward sunset I took a long, slow walk up the ridge to a tundra flat 150 yards above camp. This journey was my major exertion so far; I was pleased just to find it was possible. "I am not very strong," I wrote in the notebook, "but if I put my mind to it, I can get about."

I was sitting up on the small flat photographing clouds when the landscape suddenly went surreal. The display came without warning and went fast. Sheets of cloud parted in the west, and a narrow shaft of light flashed up the basin, turning the Wetterhorn a metallic yellow against a background of cloudy jet-gray. Just as suddenly those clouds tore apart like an exploding nebula. The yellow on the Wetterhorn shot past orange down into red and then scarlet. The sky, which moments before had been near black, was shaded from blue toward purple.

I photographed, ran down the ridge for another angle, photographed, and ran some more, the fastest I'd moved in two days. Pink bursts of cloud continued to erupt over Wetterhorn and adjoining ridges, then dissipate. Then shadows ran up the peak, the colors left, and the light returned to normal. It got dark.

When it was over, I was 150 yards below camp sitting in a meadow next to a log I'd used to steady my camera. I felt no fatigue but was pleasantly warmed from my downslope dash. Back up at camp I slid into my sleeping bag like a piece of toast, with my chill problems solved. I slept straight through the night.

Day three broke in mixed clouds and sun with dew on the grass. Knowing it was the last day made a difference from the outset. Basically, I figured I'd make it; at least I was on the downhill slope; solo was two-thirds done. The knowledge was soothing. I'd dealt with the unknowns, the questions, the fears I'd had when I set out.

Could I stay dry? Sure.

And warm? Yes, most of the time.

Would hunger pangs consume me? No.

Would I get sick? No.

Would I pass out? Not if I was careful.

Could I function? Yes, at a reduced rate.

Once again I stayed in the bag until the sun hit the tarp. It took me a long time to get out. Body weakness was greater, making everything I did a deliberate, measured effort, one I could not afford to interrupt. I walked down to get water, and 70 yards out of the camp, in the lowermost patch of krummholz, twelve or fifteen white-crowned sparrows were chipping about and feeding. I moved to within arm's length of the birds, and they took no notice. My normal impulse would have been to scurry back to camp for the cameras, but not this time. I paused to watch the sparrows briefly, but getting water was first priority, so that's what I did.

"One thing at a time," I wrote in my notebook back at camp. "This is nice. I'm so weak I can do only one thing at a time. My mind is not jittering all over. Not busy. Just here." It was probably the best insight—it seemed more a revelation—that I had during the entire three days.

Day three went that way. Whatever I did seemed all I could do, at least all I wanted to do. I lay around a lot watching and listening to sounds. Rockfalls off the face of Coxcomb, nutcrackers going *waack, waack* somewhere nearby, the erratic flight of a water pipit, the hawk's soaring, its high, shrill cry. The life in Wetterhorn Basin was becoming familiar now, likewise the weather patterns and the path of the sun across the summer sky.

The clouds were up to it again, billowing and streaming. High to the southeast I saw a fragment of a rainbow in the sky—patches of red and green fringed with other colors—emanating from the crest of a tall cumulus swell. I let time be measured by the intervals when the sun was out, basking when I could and bundling up otherwise.

It was by far the calmest of my three days. I finished whittling the magic stick. The afternoon sank into an undifferentiated lump—I slept, lay back and took a few small actions that required immense resolve to get going. With the knife I cleaned caked mud from the soles of my now-dry boots. Toward dusk I heard a great horned owl calling below in the basin. Then the sun set, not brilliantly this time, just clean and bright.

As I turned in for the night, I felt strangely torn. The day had been smooth and calm. Part of me sensed that I was just on the threshold of what an experience like solo could offer. Another part was relieved to be almost done with it and eager, nay ravenous, for the next day's breakfast of fresh bananas, yogurt and honey. I looked forward to the reunion with Alan and my companions on the Outward Bound patrol. For Alan I felt a special warmth; I wondered if he'd yodel as he walked up to take me off solo. Still, it was hard to turn away from solo, having come this far. It was like long-distance running, like stopping after eight miles when you know you could have gone on for 20.

"What is out there in those days to come?" I asked in my notebook. "Day four, and five and six? Suppose I had kept going?"

As I wrote in my sleeping bag by candlelight, I heard a light plane fly overhead. Later I dreamed that it had crashed, that I walked up to the wreckage, that I found no survivors and no bodies either, only a Baby Ruth candy bar on a little shelf above the instrument panel.

Later I saw the moon set, and later still, the two planets rose. I woke to familiar sounds. The rosy finches, a robin, a pika. I started taking down my tarp while still in the bag, untying a rope and pulling a stake, untying a second rope, cutting a third that I couldn't unknot. I was very weak but even more methodical. Item by item I loaded my pack. One thing at a time. Then I scattered sticks and spruce needles over my site, thanked The Guardian and walked out on a little knoll to wait for Alan.

We saw each other when he was 200 yards below; both of us waved jubilantly. □

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A TALK WITH MIKE McCLOSKEY

Executive Director of the Sierra Club

FRANCES GENDLIN

Frances Gendlin: *You've worked for the Sierra Club for more than 20 years, so you've seen it grow from a small group of 17,000 people to an organization of almost 300,000, which it is now. In addition to the change in size, would you say the Club is different in focus now?*

J. Michael McCloskey: When I began working for the Club in the early 1960s, most members joined to go on outings. But in the course of the '60s, a profound change occurred. More and more members came aboard because they wanted to be active in the conservation cause. In the '60s we were learning how to go about effectively advancing that cause. With Earth Day and the dawn of the environmental movement, the Club was better positioned than most of the organizations to move with greater assurance and professionalism into advancing an environmental agenda. We learned how to move from good intentions and enthusiasm into pursuing a series of effective steps toward an end.

There was a time, for instance, when the Club, in a burst of enthusiasm, would produce flyers and materials with no real thought of how to get them out to people, without a plan of distribution. Increasingly, we've learned how to organize the process from beginning to end. We've brought on more and more people who are experts in their fields, or who have worked in the environmental movement for many years, and we've thought through the whole system of how you actually achieve results. We've become results-oriented rather than simply providing an outlet for good intentions.

FG: *We have had record membership growth in 1981. Does it seem to you that our newest members might be joining in a negative reaction to the Reagan administration's antienvironmental stance, rather than for positive reasons?*

JMM: I think people have always tended to join because they were concerned about a threatened resource or program. People who thought things were in good shape had little reason to join a "cause" organization such as the Sierra Club. Most of us joined because there was a special area we loved that was threatened—a wilderness area, a wild river, a local park. So we looked around for an organization that we could join to help rescue that area. There is a quantitative difference now, however. We're getting people who are not just worried about something close to home being threatened; they're worrying about the whole wilderness system being threatened, or a whole program of combatting pollution.

"Conservationists are the body in society that worries most about conserving values for the future—the biological stock of the planet, the basic life processes."

FG: *With more than 100,000 new members in one year, can we hope to involve them as much in grassroots activity as our more long-standing members?*

JMM: We've never before faced the challenge of assimilating so many new members in one year. We may have more than 125,000 new members by the time this issue of *Sierra* is out. But one of the truly remarkable things over the past decade has been the way we have cloned groups with the Club's style and ethos all over this country and in Canada, too. We never made a study of how this happened, but wherever they spring up, they seem to represent the same set of values and attitudes.

FG: *You mean chapters?*

JMM: I'm talking of groups. Chapters, too, but the group is really the grassroots unit of the

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Sierra Club. I have ceased to worry about whether these units would somehow wander from our traditions and commitments. I think people join us because they have a pretty good idea of what we stand for, respecting the fact that we have a proven record of success. We've learned how to make an impact on society.

We do have a challenge, though, of finding a way to get acquainted with all these new members. One of the essential dilemmas in the way the Club works is that it is not here simply to provide a satisfying experience; it is here to provide a better environment. The theory of lobbying stresses understanding how to make change happen, how to be influential in achieving a given goal. You have to tailor-make your strategy in every campaign. It takes leaders who will invest the time to learn the issues and to analyze the decisionmaking structure that controls the outcomes of those issues. Thus, a person cannot just sign a membership application form and expect the next day to know how to lobby the city council. There are people who do know how in many of our units, but this is the dilemma: how these poeple who know the ropes can reach out to new people, to find them and involve them in the work, to teach them and to turn over work to them.

One of the truly distinguishing things about the Club is that we are more open and accessible than almost any other volunteer institution in the United States. We tend to be open, to trust people. We repose responsibility in them, and most of them live up to the trust that is extended. It's a problem to figure out how this style can absorb so many new people who, I'm sure, want to be helpful, want to become involved. We've never before had such a challenge.

I hope these new members will be patient with us, because although we might in the past have absorbed them and found places for them in the first year, it may now take a couple of years just because of their sheer numbers.

FG: *Do all these people want to be so involved? Don't some of them just feel some vague sense of support for us and outrage at the attitudes of the Reagan administration?*

JMM: We should remember that 70% to 80% of our new members have been recruited by our direct-mail program in a fashion that probably would have occurred even if Reagan had not become President and Watt had not become Secretary of the Interior. I think there is no basis for assuming that these members are all that different from the members we've been recruiting over the last few years. I think they're pretty similar. As a matter of fact, the additional 20% or 30% who have come in over our projections really are likely to be the same kind of people, too. We simply got a better response from the direct mail because of the threats posed by Watt, but the people were often recruited from the same mailing lists. So the nature of the members is likely to be similar.

FG: *Do you think we're going to need more chapters and groups? Can we actually service 100,000 new members?*

JMM: One problem is that these members are coming in very heavily in some of the already large chapters and groups. To some extent this may lead to the formation of new groups, but to a large extent the new members will find themselves placed in existing units. When a group gets too large, there is a real problem of how to provide enough opportunities for participation. My own guess is that the ideal size for a group is about 1000 to 2000 people. When it gets much larger, it begins to be cumbersome in terms of finding opportunities for enough people. When it's too small, less than 500, it may have problems in terms of the leadership base not being large enough. If we could ideally distribute these new members around the country, we would form many new groups. But this is not how the members are going to distribute themselves. So I don't know the answer to how to absorb most effectively members in the very largest groups.

FG: *I want to ask you a question about what the Club is trying to accomplish. Do we have an overall philosophy that all our various members can respect? We know that some people join because they like wilderness, but they may be hunters. Others may like wildlife but may not be interested in energy conservation. We have a diversity of members, and they are not all involved for the same reason. Yet is there something underlying that binds us all together?*

JMM: Yes, I think there is: respect for the needs of future generations, of other creatures and of the processes that make life on the planet possible. One of the remarkable developments over the past decade has been the convergence of thinking among environmental organizations. The disparity in our thinking was much greater at the end of the '60s than at the end of the '70s. Today most of the environmental organizations are committed to pretty much the same goals. Their thought processes are fairly similar, even though many of them have different activity bases. The Club still has an activity base of outings, for instance, and Audubon has birding. Yet the basic programmatic commitments are very similar. This is increasingly true with the National Wildlife Federation, too. There are some differences for those of different generations, but basically people under 40 pretty much share the same ethos and commitments.

How to describe that? It's a commitment to protecting and improving the environment in a broadly defined manner. It includes everything from controlling pollution, conserving energy and limiting population growth to thinking in fresh ways about planning, economics and transportation. The Club deals with them all. It changes its emphasis from time to time as the challenges and opportunities vary.

FG: *Each one of these topics looks to the future. So it's not just preserving the environment for today, or saving energy today. It really has to do with the preservation of the future.*

JMM: An orientation toward the future is probably the most fundamental notion in the history of conservation. We are the body in society that worries most about conserving values for the future—the biological stock of the planet, the basic life processes. I would say, though, that the Club tends to take a nondogmatic approach to the future. Our values are fixed in terms of what we want carried over into the future and held in perpetuity; but we have found that one can make more progress toward perpetuating our values by looking for pragmatic opportunities to move forward step by step, than by becoming preoccupied with the full articulation of a blueprint for the future. In fact, those who have become preoccupied with that usually retreat from the world of reality and from grappling with all of its complexities. Not only do they miss opportunities to do something *now* by their preoccupations with the distant future, they usually lose touch eventually with the definitions of reality and real trends today. We've also learned that the world is changing so rapidly that there are grave risks in being doctrinaire about diagnoses of problems and prescriptions for the future.

Take the case of natural gas. The received wisdom four or five years ago, in terms of energy planning, was that natural gas was finished as a future source of supply. It had no place in most future supply scenarios. Suddenly the facts seem to have turned around in a massive way, and some people are now predicting that in the intermediate future it will continue to be a large source of the domestic supply. There were those who were very dogmatic about natural gas being finished, but the Club was less so and kept an open mind.

Predicting the future in a world that is changing so rapidly is one of the most hazardous of all occupations.

FG: *I want to talk now about the current*

administration. It seems so basic to us that if the water is increasingly foul, if the air is bad for us to breathe and habitats are being destroyed, that's not good for the planet or for human beings. Can you understand how some people can come to a position that seems to be against preserving the planet for future generations?

JMM: The attitude of the current administration is almost unprecedented. I don't know of any administration like it, in terms of its negativism toward the conservation cause.

When the '70s ended and I looked forward to the '80s, I thought the issues would center very heavily on questions affecting the rate of environmental progress we would make—rates of progress, for instance, in pollution control, rates of investment in control equipment. I thought the serious questions we would face would deal with matters of degree, questions on the margin of decisionmaking. I did not foresee that we would be thrust back into debating once again most of the basic premises of environmental improvement programs that came to be well accepted in the '70s.

The environmental-policy people in the new administration are ideologues who have doctrinaire commitments down the line in matters of both broad philosophy and great detail. They represent the 5% to 10% of the public who are actively hostile to environmental programs. In many ways they are an accident in American politics. Doctrinaire radicals who have no appreciable public support managed to emerge in a Reagan administration that was elected because of the public's desperation to find a cure for inflation. The public did not expect that these people would emerge in the process. The transition teams the Reagan administration appointed gave us some reason to expect that people with more moderate views would find places in the administration. They found places in the Nixon and Ford administrations. They found places when Reagan was governor in California, but they have not, with rare exceptions, found places in the Reagan presidency. The stranglehold of these extremists is really a fluke in American politics.

FG: *Yet this has put us into a much more confrontational stance than in the '70s, when we emerged as a national organization committed to working within the system. How is this going to affect the Club?*

JMM: Normally one's ability to lobby government depends on there being a sufficient number of people who have not made up their minds on all subjects, or who don't have a dogma covering every question that gives them the answer automatically. But we find there are almost no such people who are open to persuasion in this administration, at least among the people dealing with environmental policy. So our traditional techniques just won't work with them. We may find some limited opportunities in the Congress, but less so there, too.

As a result, we're turning more to two other techniques. One of them is to go to the grassroots and to use techniques of direct action. Our petition campaign was an example of obtaining a large manifestation of sentiment from the grassroots. It was one of the largest public petition campaigns in history. Also, our people locally have been picketing James Watt at almost every one of his appearances around the country. We've done very little picketing in the past. That's a way of making our protest manifest both to him and to the local press corps. We are also trying to carry our case to the public much more through the media.

The Club has not had an appetite, in the past, for direct action. One reason is that the techniques are not as effective as lobbying when figures in public office are open to persuasion. But we're forced to these techniques because we don't enjoy such a receptive situation today.

FG: *I know you meet regularly with the top people in the other environmental groups. How do they fit in with what we're doing?*

JMM: All of the organizations are finding that they have to grasp the nettle presented by the Reagan administration. Some of them, as a matter of style, would like to be more positive and conciliatory. Yet they're all getting the back-of-the-hand from the Reagan administration. In their own way and in their own time, they are coming to the same conclusions we have. Many are being forthright in a way they never have before. Some of them with more conservative memberships have taken longer in sorting out their stances, but almost all of them now have come to the same position we have.

At our meetings we spend a lot of time discussing strategies for the movement as a whole, and how we can collaborate. I might add that this is of recent origin. It's only since the middle of 1980 that the leadership of the environmental movement has been meeting regularly to confer on strategy. We usually focus on a few major initiatives on which we try to collaborate each year. Throughout the '70s, there were *ad hoc* coalitions on almost every important subject, but they usually did not emerge as part of any overarching strategy involving the leadership of the movement. They were merely alliances of convenience on some specific topics. I think we have invented something new that is important in its implications for the future. It's another sign that the movement is being bound together. Our hope is that this binding together will now also take place at the state and local levels.

FG: *What about other interests in society, other opinion leaders such as labor unions, teachers, religious groups, minorities? Wouldn't it be natural that we strengthen our ties with these people?*

JMM: It's very important that we do so. In a rough-and-ready fashion there are already lots of casual associations along these lines at the national level. We have worked with a number of the industrial trade unions on pollution-control legislation through the years—unions such as the Steel Workers and the Oil, Chemical and Atomic Workers. We've worked with the League of Women Voters on water-pollution questions. We've often been in a leadership position with these groups. We also have lines of communication with consumer groups, and with minority groups to some extent.

This is an area where I feel we should concentrate more effort. I believe that the officers of the Club, key staff members and I should do more in a systematic fashion to strengthen our ties with other public-interest groups that basically are sympathetic to our purposes. We may be able to enlist them more often in helping with our programs to a limited degree. There may be a cost involved, though, for they in turn may ask for our support on a limited basis, too.

Indeed, we've begun to do this, too. We have helped some of the unions on Occupational Safety and Health Administration questions, we've endorsed the Equal Rights Amendment and we've occasionally helped with some consumer legislation. But we do so in only those cases where we see a bonafide environmental interest involved.

FG: *This seems like a deliberate new direction. Is it helping?*

JMM: We've come to the conclusion that the environmental agenda is so far-reaching, and threads its way through so much of the American society and economy, that we cannot hope to accomplish all our purposes alone. The Sierra Club can't do it by itself. Nor can the environmental movement. There have been instances where we have prevailed, such as the battle over the SST, even though we had business, much of labor and the scientific community against us, as well as an administration. But instances in which we can singlehandedly prevail over all other power structures in society are few in number and likely to be even fewer in the future. We've got to sort out our objectives with other sectors in society and work out accommodations with them. They also need us, and I think we represent a natural basis

for a political alliance in society. In fact, if these relationships can be strengthened, they suggest a basis for some new alignments in American politics.

FG: *This alignment may come because of the original strengths of our various movements. What would you say our biggest successes have been up to now, for the Sierra Club and the environmental movement?*

JMM: The environmental movement has been remarkably successful since the early '70s. We've been instrumental in causing a huge amount of federal legislation to be enacted. The Sierra Club alone has been in the leadership position in persuading the Congress to enact well over 70 environmental measures that are now law. I might add that this is probably the most distinguished record of accomplishment of any environmental group. Indeed, since the beginning of the '70s, the environmental movement has probably showed more staying power and vitality than any other public movement.

In the process we have also managed to transform basic public attitudes and beliefs. When the '70s began, the environmental ethos was primarily an outgrowth of the upper-middle-class and the intelligentsia. At the end of the '70s, public opinion surveys showed that our belief system had become pervasive in American society, that it permeated pretty much all income and educational levels. And it was prevalent in all regions, with only minor differences of degree. Quite a revolution in thinking and values occurred in the course of a ten-year period. I doubt that that is going to change quickly.

What does seem to change is the degree to which people perceive a clear and present danger to their environmental belief system. I might add that studies of American political parties have shown that these revolutions in public thinking and commitment occur only rarely in American politics and, once set, tend to endure for decades. I think this may be true for the environmental movement, also.

I might add that there are cycles to social activism in American politics, which recur about every ten to fifteen years. We had one from 1962 to about 1972. I think it is fairly likely that sometime during the 1980s there will be another cycle of social activism. These are periods in which people are really upset over an accumulation of grievances, and they are determined to press for redress of those grievances in visible, forceful ways. They are moved by a certain optimism about the possibility of redressing grievances. Those periods generally wind down after a time because people become rebuffed or disillusioned, and the emotional momentum can't be sustained indefinitely.

FG: *How does the environmental movement fit into this pattern?*

JMM: The movement, with deep roots in our history, has learned that there are waves and cycles and that it has to squeeze as much as it can out of the moments of opportunity when these favorable cycles occur. During the less favorable periods we have to consolidate our gains and be poised to re-emerge when conditions are more hopeful. Ironically, though, the environmental movement's recent progress didn't match this period of social activism exactly. We emerged with a very strong presence late in the last cycle. It wasn't until about 1969 that we emerged with a strong profile. Our greatest progress, at least in terms of Congress and federal laws, occurred after 1972, after this last period of social activism was pretty much spent. I think it was because we had been able to develop a new basis of public support during that time.

It may well be that the environmental movement in the '80s will be in the vanguard of any new period of social activism. There is reason to think that right now our own activism, along with that of the antinuclear movement (concerning both power and weaponry), may signal the re-emergence of such an activist period. It's a bit early to say whether that's coming in 1982 or will really only emerge a few years from now.

FG: *How do you see the Club moving into the future?*

"This is a hallmark of the Club. We're in this for as long as it takes: for decades, generations, centuries. We never stop."

JMM: What I think was clear as the '80s began is that the country has not yet translated either our beliefs or the programs into tangible results. We have lots of laws on the books. We have a great many people working on programs with billions of dollars being spent, but the pattern of results is still very spotty. One can point to limited success in terms of improving air and water quality, in terms of fish coming back in many streams. But in terms of tangible measures of environmental improvement, particularly in the pollution-fighting field, we've probably moved only 15% to 30% of the way toward our goal. On some issues, such as hazardous waste dumps and toxic chemicals, we are still pretty much caught at the level of spinning out words with very little tangible action. And in other ways, the degree of pressure on natural resources and on the environment continues unabated.

The principal challenge ahead for the Club is to learn more about how to turn programs and promises into results. We also have to learn to be discriminating about sizing up programs we've brought into existence and judging those that are likely to succeed or fail. We must remain open to innovation, willing to make judgments when things don't work out and not insist that every program should last forever. It is important to have a healthy pragmatism in trying to sort through what is working and what isn't. I think it is also important to realize that we are tackling absolutely staggering problems. We can't expect overnight results or even to turn everything around in a decade.

FG: *Most successes take a long time to realize.*

JMM: Yes. In the case of the national parks, sometimes it's taken us many decades to reach our goals. For example, in 1909 John Muir drew the ideal boundaries for Sequoia National Park. He did this after being frustrated in the last part of the nineteenth century over the first steps to set aside reserves of sequoia trees. In the 1920s, the Club was instrumental in achieving a major expansion in the park, but we didn't get all we wanted. We came back in the 1930s and got more in Kings Canyon, but still things were left out. We came back again in 1965 and got the part added that had been left out. Then we came back even again in the late '70s and got the remaining part of Sequoia, the Mineral King enclave, that was left out in 1926. Finally, in 1976, Muir's boundaries were complete.

I am not saying that all our pollution programs should take 70 years, but we may have been naive in 1970 to believe that in 1981 or in 1983 we would have all the waters

of the United States free of pollution.

FG: *So one thing we've learned is not to give up just because we have a temporary setback, or because we don't get what we want. We're persistent.*

JMM: Yes, this is a hallmark of the Club. We're in this for as long as it takes: for decades, generations, for centuries. We never stop.

This lesson is even more important when it comes to the global environment. It is one thing to learn how to save redwood trees, and another thing to learn how to develop a national system for fighting air pollution. It is yet another thing to learn how to deal with worldwide carbon dioxide problems, and how to deal with sources of emissions around the globe.

Only in the last decade have people in the environmental movement really started trying to learn how one can make an impact on the world scene. We are still developing models for success on the international scale.

Public attitudes toward environmental values on the world scene are changing rapidly. For instance, at the 1972 Stockholm conference, Brazil was viewed as a center of resistance to environmental values. Yet today Brazil has a woman ecologist as the equivalent of our Secretary of the Interior. She is an enlightened person and is a councillor of the International Union for the Conservation of Nature. She was instrumental in having more hectares set aside for national parks in Brazil last year than we achieved last year in Alaska at the end of a ten-year fight.

FG: *Brazil, as I remember from Stockholm, was talking more about industrial development, saying that the developed countries were unrealistic about the developing countries; we were already developed and trying to persuade them, on environmental grounds, to go slowly on development. Are they—or we—more enlightened on that aspect, as well?*

JMM: Of course, the situation is different in every country, but increasingly in more and more countries, even those in the developing stage, leadership echelons are recognizing that there is a need for some sort of balancing of values. The balance may be a far cry from what we would recommend, but a few years ago they weren't even willing to concede that a balance between development and environmental values was desirable.

One of the most encouraging things at the recent IUCN conference in New Zealand was that delegates from countries around the globe were all speaking the same basic language when it came to the environment. There were minor differences, of course, but we were motivated pretty much by the same concerns and the same visions for the future.

In fact, speaking of the future, the challenges on the international scene are growing. I believe there will be a shift, in the course of time, from the Sierra Club being primarily preoccupied with domestic environmental matters to investing more of its energy in the international scene. It does not make sense for environmentalists in the developed countries to tie up most of their energies in infinitely perfecting the details of techniques for protecting their own environments, while leaving so much of the rest of the world untended and defenseless. How we can employ our resources and energies in a way that will be most politically effective abroad remains to be thought through.

FG: *Do you foresee a time when the major environmental questions will have been answered?*

JMM: The Club's agenda has two dimensions to it. One focuses on an immediate set of programs, and the other deals with very broad convictions about the long-term underpinnings of a future society. With respect to the latter, that's so far off that all I can say is that almost all of our work is ahead of us.

With regard to the more immediate interests, we have moved a good share of the items on our agenda into law over the last ten or fifteen years. Many of these are what I would call first-generation reforms. That is, they were the first cuts at finding a solution to the problem. Further reforms involve refinements of those efforts so that the programs can become more effective. After the original problem is dealt with, you are no longer working with an issue that appears fresh. You aren't just reacting to a grievance. Addressing a first-generation problem generates enthusiasm, because you can point primarily to a clear and present evil. But once you have a curative program and perhaps find it's not working well, the dialogue becomes cast much more in terms of how the program needs to be improved. It gets a bureaucratic or a highly technical cast to it. These stages of development are not as easily publicized, and they certainly are not the stuff that stirs people's souls. So those campaigns are more difficult to conduct.

Each time it gets harder. The more programs we get enacted, the more we have to defend, and the more inevitably we have a mixture of offensive and defensive components to our program. We can't stand by and see all the things we've labored to enact through the years put on the chopping block. We do not have the luxury to say we are not going to be on the defensive. A commitment to a defensive posture is an inevitable concomitant of being successful.

"The Club's agenda has two dimensions to it. One focuses on an immediate set of programs, and the other deals with very broad convictions about the long-term underpinnings of a future society."

FG: *Is that where we are now?*

JMM: Not entirely. We still have a good number of first-generation reforms on our agenda. The times are not propitious to move on them right now. We are waiting for the day when we can repeal the Mining Act of 1872 for public lands. There are still a half-dozen reforms of this nature awaiting the time when we have enough friends in public office to pursue them once again. But there will come a time when these programs become fewer in number, particularly those of a broad and generic nature. We do seem to have a huge supply of site-specific measures that will keep us busy for decades, should they survive the current onslaught—particularly proposed wilderness areas in the national forests and on the public lands administered by the Bureau of Land Management. There will never be an end to the threats posed to the national parks, to nature reserves. So that work is endless.

FG: *We're getting toward the end of the interview now, and we haven't talked at all about you and your work. You started with the Club in 1961 as the Northwest Field Representative. You were the first field rep?*

JMM: That's right. The Club had no staff outside San Francisco at that time. I was hired first by a consortium of outdoor clubs and conservation groups in the Pacific Northwest, including the Sierra Club. I had come back from college and the Army and enrolled in law school at the University of Oregon. I became active in one of the local

outdoor clubs, the Obsidians.

FG: *But why did you get interested in the first place?*
JMM: I had mountain-climbed in the '40s and '50s. When I got back after being away for six years, I found that many of my favorite forests and wilderness areas weren't there any more. They were logged while I was in the Army. I was outraged. Some of the beautiful trout streams had dams thrown up on them. I had read some of the bulletins of the Obsidians while I was away and followed some of the first conservation fights, such as the one over the Three Sisters Primitive Area, starting in 1953. That was the first fight over a wilderness reclassification in the United States, and it was an area I had grown up with. So I immediately plunged myself into all sorts of conservation controversies and became something of a local gadfly.

In my senior year in law school, I found that the number of issues had grown to the point that Northwest outdoor groups were desperate for staff assistance to help link together activists on the various campaigns. I found they were trying to raise the money to hire somebody. I was asked and said "okay."

FG: *You didn't have to raise funds for your own salary, did you?*
JMM: No, I didn't. The Sierra Club agreed that it would match any money raised in the Northwest by the clubs up there. Well, I represented them all for four years. I spent more than half my time on the road, driving through the rain and snow storms, working around the clock at times, trying to organize the isolated bands of conservationists. That was the principal problem at that time: the activists were few and far between, and they felt terribly isolated and alone. They didn't know what their colleagues were doing on similar problems elsewhere. They needed to be encouraged and given models for success. The political sophistication of the movement was not great at that time. I had always been interested in politics and public issues, and I brought tools that were helpful at that time.

FG: *So the Club really has changed. When you started it had 17,000 members, no staff outside San Francisco. Then very quickly you went from field rep to San Francisco and work in the conservation department.*
JMM: There wasn't a conservation department then. I was brought down to be assistant to the president of the Club. I did that for a year. Will Siri was president then. We came to perceive that the executive director was heavily preoccupied with extending the Club's exhibit format series of books, and that he traveled a great deal. There was nobody on the staff in the main office focusing on a day-by-day basis on how the conservation campaigns could be moved along. The Club's directors who lived in the Bay Area—all volunteers—were trying to do it.

FG: *So you formed the conservation department.*
JMM: Yes. I found that what some directors wanted was to have a staff person to help them. But after a year I recommended that a better way to do it would be to form a department of the Club's staff whose principal function would be to focus on how to organize the club's efforts behind its conservation priorities. At that time we were concentrating on saving the Grand Canyon, establishing a Redwood National Park and a national park in the north Cascades.

FG: *Then you went from field rep in 1961 to executive director in 1969, only eight years later. It seems to me that the greatest difference in the Club has been from that point on. I know some people say that we have become a bureaucracy. Yet others say that was when we became a responsible organization in a social movement. How would you characterize the changes from 1969 until now?*
JMM: The Club's change in mood and style has been a steady one over the years. What I have emphasized has been a serious approach toward achieving our ends. I thought we were not here just to bear witness or to pledge allegiance to a faith, but in fact we were here to bring that faith into reality, to make it real, to have an impact on society. That means we could not rest content with having said the right things, or with having made our convictions known, but we also had to have a plan to achieve them. We had to know how the political system worked, how to identify the decisionmakers and how their minds worked. We had to have people who were concerned with all the practical details of getting our programs accomplished. We had to take that end of our work seriously, building structure and organization. It requires concern with fine details as well as with overall strategies.

I gave great emphasis to building that kind of a system and on finding people who were willing to work as a team to accomplish those ends. Prior to my time, the Club staff was characterized by people who often lacked the tools to translate their feelings into results. I think the Club's convictions have broadened and deepened now. We've built a cadre of volunteer leaders and professional staff who are determined to make a difference, not merely to bear witness.

FG: *How much do you actually have to do with the hands-on conservation work?*
JMM: My role is twofold. I oversee those who are responsible for the delivery systems, but I no longer get much into the detail or the tactics of the campaigns. Although that's what I once principally did.

FG: *Do you miss it?*
JMM: I do, to a considerable degree. But I realize how much more sophisticated the whole process has become and that I'm not the person who knows most about that any more. We have people now who are much more proficient than I in that regard.

The other thing I do is to deal with strategy at its broadest level. The Club presidents and I collaboratively make the hard decisions about what to do in tight spots.

I remember how we dealt with crises in handling President Carter's proposed Energy Mobilization Plan. This was the measure that would have overriden all the pollution-control measures to fast-track energy projects. I believed that project was wrong in its conception. It was an unconscionable project, and we had absolutely nothing to lose by fighting it every step of the way. Yet our lobbyists were often downcast. Repeatedly we were fighting overwhelming odds. At a number of critical junctures our lobbyists told me that we'd gotten everything we could and to drop further opposition, for we were wasting our time. I said, 'No, there's nothing to be gained from that. All we can do is lose, and these concessions amount to so little that they're equivalent to losing anyway. Let's persist.' Those were critical judgments. We persisted and won. We were beaten back at about 19 or 20 steps along the way, but we won on the 21st step. The plan was turned back on the floor of the House of Representatives for reasons that actually had little to do with the environment, yet by hanging it up so long and continuing to fight, we won. So that is an example of a major role I play.

FG: *You play this role because you have an overview of the entire movement and of the Club. You're probably one of the very few people who can have such a real overview.*
JMM: That may be the case. I have now been chief staff officer of a large environmental group longer than anyone else in the movement. And I have one of the longer tenures as a staff member, in general.

FG: *After so long can you still be enthusiastic?*
JMM: Absolutely. One of the things John Muir said, after all the years he spent working on conservation as his lifetime commitment, was that there will never be an end to it. All we can do is our best every day. We'll have better days and worse days, better years and worse years. But we will persist. □

STORM

HARRY MIDDLETON

THE CUMULUS CLOUDS begin rolling into one another, meshing, building. The wind stops, even here on the summit of Hawksbill Mountian looking out over the Blue Ridge Mountains of Virginia and the fertile Shenandoah Valley. In an hour the clouds to the west are enormous, angry combinations of black and violet, chalk white and cobalt blue. The clouds resemble gigantic misshapen mushrooms, skillet-flat on the tops and bottoms. These are the storm's heralds: the thunderheads, what meteorologists call cumulonimbus clouds. The ridge where I sit waiting for the storm becomes a show of flat, slow-moving shadows until the wind, all of a sudden, picks up again with a roar, bending the tasseled boles of old white oaks halfway to the forest floor. The same angry wind sends the shadows scampering down the greenstone into the dark, damp safety of the hollows.

On the Blue Ridge the wind is the messenger of summer storms, the only warning. When the wind builds and cools, there are suddenly no birds, or at least no singing. The indigo buntings have gone deeper into the wood, as have the tufted titmouse and rose-breasted grosbeak. Even the ravens have given in to the wind and come down to the mountain to wait out the storm's fury.

There is an ecstasy to summer storms in the mountains, the way the earth seems to hold its breath and yet delight in the storm's fury. Instead of following the buntings down into the hollow, I descend down the ridge barely 50 yards and scurry up a hemlock for a better look at this spectacular storm. Once over the mountain the clouds willingly join, forming one immense cloud so heavy with rain and electrical energy that it appears to hang but feet from my head. Low guttural rumblings come out of the west, explode about me with the force and vibration of an orchestra of cymbals. The first bolts of visible lightning zig-zag from cloud to cloud and from cloud to earth. A dead oak but twenty yards above me is decapitated. A mother raccoon, as much irritated as frightened, abandons the smoking tree, pushing her three kittens along in front of her.

The storm has consumed the sky, leaving a thick blackness that is torn open only by the lightning's orange energy. It is hard to remember, crouching in the high branches of this oak, lightning splitting the sky about me like so much cheap cloth, that lightning after all is just a matter of electrons. Lightning bolts are like great electrical pistons gone haywire. Each explosion of lightning is not one bolt, but many. The weaker elements of the bolt are called leader bolts, which emit a dim light and are rarely visible or dangerous. It is the second, or return, stroke of the bolt that can travel more than 60,000 miles per second, that so scars the sky with light and so punishes the earth. The bolt that struck the oak above me was perhaps an average streak of lightning, less than a foot across and several thousand feet in length, and yet when it crashed blindly into the dead oak, it pulsed with at least 250 kilowatt-hours of electricity, and when it first exploded in the sky it was fueled by more than a million volts of electricity. The bolt that finished the oak is what scientists call a cold bolt of lightning, fast, short and hot: killer lightning. Hot lightning is denser, longer in duration, and carries less energy, less punch. It causes the long, twisting celestial matches that in turn cause most forest fires.

At the storm's crest, the bulging cloud creeps over the Hawksbill peak. The sky is a nest of electrical charges. Lightning makes tracks across the sky like a lost skier over new snow. The bolts flash from cloud to cloud, from cloud to earth, from cloud to atmosphere, always followed by the sharp report of thunder, the hot air's response to the searing lightning. The rain comes, so hard it strips great chunks of bark off the trees, tears away clumps of rock along the exposed ridge. Despite all this fury the storm is soothing, reassuring testimony to what the land can absorb, endure. The storm ends more quickly than it began. There is less fanfare to the conclusion than to the beginning, giving the storm the continuity of a symphony. There is a weak arch of lightning across the sky; the cloud breaks up, moves on out over the valley. In the storm's wake there is a moment of almost complete stillness, a pause as the wood and mountain absorb what the storm has left behind: water. The forest shimmers and the birds return, drinking earnestly from small pools of rainwater caught in the worn greenstone, and the wind calms, and the sky, exhausted, turns a quiet purple. □

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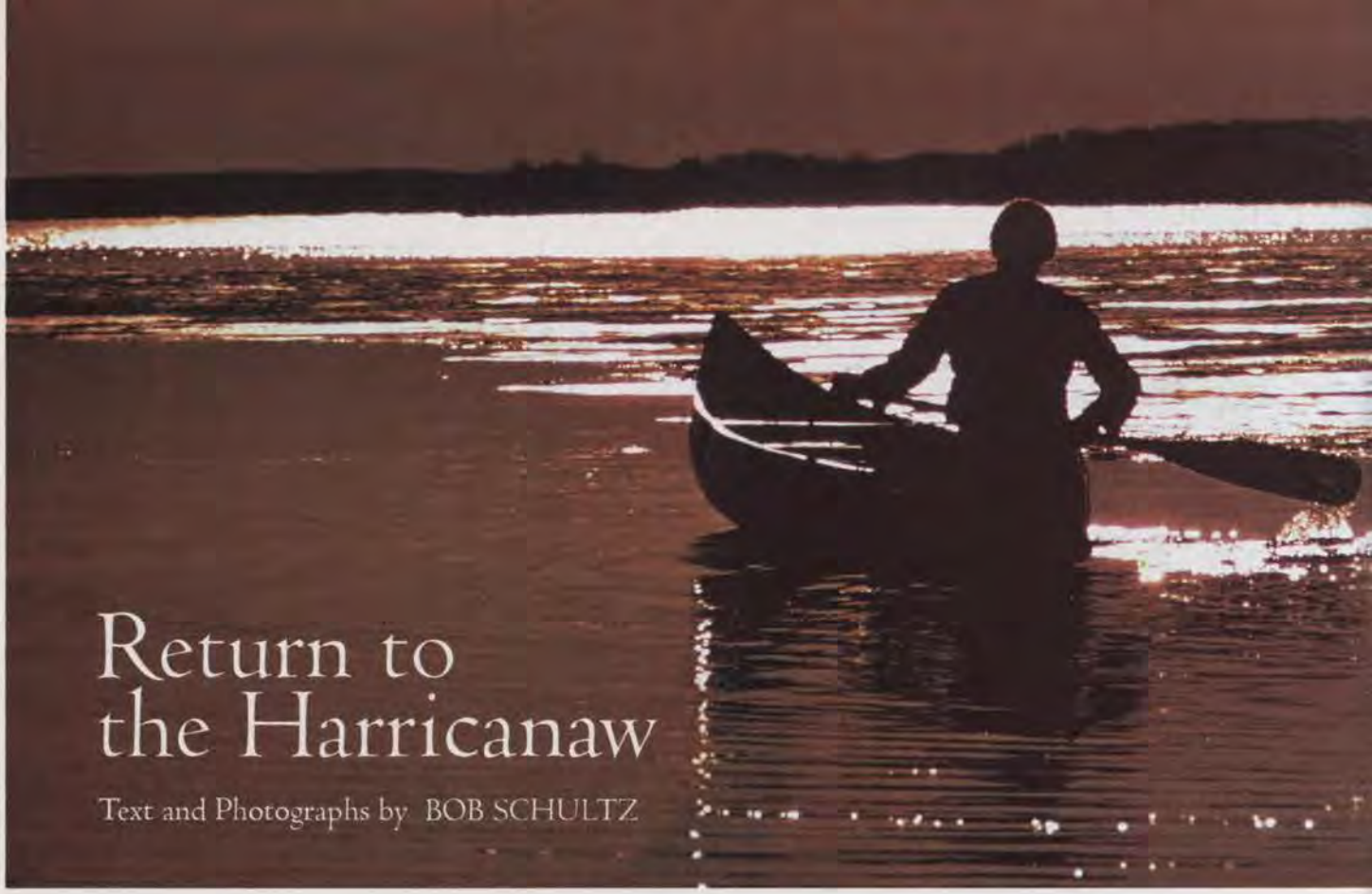
TOM TROGDON/THE PHELPS AGENCY



Return to the Harricanaw

Text and Photographs by BOB SCHULTZ

THE MONTHS OF PREPARATION were over. We were ready to try again. Three hundred miles to James Bay. Two men alone in a wilderness, one experienced canoeist and one novice, on the river that had nearly claimed our lives the year before.

As Glen Heger and I slipped our canoe into the headwaters of the Harricanaw, the memory of our nearly disastrous first trip was very much on our minds. But there was also this: we had never felt more alive or more at peace with ourselves than during our previous year's harrowing experience on the Harricanaw.

Sight unseen, the Harricanaw had seemed a logical choice for a wilderness canoe expedition; it was a major river system flowing through a true wilderness, unmarked by roads and settlements or by signposts pointing to portages and designating campsites. While our maps indicated there would be rapids to run, nothing suggested that the Harricanaw—known only to a few French-Canadian trappers and the Cree Indians coming down from James Bay for moose hunting—would be anything but a pleasant summer passage.

But it proved to be the most difficult wilderness river I have ever canoed.

From its headwaters in southwestern Quebec, the Harricanaw flows north over the Canadian Shield toward the province of Ontario's border and James Bay. The river gradually broadens from an eighth to three quarters of a mile in width as it reaches the ocean. Its clear, copper-colored water moves through a rock garden on its journey to the sea, down narrow gorges with high, sheer walls and through lakes and rapids, more rapids than on any other river I have canoed.

At one point the force of the Harricanaw has carved an island out of the Precambrian stone, a single rock more than eight miles long. The left channel, the route to James Bay, contains no fewer than four gorges and ten miles of almost continuous rapids. Time and again when boulders block the path, the canoeist is forced to "line" the canoe while walking along a narrow shelf that extends from the shore, or to portage.

At the end of the island the channels join together to cascade over steps in the river, one after another as far as the eye can see. A mist rising from the water through shafts of sunlight blurs the outlines of the shore and makes the setting look mystical.

Pines, aspens and birch line the river's shores in stands so dense that, while portaging, it is often impossible to swing the canoe more than a few inches from left to right to maneuver through the trees.

Back from the river, the forests gradually blend into the Canadian bush, where thick brush covers the land and surrounds the bogs and lakes that abound in the region. Walking out over this terrain would be very difficult, if not impossible, because a traveler struggling to get through the brush and traverse the bogs and lakes would be attacked by hordes of buzzing black flies and mosquitoes.

Small wonder that the Harricanaw has remained largely unknown.

Glen Heger, Greg Went and I were halfway to James Bay during our first trip on the Harricanaw when disaster happened. Two hundred yards into a bad rapids, our canoe suddenly hit a rock, spun sideways and slammed against a boulder farther downstream, where the relentless, pounding river held it fast.

Trying to stand in the waist-high rapids and fighting to keep from being swept away took all our strength. Our aluminum canoe began to crack as we tried, without success, to lift it off the rock. Chilled through by the Harricanaw's cold waters, we waded ashore

The calm twilights and mystical islands of the Harricanaw did not lessen the danger in bank-to-bank rapids for author Schultz and his companions. Because of its remoteness, the river has been neglected by canoeists and left principally for the Cree Indians and French-Canadian trappers to enjoy.

and quickly built a warming fire.

But no sooner had we begun to warm ourselves when, looking out to the canoe, I saw our food bags break loose and head downriver in the fast current. Running barefoot along the shore—the force of the rapids had ripped off my rubber boots and wool socks—I was able to get ahead of our supplies just as the river narrowed to move through an even worse rapids. I dove in and grabbed the bags in the nick of time.

We brought the rest of our equipment ashore from the canoe and set up camp, making three more attempts before nightfall to retrieve our canoe. Twice again the following day we tried and failed. Finally, late in the afternoon, we decided to try prying the canoe off the rock with a log, realizing we ran the risk of further damage to the canoe. But we had nothing to lose.

Wedging the log against the rock, I began prying as Glen and Greg handled the ends of the canoe. It didn't work. With all my strength I tried again. The canoe began to move, little by little, off the rock. By the time it was free, I was totally exhausted. I collapsed just as I reached shore. Glen and Greg carried me to our campfire to rest, then examined the canoe.

The damage was serious: a crack nine inches long extended down each side. Early the next morning, we hammered the edges of the crack with rocks and, using our towels to fill the gaps, set out again. It meant bailing every five minutes, but it was far better than trying to walk out of the wilderness.

When we reached James Bay, we faced another problem. To reach the village of Moosonee, our pickup point 40 miles to the west, we would have to canoe around a fifteen-mile-wide sandbar that extended six miles out into the bay.

We struggled some distance, the swells almost capsizing us. At last we decided, considering the condition of our craft and the threat of approaching storms, to abandon our canoe. Salvaging what food supplies remained, we set out on foot across the sandbar toward Moosonee.

We had covered only a short distance when several storms rolled in across the bay, repeatedly forcing us to raise our tent for shelter. By noon we had made little progress. The storms had passed over, but the tide, which had been ankle deep over the sandbar, was now to our knees. It rose chest high by mid-afternoon as we continued moving westward.

Toward evening the tide reversed. Soon the shore reappeared with its covering of muskeg—moss-covered mud with dense clusters of waist-high, spearlike blades.

After slogging through the muck and reeds beyond the high-water level, we set up camp. We ate sparingly of our remaining rations, then fell asleep, exhausted.

I was awakened after midnight by the feeling that we were no longer resting on solid ground. I looked out of the tent and discovered to my horror that we were floating out to James Bay! With a full moon, the tide had swept in beyond the high-water marks we had been so careful to check before making camp.

Jumping quickly into the bone-chilling water, we pulled our tent beyond the reach of the tide and crawled back inside. Two of our sleeping bags were soaked and useless. Into the third we went, jammed together for warmth.

Two hours later the sound of lapping water woke me again. Again we moved our tent further back, but too late to prevent the tide from soaking our remaining sleeping bag. Huddling together inside the tent, we waited for morning.

Each of us had one packet of food left. It would be enough—if we were in Moosonee by nightfall. We returned to the sandbar where the walking was easier and headed west again. Glen was suffering from exhaustion and the bites of black flies and mosquitoes; he slowed our pace, and by afternoon there were still several miles to go.

We decided to split up, Greg going on alone for help, hoping to reach the Moose River in time to wave down the last excursion boat returning to Moosonee for the night. I would stay with Glen.

Leaving the sandbar to find a campsite, Glen and I made our way through the muskeg to a small river and swam along its bank until we came to a log jam. By that time Glen was limping badly from a swollen foot and could go no farther.

We pitched our tent atop the log jam to escape the tide, which would later surround us. Our shoelaces anchored the tent to the logs. Then, starting a fire with birch-bark strips, we ate the last of our rations and waited for Greg's return.

That night violent storms lashed us again. I braced my feet against the sides of the tent and clung to the upright pole while Glen held on to me. With only the clothes on our backs for warmth, we tried to maintain our body temperatures by taking turns wearing my wool cap. Glen had lost his in the river.

I began to doubt that we would make it as the driving rains drenched us over and over again. Glen, shaking badly, kept passing out. I fought to stay awake, knowing that if I succumbed to sleep, hypothermia would be our fate. It was now a question of whether we could last another hour, then another, until mercifully the storms abated. Daybreak came bright and clear.

Greg reached the Moose River just as the last excursion boat was approaching. He jumped into the river and swam toward the boat, but no one aboard saw him or heard his desperate shouts.

Returning to shore, Greg had just begun to make a shelter for the night when he heard the sound of another motor, a Cree Indian in a small boat returning to his village.

Again Greg was in the water, swimming and shouting, and this time with success. After spending the night in Moosonee, Greg hired a helicopter and, flying along the shores of James Bay, soon spotted our campfire. The ordeal was over. But even as the helicopter lifted off, we knew that we had to come back to try again.

The winter months seemed endless as my longing to be back on the river grew. I began training in early spring, getting in shape for the mental and physical demands the Harricanaw would make on us. There was also the matter of replacing all the equipment lost in the first expedition—no small task. But when summer arrived Glen and I were ready. Greg, unfortunately, was unable to get away.

The first day of our second expedition was uneventful. Strong north winds, a sure sign of an approaching storm, made progress difficult. That evening we stayed in a primitive but comfortable trapper's cabin. From the headwaters there would be a dozen or so of these cabins along the river for a hundred miles, and then nothing save a cemetery marking the final resting place of early voyageurs who had lost their lives canoeing the Harricanaw.

The winds were stronger the second day; surely the storm would be upon us by day's end. We approached the first of the many

Some of the prices of canoeing are sleeping on rocks on the shore (top), righting a damaged canoe in midstream (middle) and carrying the canoe and provisions for long distances on portages (bottom). Canoeing in the wilderness requires strong arms, stamina and good overall conditioning.

In return for the effort of getting into the remote country of the Harricanaw, author Schultz and his companions had the pleasure of seeing the aurora borealis (top), sunrises in idyllic spots (middle) and moose (bottom) and other wildlife at close range.

gorges on the Harricanaw that afternoon. There would be no canoeing the pounding, churning waters that tumbled through the gorge, splashing high against the granite walls that rose almost perpendicular for 60 feet. We chose to line our canoe. I took the lead line and climbed to the top while Glen held the canoe fast against the face of the gorge. Then, taking the end line, Glen climbed to the top. The canoe, heavy with the weight of our gear and supplies, twisted, turned and pulled against the lines, trying to break free and join the cascading waters. It took all our strength to hold on to the lines as we slowly moved along the edge.

Suddenly waves were washing over the sides of the canoe. We tried desperately to hold on, but it was useless. We were being pulled over the side, so we had to let go. The canoe tumbled end over end as it went down through the gorge, its contents strapped securely inside in waterproof bags.

There was no time to waste—our canoe was moving rapidly away from us. We could not walk back to our starting point some 60 miles away, minus food and clothing, swimming two rivers against the current.

Quickly checking our maps, we realized we had one chance: the gorge emptied into a large lake. If the canoe came close to the side we were on, there was a chance we could swim out to it. But if the wind and current carried the canoe to the other side, we could not walk around the lake without swimming across the Harricanaw, with hypothermia the danger.

As we reached the lake, the canoe floated to the middle and stopped, held there by the wind against the current. Calculating where the canoe would float closest to our shore, we built a fire and waited. We would need the warmth after our swim.

Finally the canoe began to move, and it came our way. When it had floated as close as possible, we leaped into the water, swimming furiously until at last it was firmly in our grasp. Once back on shore, we quickly set up our tent and dove inside, exhausted and chilled through.

It began raining toward morning and continued throughout the day, but for once we didn't care. We were still alive, and we had our ticket out, our canoe, no worse for wear despite the tremendous beating it had taken passing through the gorge.

Were the dangers and hardships we endured worth it? The answer is yes, but it's a matter of values: we saw the wilderness and wildlife as few will ever be privileged to see them—and had the thrill of sighting whales in James Bay. □

Bob Schultz is a graduate student in Michigan who has traveled on five continents and in 35 countries.

Hot liquids and fire help fight hypothermia. (Quiz: can you find the campfire error here? See the story on page 57.)

A Hypothermia Primer

VANESSA SCHNATMEIER

THE CANOEISTS on the Harricanaw were worried about hypothermia—and with good reason. In any season, canoeists face this danger, which is a gradual cooling of the body's core that, unless arrested, causes normal bodily processes to fade and eventually to stop altogether. The problem arises because the human body functions well only at a certain optimal temperature. When the internal temperature falls more than a degree or so, the body's malfunctioning can be fatal if it isn't treated.

It doesn't have to be extremely cold for hypothermia to develop. A thinly clad backpacker can succumb to hypothermia in 50-degree weather. There are three basic factors that contribute to hypothermia: cold, wetness and wind. The wetness could come from fog, rain, snow, immersion of the body in water or even excessive perspiration. The wind needn't be high; the wind chill of a two-mile-an-hour wind can lower the body temperature of a wet hiker as effectively as a gale.

Hypothermia is most dangerous when least expected. Summer hikers need to keep special watch for it, therefore, and canoeists or anyone on the water in the wilderness should prepare for it as a matter of course. Tired, elderly or poorly nourished people are more susceptible.

The symptoms of hypothermia generally move through several clearly defined stages whose speed and order may vary slightly from person to person. In the first stage, as the internal body temperature drops from the normal 98.6°F. to 97° or 96°, victims begin uncontrollable shivering; often they can't perform simple tasks such as closing a zipper or striking a match. Shivering becomes more violent as the core temperature drops further to 92° or 91°. Victims start to lose coordination; they have difficulty speaking, and their pace slows.

When the body temperature sinks to 87° or 86°, shivering stops. Muscles become stiff and rigid; coordination is severely impaired; and victims show obvious signs of irrational thinking, though they retain contact with the outside world. At 82° or 81° that contact vanishes. Muscular rigidity continues, the pulse and respirations slow and a zombie-like stupor may follow. Most people lose consciousness when their core temperature goes below 80°. If chilling continues, victims may cough up foamy white fluid from the lungs, a sign of terminal pulmonary edema. Finally both heartbeat and respiration stop.

These symptoms can progress very swiftly indeed; for instance, the icy water of the Arctic can drain a person of vital heat in less than two minutes. But usually the hypothermic process occurs more slowly, leaving plenty of time for the victim or his or her companions to recognize the danger and treat it.

Treating hypothermia on the trail involves three key measures. First, get the victim into shelter and warmth, out of the wind and water. Get him or her into dry clothes. Second, use external heat sources to warm the victim's body. Put him or her into a prewarmed sleeping bag, with one or more trail companions huddled against the bag. Lighting a fire, or one on each side, is also effective. Third, supply the victim with hot fluids and food to build up heat from the inside and provide energy. Warm the body's core. Give hot soup or tea as long as the victim is conscious, along with candy, dried fruit or other foods that contain sugar.

Remember that rewarming is slow and may take up to six or eight hours after a serious bout. *Don't* leave the victim alone; as hypothermia worsens, he or she won't feel cold and may actually perceive heat, shedding clothing and sleeping bag. An able-bodied person should stay on the scene, if at all possible, while someone else goes for help.

The best protection against hypothermia may be an awareness that it can occur. Any outing in cold, wet or windy conditions carries the potential for hypothermia; everyone in the party should know of and watch for its symptoms. Travel equipped with adequate clothing, particularly wool clothing, which can keep the body warm even when wet. Carry extra food and stop often for rest and snacks. Never skimp on meals; your body may need three to four times its normal amount of food to maintain body heat and energy. Bring some kind of emergency shelter, such as an overnight tent or a tarp. If the weather is chilling, make camp as soon as you can, and until then *keep moving*—exercise, chop wood, do isometrics or anything else that produces warmth (without excessive perspiration).

Finally, try to preserve an optimistic outlook. Psychological factors play an important role in hypothermia; many cases indicate that potential victims who are overcome with fright or panic are more likely to be stricken, while those who maintain a positive point of view and vigorously combat the symptoms will probably escape unscathed. □

ARE WE FIT TO FIT IN?

NASA

LEWIS THOMAS

THERE ARE SOME THINGS that human beings can only see out of the corner of the eye. The niftiest examples of this gift, familiar to all children, are small, faint stars. When you look straight at one such star it vanishes; when you move your eyes to stare into the space nearby, it reappears. If you pick two faint stars, side by side, and focus on one of the pair, it disappears and now you can see the other in the corner of your eye, and you can move your eyes back and forth, turning off the star in the center of your retina, and switching the other one on. There is a physiological explanation for the phenomenon: we have more rods, the cells we use for light perception, at the periphery of our retinas; more cones, for perceiving color, at the center.

Something like this happens in music. You cannot really hear certain sequences of notes in a Bach fugue unless at the same time there are other notes being sounded, dominating the field. The real meaning in music comes from tones only audible in the corner of the mind.

I used to worry that computers would become so powerful and sophisticated as to take the place of human minds. The notion of *artificial intelligence* used to scare me half to death. Already, a large enough machine can do all sorts of intelligent things beyond our capacities: calculate in a split second the answers to mathematical problems requiring years for a human brain, play master-class chess, draw accurate pictures from memory, even manufacture successions of sounds with a disarming resemblance to real music. Computers can translate textbooks; write dissertations of their own for doctorates; even speak, in machine-tooled, unhuman phonemes, any words read from a printed page. They can communicate with each other, hold consultations and committee meetings of their own in networks around the earth.

Computers can make errors, of course, and do so all the time in small, irritating ways, but the mistakes can always be fixed and nearly always are. In this respect they are fundamentally inhuman, and here is the relaxing thought: computers will not take over the world, they cannot replace us, because they are not designed, as we are, for ambiguity.

Imagine the dilemma faced by a computer programmed to make language, not the interesting communication in symbols achieved by brilliant chimpanzee prodigies, but real human talk. The grammar would not be too difficult, and there would be no problem in constructing a vocabulary of *etymons*, the original, pure, unambiguous words used to name real things. The impossibility would come in making the necessary mistakes we humans make with words instinctively, intuitively, as we build our kinds of language, changing the meanings to imply quite different things, constructing and elaborating the varieties of ambiguity without which speech can never become human speech.

Look at the record of language if you want to glimpse the special qualities of the human mind that lie beyond the reach of any machine. Take, for example, the metaphors we use in everyday speech to tell ourselves who we are, where we live and where we came from.

The earth is a good place to begin. The word *earth* is used to name the ground we walk on, the soil in which we grow plants or dig clams, and the planet itself; we also use it to describe all of humanity. "The whole earth responds to the beauty of a child," we say to each other.

The earliest word for earth in our language was the Indo-European root *dhghem*, and look what we did with it. We turned it, by adding suffixes, into *humus* in Latin; today we call the complex polymers that hold fertile soil together humic acids, and somehow or other the same root became *humility*. With another suffix the word became *human*. Did the earth become human, or did the human emerge from the earth? One answer may lie in that nice cognate word *humble*. *Humane* was built on, extending the meaning of both the earth and ourselves. In ancient Hebrew, *adamha* was the word

ILLUSTRATION BY BILL PROCHNOW

for earth, *adam* for man. What computer could run itself through such manipulations as those?

We came at the same system of defining ourselves from the other direction. The word *wiros* was the first root for man; it took us in our vanity on to *virile* and *virtue,* but also turned itself into the Germanic word *weraldh,* meaning the life of man, and thence in English to our word *world.*

There is a deep hunch in this kind of etymology. The world of humans derives from this planet, shares origin with the life of the soil, lives in humility with all the rest of life. I cannot imagine programming a computer to think up an idea like that, not a 20th-century computer anyway.

The world began with what it is now the fashion to call the "Big Bang." Characteristically, we have assigned the wrong words for the very beginning of the earth and ourselves, in order to evade another term that would cause this century embarrassment. It could not, of course, have been a bang of any sort, with no atmosphere to conduct the waves of sound, and no ears. It was something else, occurring in the most absolute silence we can imagine. It was The Great Light.

We say it had been chaos before, but it was not the kind of place we use for the word *chaos* today, things tumbling over each other and bumping around. Chaos did not have that meaning in Greek; it simply meant empty.

We took it, in our words, from *chaos* to *cosmos,* a word that meant, simply, order, cosmetic. We perceived the order in surprise, and our cosmologists and physicists continue to find new and astonishing aspects of the order. We made up the word *universe* from the whole affair, meaning literally turning everything into one thing. We used to say it was a miracle and we still permit ourselves to refer to the whole universe as a marvel, holding in our unconscious minds the original root meaning of these two words—miracle and marvel, from the

ancient root word *smei*—signifying, simply, a smile. It immensely pleases a human being to see something never seen before, even more to learn something never known before, most of all to think something never thought before. The rings of Saturn are the latest surprise. All my physicist friends are enchanted by this queer phenomenon, marvelling at the small violations of the laws of planetary mechanics, shocked by the unaccountable braids and spokes stuck there among the rings like graffiti. It is nice for physicists to see something new and inexplicable; it means that the laws of nature are once again about to be amended by a new footnote.

The exploration of the whole universe is well under way, and we will be in for one bewilderment after another, in all the years ahead, if we can keep at it. The ground-based radioastronomers have brought us along a certain distance, but no one can predict what waits to be observed from the instruments we will send out into space itself. Whatever, it is bound to be new and confusing, and therefore marvelous.

But the greatest surprise of all lies within our own local, suburban solar system. It is not Mars; Mars was surprising in its way but not flabbergasting. It was a disappointment not to find evidences of life, and there was some sadness in the pictures sent back to earth from the Mars Lander, that lonely long-legged apparatus, poking about with its jointed arm, picking up sample after sample of the barren Mars soil, looking for any flicker of life and finding none. The only sign of life on Mars was the Lander itself, an extension of the human mind all the way from Earth to Mars, totally alone.

Nor is Saturn the great surprise, nor Jupiter, nor Venus, nor Mercury, nor any of the glimpses of the others.

The overwhelming astonishment, the queerest structure we know about so far in the whole universe, the greatest of all cosmological scientific puzzles, confounding all our efforts to comprehend it, is the earth. We are only now beginning to appreciate how strange and splendid it is, how it catches the breath—the loveliest object afloat around the sun—enclosed in its blue bubble of atmosphere, manufacturing and breathing its own oxygen, fixing its own nitrogen from the air into its own soil, generating its own weather at the surface of its rain forests, constructing its own carapace from living parts: chalk cliffs, coral reefs, old fossils from earlier forms of life now covered by layers of new life meshed together around the globe, Troy upon Troy.

We have learned enough, just enough, to be able to make up a story about its origin, and our own origin. It is a wonderful tale, as compelling in its sweep and grandeur as any ancient tribal myth, and in a way not all that different. First the explosion of the universe and The Great Light, then the expansion and the formation of matter from the particle-waves of light, the condensation of matter into all the trillions of galaxies, the clocklike construction of the stars and their planets, and the emergence of life on at least one cooling planet at the edge of at least one galaxy—our own earth.

I pass over the problem of how life began here; this is a mystery, but not the greatest mystery. The thing I cannot understand at all, that most of all I would wish to have explained, is how, from that single bacteria-like cell that was pieced together somehow under the influence of sunlight or lightning 4 billion years ago, there could have emerged so many different forms of life, covering every part of the planet, and yet behaving in fundamental ways as though they were the working parts of a single immense organism.

The varieties of life on earth are not so much a mystery as is the underlying sameness of life. We are all made essentially the same way. Human beings share genes in common with grass and seagulls. The DNA of bacteria is simpler than ours; theirs comes in strips of straightforward linear messages, coding out precisely the amino acids for a peptide sequence, while our genes contain long strips of apparently meaningless DNA called "intervening sequences," inserted between parts of the genetic message, as queer a thing for the molecular biologists as those braids in Saturn's rings. Nonetheless, despite the differences, our genes work in the same fashion as those of microbes.

It is the collaboration among all the different forms of life, their dependency upon each other and their tendency to link up in symbiotic partnerships, that produces the most spectacular and astounding features of life on this planet. Seen from the right distance, from the point of view of an extraterrestrial visitor, it must surely seem to be a single creature, clinging to the round warm stone, turning in the sun.

There is no such thing as a solitary form of life on our kind of planet, least of all ourselves. Our cells obtain all their energy from small structures inside which are the descendants of ancient bacteria. The cells of green plants are enabled to tap the energy of the sun because of their own photosynthetic lodgers, the progeny of the blue-green algae that took up residence a billion years ago and are the source of all the oxygen in our atmosphere and the primary manufacturers of all our food. Every species lives because of the existence of other, different creatures. The place works by a system of exchange and fair trade. From time to time, the precarious balance shifts slightly, and evolution takes a new turn, but always the rule of thumb for survival is symbiosis. The survival of the fittest does not mean those fit to kill, it means those fitting in best with the rest of life.

It is up to us, if we are to become an evolutionary success, fit to fit in, to become the consciousness of the whole earth. We are the planet's awareness of itself.

WE LIKE TO THINK of ourselves as the most special things on earth, uniquely endowed with intelligence and awareness, the owners and operators in charge of the place, but this is a notion we will probably have to outgrow. If we try to hang onto the view too long, we run the risk of not outliving it. We cannot survive indefinitely thinking of the earth as a kind of combination domestic animal and kitchen-garden placed at our disposal for consumption, by luck or providence. We are obliged, like all other living beings, to pay our way.

The challenge confronting us at this stage in our development is to discover what is meant by paying our way. Perhaps we are too young as a species—having arrived only moments ago in evolutionary time—and no doubt we have a great deal to learn. This is, I believe, the underlying purpose of science, for many of the things we need to learn concern the way the whole place works, from the inner parts of individual cells to whole organisms, then coral reefs, rain forests and cities like London, Tokyo and New York. We are the brainiest of animals, perhaps indeed the only species on the planet in possession of consciousness, but for all our frontal lobes we have an enormous deal to learn.

Come to think of it, I am not all that sure we are entirely unique in the matter of consciousness. There is an extraordinary insect known as the weaver ant, which lives in huge colonies scattered over acres of forest trees, each family within rolled-up leaves they convert to sheltered fungus farms by first tugging the edges of a leaf together and then, holding a larval ant like a shuttle, binding the leaf surfaces by an adhesive protein elaborated in the larva's spittle. Now, the weaver ants do a lot of foraging, venturing out in platoons into other trees and across the

The exploration of the whole universe is well under way, and we will be in for one bewilderment after another, in all the years ahead, if we can keep at it.

ground, bringing back odds and ends of edible things, but always aware of the precise boundaries of the colony's territory. When a group of ants of one colony encounters an alien ant within its territory, even another weaver ant of the same species but from another colony, an extraordinary defense reaction occurs. Some of the defenders rear up on their hind legs and make threatening gestures, while others run back to the colony's center to get help, leaving trails of scent along the route so that they can find the way back without fail. Within a few minutes a whole army is recruited in this way; the signals indicating invasion are conveyed by the messenger's posture and headwaving, and the direction is clearly marked by the scent.

Well, one way to look at this behavior is to dismiss it as entirely automatic: the ants are little encoded machines, the individual parts-on-legs of a larger computer, the colony; but automatic, nothing more. But another way to see it, fair enough so far as I can see, is as the carefully thought-out response of very small animals endowed with very small brains, nothing at all like ours, incomparably tinier, only a few strands of nerve fibers connecting a sparse array of ganglia, maybe capable of giving rise only to one or two very small thoughts, but thoughts nonetheless, same as ours. Our trouble may be that our brains are extremely large, constantly extruding great masses of thought all the time, long strings of sequential thought, complex fugues of thought, and we are, therefore, unable to imagine what it would be like to think only one single thought, like a flea, or two or three thoughts at a time, like a weaver ant. The mind of a single insect contains no lessons for the human brain.

But consider what comes into play when a half-million or a million ants are assembled in a colony, in constant motion, exchanging messages and single bits of information, always touching each other, as coherently connected as the ganglia of a huge central nervous system. It is what biologists used to call a *superorganism*. An anthill and a termite colony can be viewed as structures with some of the properties of a cerebral cortex, capable of calculating with precision the ventilation engineering needed for maintaining optimal temperature and humidity for the whole colony, and estimating the distance and direction of remote sources of food. The colony can live as long as a turtle, even though each individual member has a lifespan of only a few weeks. A single honey bee is nothing more than a sparse string of nerve cells on wings, but the whole hive can solve equations in solid geometry and trigonometry all day through, finding sugar by knowing exactly where the sun will be an hour from now.

Human society is not like this at all, of course. We do a lot of things together, build cities, for example, and swarm into and then out of them, but we are not bound by our genes to keep doing the same sort of thing over and over again, generation after generation. We have risen above the social insects long since, thank goodness. We can change our minds, think up new ways, imagine different futures, even wander away from time to time. Still, we are bound to each other by language, by music, by affection, most of all by our curiosity about each other and about the world at large.

IT IS NOT ENOUGH to pay our respects to the earth, pasting the latest photographs from satellites into our family albums, remarking on its dazzling progress from what must once have been a single clone of single-celled bacteria to such an exuberance of complex life tumbling about over every acre of its great surface today.

Very likely, we have obligations. Human society is as much a working part of the planet's collective life as any other part, but what are we good at? Could it be that we are a transient tissue, something being tried out for a role in evolution, here today but gone tomorrow? I doubt this, partly because I wish to doubt it, but also because I believe that nature makes sense in every natural enterprise that science has thus far explored in any depth, and I am inclined by this bias to the view that our species will make sense as well.

What we need is time: time to figure things out, to learn more about the life in which we are ourselves aswarm; time, above all, to grow up as a species, to begin thinking together as a species, at least as cleverly as weaver ants and termites. The difference for us is that we will be obliged, by our very nature, to worry about more than our own isolated colonies; it is up to us, if we are to become an evolutionary success, fit to fit in, to become the consciousness of the whole earth. We are the planet's awareness of itself, and if we do it right we have a very long way to go.

It is the tendency of life to survive by propagating, and to extend itself into any new niche that it can find. Even in the rocks dug from remote depths beneath the Antarctic ice, there are living creatures, as much alive as roses only different in their structure. The near-to-boiling water of geothermal springs contains living cells that can only survive and propagate at that temperature. There are forms of life that live off pure sulfur. Viruses make their living by becoming parts of the genetic material of other cells. Certain bacteria can insert their own DNA into the chromosomes of the plants in which they live, changing their environment by the same technology we use for making interferon by recombinant DNA. There is no limit to the ingenuity of nature on this planet.

Perhaps we will land and set up households on other planets someday, even build ourselves mobile cities in plastic domes to travel elsewhere in the galaxy, tacking our way to the edge of the solar wind, gardeners for our part of the universe.

When people from my profession talk like this, it is sometimes called hubris. Science is thought to be a process of pure reductionism, taking the meaning out of mystery, explaining everything away, concentrating all our attention on measuring things and counting them up. It is not like this at all. The scientific method is guesswork, the making up of stories. The difference between this and other imaginative works of the human mind is that science is then obliged to find out whether the guesses are correct, the stories true. Curiosity drives the enterprise, and the open acknowledgement of ignorance. The greatest single achievement of science in this most scientifically productive of centuries is the discovery that we are profoundly ignorant; we know very little about nature, and we understand even less.

Starting with ourselves and the life immediately around us, we have lots of homework to do, lots of pride to swallow, lots more ignorance to face, some of it only sensed out of the corner of the eye. But I think we can make a guess at one kind of answer to my question: what are human beings good at, really good at as a species, making us worth all the trouble we cause? For the very long run, if we are to have a long run, learning is what we are good at, and if we keep at it long enough we may one day begin to pay our way. □

Lewis Thomas is a biologist, chancellor of the Memorial Sloan-Kettering Cancer Center and an essayist. His collection of essays entitled The Lives of a Cell *won the National Book Award in 1974.*

SIERRA CLUB Financial Report

To Members of the Sierra Club

Fiscal 1981 ended with a surplus of $935,900 compared to a surplus of $142,000 in 1980. Fund balances (net worth) reached an historic high for the third successive year and now stand at $2,178,900.

Revenues rose $2,457,300 to $12,181,700 in fiscal 1981. While member dues, up $1,327,700 to $4,573,200, was the largest increase, contributions and grants were up $234,600, Outings and lodge income up $273,000, sales up $414,900 and miscellaneous income up $215,700. The number of Sierra Club members rose from 181,773 to 246,317, an increase of 36%.

Expenses increased by $1,663,400 to $11,245,800 for fiscal 1981. Expenses for studying and influencing public policy were up $127,000 and for information and education up $427,600. Chapter dues allocations were $813,600, an increase of 32% over fiscal 1980. Expenses for support services of $1,853,500 represented 16% of total expenses, down from 17% last year.

The excellent revenue in fiscal 1981 permitted the Sierra Club to be out of debt with our bank at year end, compared to $500,000 indebtedness last year. The bank overdraft was also reduced by $116,500.

Investments increased to $1,056,400. Of that amount $977,700 is designated by the Club by-laws for permanent investment. This "endowment fund," primarily from life memberships, is up $281,200 from fiscal 1980.

Pursuant to the provisions of sections 8321 and 8322 of the California Corporation Code, the following information is furnished as an annual report:

The Club's financial statements for the fiscal years ended September 30, 1981, and September 30, 1980, together with the report of Touche Ross & Co., independent accountants, are presented herein;

The membership list of the Sierra Club is on file at the Club's headquarters at 530 Bush Street, San Francisco, California 94108;

There are no transactions to disclose that constitute a conflict of interest involving directors or officers; no member has voting power of 10% or more;

The books of account and minutes of meetings of the Board of Directors are available for inspection by members on written request at the Club's headquarters at 530 Bush Street, San Francisco, California 94108.

Denny Shaffer, Treasurer

Report of Independent Accountants

December 4, 1981

Board of Directors
Sierra Club
San Francisco, California

We have examined the balance sheets of the Sierra Club as of September 30, 1981 and 1980, and the related statements of revenues, expenses and changes in fund balances, changes in financial position and functional expenses for the years then ended. Our examinations were made in accordance with generally accepted auditing standards and, accordingly, included such tests of the accounting records and other auditing procedures as we considered necessary in the circumstances.

In our opinion, the financial statements referred to above present fairly the financial position of the Sierra Club at September 30, 1981 and 1980, and the results of its operations and the changes in its financial position for the years then ended, in conformity with generally accepted accounting principles applied on a consistent basis after restatement for the change, with which we concur, in the method of accounting for vacation pay as described in Note E to the financial statements.

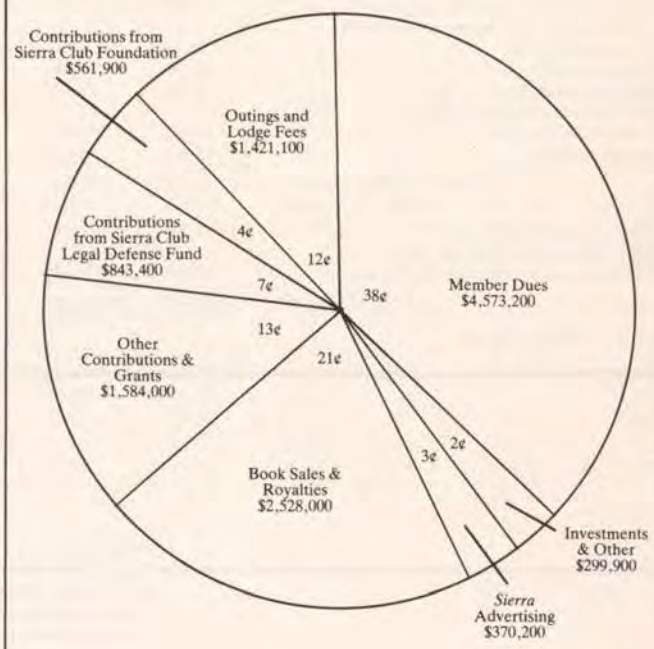
TOUCHE ROSS & COMPANY
Certified Public Accountants

Fiscal Year Ended September 30, 1981

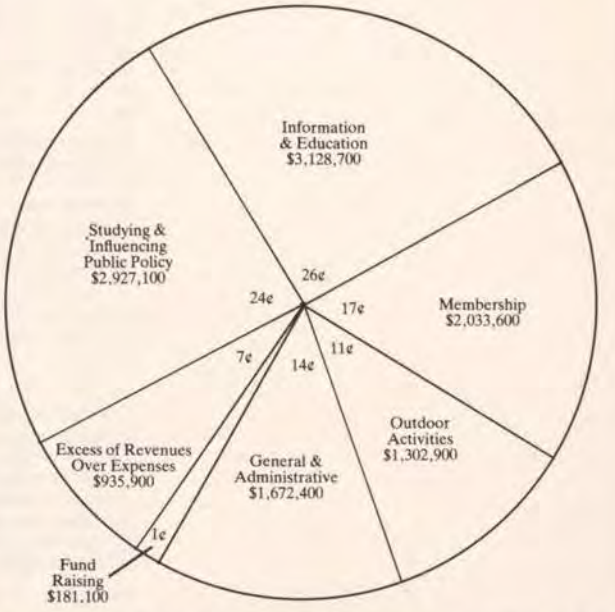
FISCAL YEAR 1981

TOTAL FUNDS $12,181,700 EQUALS 100¢

Source of Funds



Use of Funds



Charts are graduated in cents/dollar of funds for source and use of funds and show actual funds as well as cents/dollar

SIERRA CLUB
BALANCE SHEETS

ASSETS

	September 30 1981	1980
CURRENT ASSETS:		
Cash	$ 206,900	$ 8,200
Investments (Notes B and D)	323,100	416,200
Trade accounts receivable, less allowances for returns of $70,000 and $75,000 (Note A)	686,200	825,400
Other receivables, less allowances for doubtful accounts of $10,000	226,100	209,000
Grants receivable	227,300	232,100
Inventories (Note A)	612,400	717,600
Advances, less allowances of $42,100 and $41,800 (Note A)	383,400	352,000
Prepaid expenses	236,100	247,300
TOTAL CURRENT ASSETS	2,901,500	3,007,800
Investments (Notes B and D)	733,300	444,100
Property and equipment, less accumulated depreciation and amortization (Notes A and C)	862,600	809,900
TOTAL ASSETS	$4,497,400	$4,261,800

LIABILITIES AND FUND BALANCES

	September 30 1981	1980
CURRENT LIABILITIES:		
Bank overdraft	$ 89,800	$ 206,300
Notes payable to bank (Note D)	—0—	500,000
Other notes payable (Note D)	100,000	100,000
Accounts payable	1,204,700	1,035,800
Obligations under capital leases (Note F)	34,000	44,300
Accrued expenses (Note E)	302,400	398,400
Deferred revenue (Note A)	441,700	524,200
TOTAL CURRENT LIABILITIES	2,172,600	2,809,000
Obligations under capital leases (Note F)	145,900	179,800
Fund balances (Note G):		
Restricted	34,500	64,400
Unrestricted	2,144,400	1,208,600
	2,178,900	1,273,000
TOTAL LIABILITIES AND FUND BALANCES	$4,497,400	$4,261,800

See notes to financial statements.

SIERRA CLUB
STATEMENTS OF CHANGES IN FINANCIAL POSITION
Years ended September 30, 1981 and 1980

	1981 Total	1980 Total
Financial resources were provided by:		
Excess of revenues over expenses	$ 935,900	$ 142,000
Add items not requiring working capital:		
Depreciation and amortization	169,100	115,000
Loss on disposal of property and equipment	6,600	4,400
TOTAL RESOURCES PROVIDED FROM OPERATIONS	1,111,600	261,400
Proceeds from sale of property and equipment	61,400	—0—
TOTAL RESOURCES PROVIDED	1,173,000	261,400
Financial resources were used for:		
Acquisition of property and equipment	289,800	347,000
Purchase of noncurrent investments	289,200	28,900
Reduction of capital lease obligations	33,900	44,200
Distribution of restricted fund assets	30,000	—0—
TOTAL RESOURCES USED	$ 642,900	$ 420,100
Changes in components of working capital:		
Increase (decrease) in current assets:		
Cash	$ 198,700	$ 2,000
Investments	(93,100)	46,600
Trade accounts receivable	(139,200)	87,100
Other receivables	17,100	63,200
Grants receivable	(4,800)	92,300
Inventories	(105,200)	268,600
Advances	31,400	97,700
Prepaid expenses	(11,200)	60,700
	(106,300)	718,200
Decrease (increase) in current liabilities:		
Bank overdraft	116,500	122,400
Notes payable to bank	500,000	(245,000)
Other notes payable	—0—	1,000
Accounts payable	(168,900)	(349,800)
Obligations under capital leases	10,300	11,000
Accrued expenses	96,000	(97,400)
Deferred revenue	82,500	(319,100)
	636,400	(876,900)
INCREASE (DECREASE) IN WORKING CAPITAL	$ 530,100	$(158,700)

See notes to financial statements.

SIERRA CLUB
STATEMENT OF FUNCTIONAL EXPENSES
Years ended September 30, 1981 and 1980

	Program services					Support Services				
	Studying and Influencing Public Policy	Information and Education	Outdoor Activities	Membership	Total	General and Administrative	Fund Raising	Total	Total Expenses **1981**	Total Expenses **1980**
Salaries and employee benefits	$1,095,900	$ 571,000	$ 160,400	$ 282,400	$2,109,700	$ 865,000	$ 48,700	$ 913,700	$ 3,023,400	$2,744,300
Outside services	145,800	448,600	545,400	255,300	1,395,100	247,100	42,400	289,500	1,684,600	1,341,200
Legal services (Notes A and J)										
Lodge and outings field expenses			175,300		175,300	600		600	175,900	181,200
Copying and printing	143,400	30,600	9,000	203,100	386,100	(1,400)	24,700	23,300	409,400	242,200
Cost of sales, principally of publications	1,900	1,274,300			1,276,200				1,276,200	917,200
Mailing and office supplies	138,000	206,400	72,700	385,600	802,700	94,400	91,400	185,800	988,500	846,100
Travel and meetings	214,000	82,500	116,600	1,300	414,400	155,300	1,100	156,400	570,800	524,700
Royalties		216,200			216,200				216,200	226,000
Rent and occupancy	101,800	79,700	50,000	83,400	314,900	63,500	5,100	68,600	383,500	316,700
Advertising and promotion	9,200	109,400	80,900	14,700	214,200	7,700	500	8,200	222,400	259,900
Chapter dues allocations				799,900	799,900		13,700	13,700	813,600	616,100
Telephone	159,600	29,200	15,100	6,600	210,500	32,500	4,100	36,600	247,100	247,200
Insurance		3,700	66,500		70,200	21,600		21,600	91,800	88,900
Interest		26,000			26,000	39,200		39,200	65,200	63,200
Other	69,400	49,300	11,000	1,300	131,000	131,000	(51,300)	79,700	210,700	245,300
	$2,927,100	$3,128,700	$1,302,900	$2,033,600	$9,392,300	$1,672,400	$181,100	$1,853,500	$11,245,800	$9,582,400

See notes to financial statements.

SIERRA CLUB
STATEMENTS OF REVENUES, EXPENSES AND CHANGES IN FUND BALANCES
Years ended September 30, 1981 and 1980

	1981			**1980**
	Unrestricted	Restricted	Total	Total
REVENUES:				
Member dues	$ 4,573,200		$ 4,573,200	$3,245,500
Contributions and grants	2,022,400	$966,900	2,989,300	2,754,700
Outings and lodge reservations and fees	1,421,100		1,421,100	1,148,100
Sales, principally publications	1,868,400		1,868,400	1,453,500
Royalties on publications	659,600		659,600	668,200
Advertising, investment and other income	669,300	800	670,100	454,400
	11,214,000	967,700	12,181,700	9,724,400
EXPENSES:				
Program services:				
Studying and influencing public policy	2,102,500	824,600	2,927,100	2,800,100
Information and education	2,986,900	141,800	3,128,700	2,701,100
Outdoor activities	1,301,700	1,200	1,302,900	1,055,700
Membership	2,033,600		2,033,600	1,365,500
	8,424,700	967,600	9,392,300	7,922,400
Support services:				
General and administrative	1,672,400		1,672,400	1,459,100
Fund raising	181,100		181,100	200,900
	1,853,500		1,853,500	1,660,000
	10,278,200	967,600	11,245,800	9,582,400
EXCESS OF REVENUES OVER EXPENSES	935,800	100	935,900	142,000
Other changes in fund balances		(30,000)	(30,000)	
Fund balances at beginning of year	1,208,600	64,400	1,273,000	1,131,000
Fund balances at end of year	$ 2,144,400	$ 34,500	$ 2,178,900	$1,273,000

See notes to financial statements.

SIERRA CLUB

NOTES TO FINANCIAL STATEMENTS

Years ended September 30, 1981 and 1980

NOTE A—*Organization and Summary of Significant Accounting Policies*

Organization

The Sierra Club is a nonprofit voluntary membership organization established to restore the quality of the natural environment and to maintain the integrity of its ecosystems. The Club operates many public interest programs covering a broad range of environmental issues. The studying and influencing public policy program consists of staff and volunteers engaged in legislative and nonlegislative activities including lobbying, research, legal and policy development. Information and education includes the literary programs of Sierra Club Books and *Sierra*, the Club's bulletin. Outdoor activities include national and international outing programs consisting of over 250 trips annually. The membership program includes support and funding of 53 volunteer chapters and over 280 groups, and the development of a broad-based volunteer membership.

Basis of Presentation

The financial statements of the Club do not include the financial activities of the Club's various self-directed chapter and group organizations.

Some members of the Club have donated significant amounts of time to both the Club and its chapters, groups and committees in furthering the Club's programs and objectives. No amounts have been reflected in the financial statements for donated member or volunteer services inasmuch as no objective basis is available to measure the value of such services.

Summary of Significant Accounting Policies

The financial statements of the Club have been prepared on the accrual basis.

Estimated losses resulting from expected returns of publications are recorded at the time of their sale.

Inventories of publications are stated at the lower of cost or market. Unit costs for new books are based on paper, printing and binding charges only (manufacturing costs). Plant costs are amortized over unit sales for the first printing, or over the first twelve months of sales.

An allowance is provided against advances to authors for estimated losses resulting from unearned royalties.

Property and equipment are stated at cost at date of acquisition or fair value at date of gift or bequest. Depreciation expense is provided on a straight-line basis over the estimated useful lives (5 to 30 years) of the related assets.

The Club defers outings and grant revenues so that they are recognized as income in the period the trip is completed or the grant requirements met.

Legal services performed on behalf of the Club by Sierra Club Legal Defense Fund are recorded as contributions with equivalent amounts charged to expense.

All contributions are considered available for unrestricted use unless specifically restricted by the donor.

Certain reclassifications have been made in the 1980 financial statements to conform to the classifications used in 1981.

NOTE B—*Investments*

Investments are stated at cost. It is the Club's intention to hold investments to maturity. No allowance for the decline of market value below cost is established unless there is a permanent impairment of value.

Cost and market values at September 30, 1981 and 1980, were:

	1981	
	Cost	Market Value
U.S. Government and Federal Agency bonds	$1,050,600	$1,006,200
Cash in savings account held for reinvestment	5,800	5,800
	1,056,400	1,012,000
Less current maturities	323,100	320,000
	$ 733,300	$ 692,000

	1980	
	Cost	Market Value
U.S. Government and Federal Agency bonds	$859,300	$829,700
Cash in savings account held for reinvestment	1,000	1,000
	860,300	830,700
Less current maturities	416,200	408,100
	$444,100	$422,600

Investment income amounted to $92,000 in 1981 and $83,000 in 1980.

NOTE C—*Property and Equipment*

	September 30	
	1981	1980
Land	$ 3,300	$ 51,100
Buildings and leasehold improvements	280,400	280,100
Furniture and equipment	792,100	407,800
Leased equipment	261,900	381,600
	1,337,700	1,120,600
Less accumulated depreciation and amortization	475,100	310,700
	$ 862,600	$ 809,900

NOTE D—*Notes Payable*

The Club has a revolving line of bank credit for $1,000,000. Borrowings under the line bear interest at the prime rate and are collateralized by investments. There were no borrowings outstanding at September 30, 1981.

The other note payable is unsecured and bears an interest rate of 10% at September 30, 1981, and 6.25% at September 30, 1980.

NOTE E—*Change in Accounting*

Previously, charges for vacation pay were recorded when vacation was taken, not when the right to such pay was earned. The Club now records a liability for unpaid vacation pay. The new method of accounting was adopted in accordance with Statement of Financial Accounting Standards No. 43, "Accounting for Compensated Absences," and, as required by the Statement, financial statements of 1980 have been restated to apply the new method retroactively. Computation of vacation pay in earlier years was not practicable. The effect of the accounting change in 1980 was to reduce the excess of revenues over expenditures by $73,300. The net effect of the change in 1981 is an increase in the excess of revenues over expenditures of $1,700.

NOTE F—*Leases*

Substantially all leases are for office facilities and equipment. The San Francisco office lease has two five-year renewal options and an option to purchase the office building and land at fair market value. Leases for computer equipment, system software, and other equipment, include options to purchase the leased assets at nominal amounts at the end of the lease. Accordingly, these leases are accounted for as capital leases.

Future minimum payments under all noncancellable leases with terms greater than one year at September 30, 1981, are as follows:

Year Ended September 30	Capital Leases	Operating Leases
1982	$ 55,700	$ 244,800
1983	55,700	250,800
1984	55,700	250,800
1985	55,700	238,300
1986	14,000	66,200
Later years	—0—	177,700
Total lease payments	$236,800	$1,228,600
Less amount representing interest	56,900	
Present value of lease payments	179,900	
Less current portion of obligations under capital leases	34,000	
Long-term obligations under capital leases	$145,900	

Rent expense recorded under operating leases was $235,800 in 1981 and $241,100 in 1980.

NOTE G—*Fund Balances*

The following is a summary of fund balances:

	September 30	
	1981	1980
Restricted funds:		
Expendable	$ 13,000	$ 14,900
Nonexpendable	21,500	49,500
	34,500	64,400
Unrestricted funds:		
Designated by Club bylaws for permanent investment	977,700	696,500
Designated by Board for Clair Tappaan Lodge reserve	82,500	82,500
Invested in property and equipment	682,700	585,800
	1,742,900	1,364,800
Undesignated	401,500	(156,200)
	2,144,400	1,208,600
	$2,178,900	$1,273,000

NOTE H—*Income Tax Status*

The Club has received rulings from the Internal Revenue Services and State of California Franchise Tax Board granting exemption from income taxation. Contributions to the Club are not deductible for tax purposes by the donor.

NOTE I—*Pension Plan*

The Club has a noncontributory defined benefit pension plan covering substantially all full-time employees who meet minimum age and service criteria. Voluntary employee contributions are permitted. Pension expense, which is funded currently, was $61,800 in 1981 and $32,500 in 1980.

A comparison of accumulated plan benefits and plan net assets as of the most recent valuation dates is presented below:

	October 1	
	1980	1979
Actuarial present value of accumulated plan benefits:		
Vested	$209,700	$163,100
Nonvested	82,500	67,100
	$292,200	$230,200
Net assets available for benefits	$348,100	$286,400

The weighted average assumed rate of return used in determining the actuarial present value of accumulated plan benefits was 6.25%.

NOTE J—*Contributions from the Sierra Club Foundation and Sierra Club Legal Defense Fund*

Contributions from the Sierra Club Foundation representing direct grants to the Club in support of programs that are nonlegislative in nature totalled $461,900 in 1981 and $696,900 in 1980. In addition, the Sierra Club Foundation granted the Club proceeds of $100,000 and $149,400 from the sale of the Flora and Azalea Lakes property to support its publication program in 1981 and 1980, respectively.

Contributions from the Sierra Club Legal Defense Fund representing legal services performed on behalf of the Club totalled $843,400 in 1981, and $772,200 in 1980.

Ten Tips on Low-Impact Camping

AUBREY WALLACE and GARRETT DE BELL

CAN YOU FIND TEN CAMPING AND TRAIL MISTAKES IN THIS PARAGRAPH?

IT'S A MOUNTAIN spring day in the High Sierra. You and your group are hiking along a trail that is wet, muddy and soft, but you've been taught always to use the established path, so you don't deviate, even though some of the party are stepping a bit to the side, where it's drier. You tramp right down the middle. When you get to the lake, your leader chooses a campsite well away from the water, yet near where other groups already are, to keep impact low. The first priority is building a large fire, so everybody gathers lots of dead and down wood and enlarges the firering somewhat to accommodate it all. By dark the group has eaten, the organic garbage has been burned, and the leader decides that for sanitation and privacy, women should go upstream and men downstream. Many people sit around the fire till late at night, talking and guarding the food from bears. In the morning before moving on, the ashes from the fire are spread among the trees to return nutrients to the soil. Then you all carefully pick your way across the meadow and back onto the trail.

ANSWERS ON NEXT PAGE

This drawing is another low-impact camping puzzle. See if you can find the errors these happy campers are making.

ILLUSTRATIONS BY KIRK CALDWELL

ANSWERS (Give yourself one point for each mistake you found and subtract one for each detail you called a mistake that wasn't. Guessing counts against you, because with minimum-impact camping, your primary responsibility is to keep informed.)

It's a mountain spring day in the High Sierra. You and your group are hiking along a trail that is wet, muddy and soft, but you've been taught always to use the established path, so you don't deviate (this is correct) even though some of the party are stepping a bit to the side, where it's drier (incorrect—1). You tramp right down the middle. When you get to the lake, your leader chooses a campsite well away from the water (correct), yet near where other groups already are (incorrect--2), to keep impact low. The first priority (incorrect—3) is building a large fire (incorrect—4), so everybody gathers lots of dead and down wood and enlarges the firering somewhat to accommodate it all (incorrect—5). By dark the group has eaten, the organic garbage has been burned (correct), and the leader decides that for sanitation and privacy, women should go upstream and men downstream (incorrect—6). Many people sit around the fire till late at night, talking (incorrect—7) and guarding the food from bears (incorrect—8). In the morning, before moving on, the ashes from the fire are spread among the trees to return nutrients to the soil (incorrect—9). Then you all carefully pick your way across the meadow (incorrect—10) and back onto the trail.

SCOREBOARD

TEN—*EXCELLENT.* Reward yourself with a five-day outing, taking a few impressionable people with you. Give them this article to read.

NINE—*VERY GOOD.* Reward yourself with a three-day outing to practice the one you missed. Carry this along to mull over.

EIGHT—*SATISFACTORY.* Take a weekend trip and emphasize correcting one mistake each day. Spend afternoons re-reading the following information.

SEVEN—*IMPROVEMENT NEEDED.* Do some homework before your next trip, starting with a thorough consideration of the points made below.

SIX OR LESS—*UNSATISFACTORY.* Don't go into the wilderness except with an experienced leader or until after much study, beginning here.

Low-impact camping methods are not just wilderness etiquette, they are the new necessities. Our wilderness areas will stay unspoiled only if we protect and care for them now, leaving as few marks as possible when we pass through. Hikers are conscientious as a rule and rarely intend to do long-term damage—it is misinformation or lack of information, not any urge to vandalize, that produces bad habits. Before you go, obtain the appropriate brochure from the agency that administers the lands you intend to visit; specific requirements such as the party size allowed vary from place to place according to environmental differences as well as differences in use. In addition, the following general notes may help you spare the land as you camp and hike.

EXPLANATIONS

1—TRAIL USE. Always stay on the trail, even if it's wet and muddy. Don't step off to the side; that will create a new trail, which will soon become wet and muddy so people will start stepping off to the side, cutting a new trail which will. . . . This is one of the prime causes of the multiple trails that create a freeway look in the backcountry. If the existing trail is too wet to travel, either avoid hiking there until later in the year, or move far off to higher, drier, firmer ground, following all the usual rules for traveling cross-country.

To travel cross-country, go in small groups whenever possible; perhaps even break up into smaller parties. Some heavily used areas have limits on party size, such as Yosemite's limit of eight for off-trail travel, so check ahead of time. All should be careful not to trample flowers and grasses, not to break down bushes. Once a route has been established, it becomes visible and will be used by other hikers. Even if the route is abandoned, the vegetation will take a long time to recover.

When you're back on the trail, of course do not cut switchbacks on the steep slopes—they create channels that increase water erosion. Cutting switchbacks also heightens the likelihood that you will injure yourself, or someone below you, by dislodging rocks. Many animals live under and around the rocks, and they prefer to be left undisturbed.

2—CAMPSITES. There is no evidence to indicate whether putting many groups near one mass campsite is better than spreading them around, after considering all impacts on the land and intrusions on other campers' peace of mind. It is, however, important that you and the people in your group don't sprawl out, which increases impact and contributes to a feeling of crowding on the part of other parties who see you. Whenever possible, choose a campsite behind natural screening such as trees or rocks. Whether your group is just yourself or fourteen other people, when you camp you have a greater potential for damage than when you're moving, especially if you stay in the same spot for several days. Choose a campsite at least 100 feet from the trail, to reduce your visual impact as well as to increase your own sense of privacy. You'll want to be near fresh water, but keep your camp at least 100 feet from the lake or stream to avoid contaminating it and to protect the fragile bank. Use an already-established site if one is available, one that is free of vegetation. Although the soft meadow may look inviting (that's why so many scenic posters show people camping there), you'll crush a lot of delicate plants and find yourself soaked with dew in the morning.

Within the group site, select your individual sleeping place in an area that requires as little rearrangement as possible, although you'll almost always have to move a few small rocks and twigs. The best spot is a smooth flat place under a tree where there isn't much growth to trample. But for safety's sake, don't sleep under a "widow maker," a dead tree with large brittle limbs.

3—SANITATION. This was a tricky point in the problem at the beginning, but many environmental impacts are subtle. The leader's first priority after choosing a general area should be to select a latrine area with minimum impact and let the group know where it is. The overriding consideration is to prevent disease and contamination of

water supplies. There is no one best way to do this in the mountains, but don't let shyness rather than biological soundness make the decision. If you want to be able to drink the water in the wilderness, then it's up to you to keep it fresh. Standards are getting stricter because of increasing cases of *giardia*. Although recommendations vary and should be checked for specific areas, a good rule of thumb is to situate bathroom functions (including washing yourself or your clothes) at least 150 feet from water sources, not only existing sources, but potential sources that might appear during storms or spring runoff: avoid drainage courses, gullies, seasonal creeks or low places. Never wash in the lake or stream, even with biodegradable soap. Don't spit toothpaste in the water source, don't clean fish in it, don't put body waste in it.

Other campers have used and will use the same campsites that appeal to you, so try to find a bathroom site that you think others will be unlikely to use. Yet—especially for a group—don't locate the site so remotely or obscurely that it tends not to be used, nor so near that insects from it might contaminate your food, in storage or during preparation. (See 6 for more on this.)

Individual catholes encourage decomposition best. Dig them six to ten inches deep, in biologically active soil such as among trees or on the moist, shady side of cliffs or boulders, rather than in sand or an open space of decomposed granitic soil, which is so porous and biologically inactive that wastes will not decompose, but instead will leach quickly into the water table. Tampons, sanitary napkins and disposable diapers shouldn't be buried under any circumstances. Pack them out or burn them in an existing firering.

4—Fire. In many areas campfires are totally inappropriate because of limited wood supplies or danger of forest fire. Check on prohibitions or restrictions before you go. The most important detail to remember is, where fires are allowed, keep them small. Remember that for many people the sight of a nearby campfire intrudes on their wilderness experience (a large part of which is to get away from human-made things), so try to locate yours behind natural screening such as trees or boulders. If a campfire is a "must" for your group, as it is for many, another "must" is to avoid crowded areas where screening isn't available. Use only dead and down wood, and collect only as much as you need. Standing trees, alive or dead, are an important part of the forest.

5—Firering. Keep any fire you build within an existing firering if possible. A small fire accomplishes most of what a bonfire does, if you sit close. Many backpackers now carry small, portable stoves to cook food, reserving campfires for community entertainment and for burning garbage. We feel the latter is one of a fire's most useful aspects in the backcountry. Preventing garbage is better, though. You should try to cook just the amount of food you or your group will eat. Save the groaning-board-style hospitality for elsewhere, because leftovers have to be burned or packed out (not buried, which would encourage scavenging animals or change the nutrient level or both). Bear this in mind when you plan menus. Sardines, for instance, might taste delicious, but the emptied can is a mess to carry far. If you are in a fire-designated area, you could put cans in a fire to burn out food traces; burned foil, however, breaks into tiny pieces without being eliminated, so pack out foil intact. Cardboard boxes and paper wrappings can be burned too. After the fire has cooled, remove the burned-out cans to pack out.

If no firering exists, do not build one. Scoop out a depression in mineralized soil, sand or gravel, well away from burnable duff or vegetation. Build a small fire in the depression; when you break camp, scoop out the ashes (make sure all garbage burns completely), dispose of them (see note 9) and put the scooped-out sand or gravel back. If this procedure is not possible under the circumstances, build your firering small and put the rocks back where they came from when you're done, sooty side to the ground. Restore the site to its original condition.

6—Upstream, downstream. First of all, as pointed out in 3, don't wait until after dark to locate a bathroom site; make the decision your first priority in the afternoon. If you decide on individual catholes, the old-fashioned "women upstream, men down" (or vice-versa) should be avoided because it concentrates use along the watercourse, unless everyone realizes "upstream" and "downstream" are directional indicators similar to "north" or "south." Avoid polluting the water. Rather, the leader should indicate a general clump of trees back from the water.

7—Campfire party. Talking around the fire is often some of the best fun of a trip, and we're not coming out against it, but when you're in an area with other campsites nearby, or when others in your group start wandering off to bed, keep the noise down. When the party dwindles to just the last few die-hards, it's time to call it a night, because many people can be disturbed by even a murmur.

8—Bears. Don't use bear-guarding as an excuse to have a party late at night. Protect your food from bears by storing it appropriately, usually by putting the food in stuffbags and hanging them in trees.

9—Ash disposal. This is a question of considerable debate. Ashes exist in nature because of fire and lightning, but not necessarily where humans build camps. Scattering ashes near camp can litter the site or nearby forest with charred wood; burying ashes can attract animals, which will dig up the ashes and strew them around. Dumping ashes in the water will add unwelcome nutrients to streams and lakes that are clean and pure largely because of their low productivity; the addition can easily increase turbidity and algae growth.

Therefore, before you leave the campsite, be sure the fire is out, then remove any cans you have burned and any bits of foil or other pieces of metal that previous campers have left. Pack them out. Leave the ashes and charred wood in the firering, where any nutrients that should be returned to the environment will be sifted out by the wind and rain.

After a while, however, many campers' ashes will build up and will need removal. This is a more sensitive process than it appears at first, because ashes are alkaline and may contain toxic residues from any number of substances campers have used. Novice campers should either pack out the ashes in plastic bags or leave the disposal to rangers or very experienced campers. Experienced campers may assess the situation, carefully considering the tolerances and natural processes of the area. If the situation permits, sift out any metal fragments or unburned material, wet the ashes to prevent fire and take them *far* from the campsite and other areas visited by humans. Bury them in biologically active soil.

10—Crossing the meadow. Another tricky one, but if you have to cross the meadow to get from your campsite back to the trail, it is probable that you were camped in the wrong spot, perhaps in the meadow itself or too near the water. Even if you missed that idea, you should have caught the detail that a group shouldn't pick its way across a meadow—it should pick its way around it. (We gave you two chances to win on this last point.) A wet meadow is more likely to be damaged than a dry one, and the beginnings of a trail can appear after a group as small as five has passed over it.

Minimum-impact camping is an ethic, with techniques that change as better methods are devised and discovered. It isn't a firmly established set of rules. You'll have to use your own judgment in many cases and always take the habitat into consideration. Remember, the idea is to leave the area looking as if you had never been there. Take only photographs, leave only footprints. □

Aubrey Wallace and Garrett DeBell are literary editor and editor, respectively, of The New Environmental Handbook. *DeBell is an environmental advisor to the Yosemite Park and Curry Company, and Wallace is a freelance writer.*

CEDRIC WRIGHT

FORWARD STEPS FOR BOOTS

These tricouni- and hob-nailed boots were widely used in the Sierra Nevada as late as the 1930s and 1940s. Boots have changed drastically since then.

KENNETH and DEENA DYLESKI

BOOTS PROBABLY ARE the most tedious and troublesome of any piece of outdoor equipment. Choosing the right boots for your needs, fitting them properly and getting a line of credit to pay for them is only the beginning. Then comes the break-in period, additional suffering on the trail, and finally a messy cleanup and reconditioning at home after your trip. With all this bother, it's a wonder any of us even makes it outdoors. Luckily, some manufacturers have been working hard to overcome classic design weaknesses, and their efforts have produced footwear that is lightweight, comfortable, less expensive and easier to care for than older kinds.

For decades the conventional all-leather, European-made boot designed for mountaineering dominated the U.S. hiking-boot marketplace. Many feet are still paying for their shortcomings. Only recently have such outmoded features as flimsy scree collars, blister-causing inner-lining heel seams and huge, vulnerable, wraparound backstays gone the way of tail fins on gas guzzlers.

We're still left, however, with a number of design problems in conventional footwear. Boot manufacturers have handled the situation two ways. Most traditionally oriented companies have taken the lead of Asolo and revamped their all-leather boots. Other companies, quick to capitalize on the high price of boots and buyers' dissatisfaction with conventional offerings, have introduced alternatives, usually with the newest synthetic fabrics in their uppers.

A few years ago, Asolo released a small new line of hiking boots, assisted by Steve Komito, the Estes Park boot designer and repairperson. That well-thought-out line quickly established Asolo as a leader in the industry and continues to keep manufacturers running to keep up. High-quality materials and workmanship, narrow backstays, a Komito cuff, a relatively wide toe and nar-

row heel in three widths and women's sizes all became standard in shops around the country. This innovative firm later produced seamless heel pockets, lighter-weight and recessed-backstay seams. But many people were still not ready to buy. Boot prices had skyrocketed along with the price of leather, and more than a few outdoorspeople went back to running shoes as a short-term solution.

Then Inter Footwear USA, a boot company, brought out its Ranger model. Sierra Designs, one of Inter's retail distributors, came up with the catchy name, "Sierra Sneaker." The name stuck, and thousands of people bought this lightweight, inexpensive canvas shoe with a cleated sole. Because running shoes were more expensive and didn't have a sole adequate for mountain trails, the Sierra Sneaker quickly became a success, and numerous copies hit the store shelves.

CANVAS hiking shoes did have a few limitations: lacking a shank, they weren't torsionally rigid enough for good support on rocky or uneven terrain; watertightness was not their strong point; the heel counters didn't support ankles enough for backpacking; and the arch support left much to be desired. But then, what did you want for less than $25?

Meanwhile, W.L. Gore released a second generation of its Gore-Tex™ coating, correcting some of the leakage problems of the original formula. Light weight, waterproofness and breathability seemed technologically feasible at last. Danner and Donner Mountain each released a new model with Gore-Tex uppers protected by leather pieces at critical wear areas. It soon became obvious that their prices were well below those of conventional European leather boots, and then the "lightweight revolution" began.

Yet some remained unconvinced. Public confidence in Gore-Tex had been severely undermined by the excessive claims made for it in sales literature. People bought Gore-Tex footwear expecting nearly perfect waterproofing and breathability, only to find that some boots leaked when very wet or dirty. Although the current advertising has modified the claim to "highly water repellent," buyers have stayed skeptical.

Discussion of the merits of Gore-Tex styles invariably turns to "doped" construction (sewn through, then taped over or caulked) versus "dropped sock" construction (a seamless sock as inner liner without seams in the boot's upper). In "doped" construction, it's true that waterproofness is only as good as the seam-sealing job. What most people aren't aware of, however, is that the biggest potential for leakage comes from the area where the fabric meets the sole, and no surefire method of sealing this section is being used on any boot now on the market. Advances in lightweight injection molding that uses new compounds now make a positive seal possible; boots incorporating this seal will be available from Pivetta in the fall. These prototypes may take fabric boots from their present status as an ongoing experiment to the point where they can reliably perform better than their all-leather cousins.

In fact, all Gore-Tex boots now available are greatly improved over the original designs and provide more than enough resistance to moisture for three-season hiking, their intended use. Because footwear often passes through wet grass, leaves and brush that constantly break the surface tension of the upper material, it may be too much to ask of any boot to keep hikers completely dry in every situation. The new-generation boots do, however, provide the driest, lightest and most maintenance-free footwear yet developed.

Non-Gore-Tex fabric boots come in at the low end of a broad price range. Inter Footwear has improved the "Sierra Sneaker" with a heavier canvas upper and the addition of a steel shank for extra support. They also will offer a new "Sierra Hiker" model with an upper of breathable nylon bonded to foam, which is much more waterproof than canvas and feels softer inside. Donner Mountain's similar "Tough Tread" series has added a contoured, removable inner liner like those found in running shoes, for extra support and cushioning on rocky trails, and a model in women's sizes. They offer improved support and construction this year and provide an adequate boot for hiking and light backpacking at a very reasonable price. Even the fanciest ones in

Footnotes: The Shoe That Fits

KENNETH DYLESKI

IF YOU foresee buying boots soon, you should purchase the best you can afford that fit properly. A comfortable fit takes precedence over everything. Far too many hikers waste their money on expensive, stiff, heavy footwear designed for mountaineering, not for walking. Inflexible soles with thick midsoles and ¾-inch shanks are fine for cramponing up Mt. Rainier but miserable for hiking the Appalachian Trail. Patronize stores that specialize in outdoor equipment, are willing to take time to fit you, and will allow you a no-risk trail period to break in your boots at home.

Be sure boots pass the toe-clearance and flex tests. Slide your foot forward in an unlaced boot until it reaches the end. Keeping your foot flat, stoop down and insert an index finger behind your heel. It should fit easily but without a lot of slack. Then lace up the boots and walk around for at least ten minutes. The boots should flex in the right place, not on toe tops or back too far.

Resolve to give your boots proper care. If they get wet, dry them with newspapers stuffed inside, away from heat. Use a boot tree between trips, and keep them clean. Given proper care, boots will last many seasons with only occasional resoling. Before treating new boots with a leather dressing, get out a piece of fine sandpaper. Fold it in half and use the edge to slightly roughen the leather areas along exposed seams. The roughened area need be only about 1/16-inch wide. Cover threads with a thin, protective coating of Boot Patch or Shoe Goo. Dry overnight, sand lightly, then repeat the process. Cuts in stitching are a common problem on rocky trails, often causing leaking. Repairing cuts involves sewing through the boot, creating a thread line that might cause blisters.

Boot linings, made of what is known in the trade as "glove leather," break in easily, feel soft and commonly rot or wear out before either soles or uppers. Inner heels usually suffer this breakdown first. Treat these areas with a light dressing such as Biwell or Lexol whenever they appear to be drying out. Avoid using too heavy or too much waterproofing compound. Otherwise excess perspiration will accelerate lining rot. In milder weather, just touch up dry spots on the upper as needed instead of soaking the leather in boot dressing. Your feet will sweat less, feel cooler. Also, blisters form much more easily on wet, wrinkled skin than on dry, smooth skin.

Reprinted from the July/August 1980 Sierra.

Outwest's Yosemite

Inter Footwear's Sierra Sneaker

Nike's Lava Dome

Nike's Magma

Nike's Approach

Inter Footwear's Sierra Hiker

Outwest's Kings Canyon

Outwest's Tahoe

these lines will be priced under $40.

The mid-price range of footwear is dominated by the running shoe companies, with Nike leading the pack. These lightweight shoes and boots are suited for everything from adventure running to backpacking; they incorporate the latest in running shoe technology and add lug soles, extra torsional rigidity, better ankle support and improved durability over the lower-priced fabric boots. Adidas, Asolo, Donner Mountain, Early Winters, Etonic, Kastinger, New Balance, Nike and Rocky Boots offer various low- and high-cut models from $45 to more than $100. Here's where the latest improvements have made the greatest impact; their success has been so great it may be hard to find the more popular sizes by late spring.

Heading the list of welcome changes is the trend toward smaller, more closely spaced lugs in the soles, which pick up less debris and cause less environmental degradation. Contoured soles with beveled heels, more features borrowed from running shoes, reduce shock and increase walking efficiency. This development, coupled with very light weight, should dramatically reduce fatigue on the trail. By using torsionally stiff midsoles that bend at the proper forefoot point, the manufacturers have put together boots that flex comfortably and balance well on rocky or uneven surfaces.

Good torsional rigidity is especially important for occasional off-trail hiking. Solid heel counters support ankles and are a must for backpacking. Check the quality by depressing the heel counter's edge with a thumb—it should not bend over. Higher fabric uppers don't provide much ankle support, but they do help keep out dirt, protect ankle bones and give kinesthetic feedback on ankle positions. Also nice to have are padded, gusseted tongues, which reduce lace irritation and keep out water and scree.

Inside many lightweight boots is a new liner material called Cambrelle. It's a light, breathable and soft polyester material, said to cause far fewer blisters than conventional leather linings. Some of these moderately priced boots also offer insoles made of a machine-washable "memory" foam that conforms quickly to foot idiosyncracies, giving custom fit and extra comfort. Thinner, cooler socks can be worn with these "sock-liner" insoles, allowing feet to stay drier and less blister-prone. Despite some limitations, the new high-technology boots offer many advances in comfort, weight savings and support, at very attractive prices. No doubt they're suitable footwear for most hikers, although they do have limitations that new conventional boots (also at very attractive prices) may not have.

Conventional leather boots make better sense in cold or wet weather, for off-trail hiking, or for situations involving hard wear or heavy loads. They can extend travel into the fourth season. Of course for mountaineering, when crampons might be necessary, the stiffer soles of heavy-duty boots are mandatory. The weakest point of the lightweights is their lower resistance to moisture. Uncoated nylon and canvas don't repel water well, and the cheapest Gore-Tex™ models aren't even seam-sealed. If leather makes better sense for your needs, you should look over Fabiano, Asolo, Galibier, Pivetta, Raichle, Vasque or any of the other well-made traditional brands long available in this country. Also competitive with the mid-price-range synthetics are a number of styles from Raichle, Outwest and Vasque, all under the $100 mark. Outwest, a new name in footwear, will introduce its High Country series this season with three models ranging from $55 to $80. They are remarkably well crafted and visually resemble the Pivetta line. (This isn't surprising, since Donner Mountain, the parent company of Pivetta, is also parent company to Outwest, which previously manufactured only garments.) If you're looking for the durability, support and weatherability of a traditional leather boot, these currently offer the best workmanship and value.

Be sure to look over the entire field of boots carefully and choose a model that will do the job you have in mind. No one boot can do all things for all people. Take the time to fit carefully, and choose a shop with the time to show you their merchandise and help with fitting. Additional information on footwear is available in *Backpacker* magazine, April/May 1981; *Outside*, October 1981; and *Sierra*, July/August 1980. □

Kenneth Dyleski is a freelance writer and mountaineer. Deena Dyleski, also a mountaineer, recently received a degree in geography.

On Energy, Cooking, Equipment, Politics and Other Selected Subjects

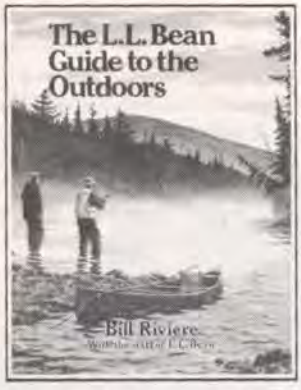
The Road From Here, by Paul Tsongas, Alfred A. Knopf, New York, 1981. $12.95.

PAUL TSONGAS is the junior senator from Massachusetts, a liberal Democrat, and has been one of the most articulate and active heroes of good environmental legislation, especially with regard to the issue of Alaskan lands. His latest rating from the League of Conservation Voters was 82%. *The Road From Here* is a series of essays on what he terms the eight basic realities of life in the 1980s. They are: energy; war and peace and the Soviets; the economic pie; resource allocation; the Third World; international trade; the environment; and inflation. The two chapters that deal specifically with environmental issues are, for the most part, sensible. There are, however, exceptions: the solution to dependence on fossil fuels, Mr. Tsongas states, is a transition to renewables and nuclear fusion. The possibility of developing renewable sources of energy has been adequately demonstrated both theoretically and practically. But the prospect of nuclear fusion is so problematical and so skeptically regarded by many scientists that to propose it seriously as a policy option smacks of optimism, if not downright intellectual escapism. Coming as he does from a state that is usually dependent on nuclear power as a source of electricity, Mr. Tsongas's lack of firm opposition to nuclear power is, perhaps, understandable.

The chapter on the environment deals primarily with five issues: population, hazardous wastes, carbon dioxide buildup, nuclear wastes and water depletion. In each case, his analysis of the problems is accurate; he sees what's wrong. Yet he fails to provide a cogent solution for any of them. For example, with regard to nuclear waste, he concludes, "It is time for all parties in the nuclear debate to realize that a resolution of this issue is in the interest of everyone. . . ."

The Road From Here seems, on its face, to be a series of liberal, well-informed speeches on topics of general concern. But it is more. It is also an intellectual toe in the chilly waters of presidential politics. As a treatise on the entire gamut of controversial issues facing the United States, it is an attempt to demonstrate a consistent, realistic grasp of the global issues that inform our own political processes. The question is: does it succeed? As a preliminary step, yes. Yet there remains a feeling that Mr. Tsongas has hedged too many questions, has hesitated to state what he feels the ultimate solutions might be to the many important questions he poses and analyzes. Still, the book also clearly shows that he is a dynamic and impressive figure whose future may well be closely intertwined with our own.

—David Gancher

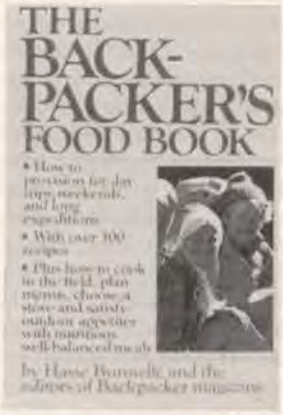


The L. L. Bean Guide to the Outdoors, by Bill Riviere with the staff of L. L. Bean, Random House, New York, 1981. $15.50

TOO MANY OUTDOORSPEOPLE, the L. L. Bean catalog of merchandise is a sort of poem of evocation; merely riffling through the illustrations of boots, shirts and jackets is energizing. Now the company also has a new guide, seven years in the making, that fulfills the promise of quality made by the company's products. It begins with a guide to predicting weather and concludes with a segment on navigating by a map and compass. The rest is a sage consumer's guide to clothing, tents, gear, cooking tackle, all sorts of outdoor equipment.

The advice is reliable and understated. The focus is no longer so heavily slanted toward hunting and fishing on the unstated assumption that they are the only activities

that can be enjoyably pursued outdoors. The discussions of equipment do not refer to particular brand names. An especially valuable feature of the guide is its Appendix II, a series of equipment checklists that strikes a perfect balance between supplying minimal needs and providing an excess. —DG



The Backpacker's Food Book, by Hasse Bunnelle and the editors of *Backpacker* magazine, Simon and Schuster, New York, 1981. $8.95.

THE AUTHORS of this book have impeccable credentials. The readers of *Backpacker* will be familiar with that magazine's attention to detail and accuracy. Hasse Bunnelle has been called, with little exaggeration, the Julia Child of outdoor cooking. In fact, she is more. The author of many of the original backpacking recipe books, Hasse Bunnelle has for years been commissary chairperson for Sierra Club Outings. She trains cooks, designs menus, advises on products and generally assumes overall responsibility for eating on outings. She knows whereof she speaks.

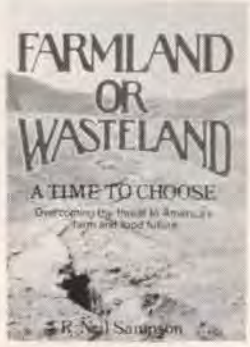
Her latest book is basic yet complete. Beginning with a section on the elements of nutrition, spices and equipment, it proceeds to a straightforward list of more than 300 tested recipes organized by types of food. Leafing through them, the casual reader will be struck by their simplicity and by their emphasis on grains. This might be inappropriate in a French restaurant, but on the trail—where food is fuel as well as entertainment—simplicity and wholesomeness can be the key to survival. The recipes guarantee no-fuss nutrition where it counts the most.

There is, however, only a very brief section, little more than a page, on menu planning. This lack is puzzling since, for the less-than-expert backpacker, putting together menus for even a modest trek can be daunting. The earlier sections do emphasize, however, the principles to be followed in combining dishes, cooking techniques and procedures. —DG

Gorp, Glop & Glue Stew, by Yvonne Prater and Ruth Dyar Mendenhall, The Mountaineers, 715 Pike Street, Seattle, WA 98101, 1982. $6.95.

THE SUBTITLE REALLY tells the story of this book: *Favorite Foods from 165 Outdoor Experts*. GG&GS is the backpacker's equivalent of a celebrity cookbook. A glance through the index indicates the exalted company: Tenzing Norgay, Willi Unsoeld, Allen Steck, Steve Roper, Galen Rowell, even Francis P. Farquhar. Each listing contains: (1) a recipe; (2) a biography about 200 words long outlining the celebrity's history and accomplishments, which tend to lean heavily toward climbing; and (3) a quote from the celebrity—sometimes anecdotal, sometimes explanatory, often witty and articulate. The recipes, although presumably reliable, coming as they do from undoubted experts, are uneven in quality and appeal. Some are fascinating, such as Richard Tucker's Olde English Plum Pudding or Thomas F. Horbein's Unmentionable Brew. Others, such as Bob and Ira Spring's Quick Mountain Glop, are revolting.

The book's sections deal with breads, snacks, camp-cooked meals, wild foods and easy meals. The charm of the book, though, doesn't rely on the recipes, but on the reminiscences and observations of the remarkable crew of authors. —DG

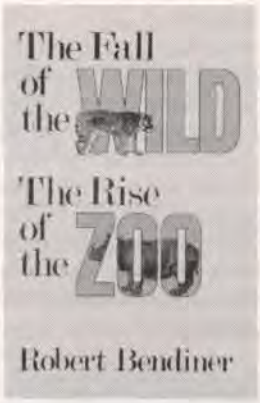


Farmland or Wasteland, by R. Neil Sampson, Rodale Press, Emmaus, Pennsylvania, 1981. $16.95.

THOUGH AGRICULTURAL experts have been urging our attention for years, the issue of the preservation of farmland has not been one of conservationists' prime concerns. Not yet. But a number of recent studies and books indicate that this age-old issue—now focusing on erosion, loss of productivity, reliance on chemical fertilizers and pesticides and, more recently, the conversion of prime farmlands to other uses—may well become one of the main issues of coming decades. The statistics have been widely cited: 2.5 million acres a year of

prime land gobbled up by suburban sprawl, shopping centers, highways, etc.; erosion 25% worse now than in the dustbowl years of the 1930s.

Still, the message has not gotten through. The technological ingenuity of modern agriculture, which substitutes chemicals for basic fertility while abandoning traditional methods of preserving agricultural productivity, has so far staved off a day or a decade of reckoning. Nonetheless it is coming; *Farmland or Wasteland* examines in considerable scope the dimensions of this problem. Some historians have argued persuasively that the decline and fall of the Roman Empire and the ancient kingdoms of the Middle East were due to the same forces that have now begun to threaten the American agricultural empire, the most important resource of the American economy. This extensive Rodale Press work doesn't focus on the legislative remedies that may (or may not) be available, but it does provide a single source of not-too-technical information and analysis of the many factors of this issue that will ultimately involve all of us. —DG



The Fall of the Wild, the Rise of the Zoo, by Robert Bendiner, E. P. Dutton, New York, 1981. $15.50.

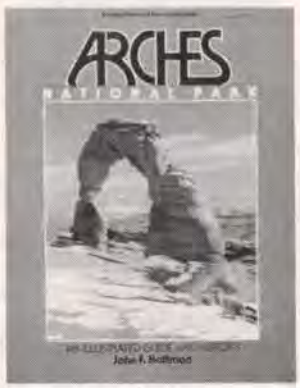
WHAT IS A ZOO? Many wildlife enthusiasts have deplored the world's zoos as prisons and sideshows for animals that should be better preserved in their own native habitats, undisturbed by humans. Robert Bendiner argues, with recent history on his side, that this view of zoos will lead to extinction more rapidly than the policy of benign neglect that many conservationists would prefer. The problem, of course, is many faceted. Habitats of endangered species are shrinking rapidly; poaching of other species, for a variety of spurious commercial purposes, further diminishes the stock of wild animals.

What is the answer? The ideal is the unrelenting preservation of wildlife habitats. The realistic approach, argues Bendiner, is the use of zoos for preservation and promulga-

tion of endangered species. This is, however, not as easy as it might appear. A number of unfamiliar factors have begun to play important parts in the roles and management of zoos: how to improve the psychological states of captive animals; the techniques of artificial insemination; preparing animals for reintroduction to restored natural habitats. A whole new science has begun to evolve in response to the problem of preserving the remnants of species; it involves learning about the physical, dietary and social requirements of a whole Noah's Ark of animals.

The specificity and detail of these requirements excite admiration for the dedication of the zoo's cooks. For example: every day an elephant at the London Zoo requires 100 pounds of hay, 2 pounds of oats, 2 pounds of maize, 4 pounds of locust beans, 4 pounds of biscuits, 10 pounds of carrots, 10 pounds of potatoes, 3 or 4 cabbages, 1 loaf of bread, apples, oranges, 1 ounce of salt, sometimes fresh leaves, bamboo shoots, dried fruit and cod-liver oil. Consider, moreover, that an elephant is not a difficult animal—not compared to a gorilla, a koala or a pygmy chimp.

The conservationist community has long been divided on the question of zoos. On the one hand, an elephant in a cage—however congenial for the elephant—is not a wild elephant, not a part of the ecosystem in which it evolved and in which it would naturally play a crucial role. On the other hand, humans can in this way preserve the genetic heritage embodied by wild animals and can, in some sense, preserve the marvelous variety of the planet's inhabitants. —DG



Arches National Park, by John F. Hoffman, Western Recreational Publications, San Diego, 1981. $19.95, cloth; $7.95, paper.

IN MANY WAYS this is the ideal sort of guidebook. It focuses on one specific region; it deals comprehensively with the history, geology, recreational features and biology of the region; and it is well written and beautifully illustrated. This

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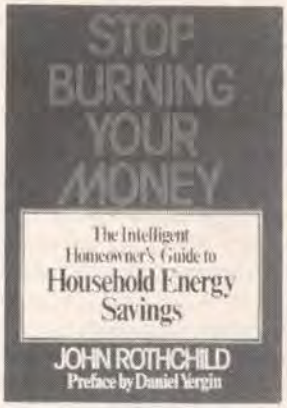
doesn't seem much to ask of a guidebook, but so few achieve it. More often, guides to national parks are glossy souvenirs, overpriced postcards that are carried instead of mailed.

Arches, sponsored by the Canyonlands Natural History Association, is clearly a labor of love. The author spent eight years researching and writing the work, and it shows. This is the guide you buy, read and study *before* you reach the park. It is intended to enhance rather than replace the experience of visiting this amazing region. It discusses in turn the geography, the geology, the plant and animal life, the prehistoric inhabitants and the history of the area, and it concludes with an excellent road and trail guide whose illustrations are practical as well as decorative. An appendix of suggested readings and maps follows. The paperback is sturdy and will undoubtedly survive a backpack experience. The hardbound version would be a worthy addition to a conservationist's library. The professional quality of the printing and design merit an additional note of praise. —DG



Stop Burning Your Money: The Intelligent Homeowner's Guide to Household Energy Savings, by John Rothchild, Random House, 1981. $15.50.

ANYONE WHO SPENT too much on heating or on running inefficient appliances last year will want a copy of this eminently practical book. Rothchild developed the Department of Energy's "low cost/no cost" approach to household conservation, so his recommendations are based on extensive research and experience. He shows how a homeowner can decide whether insulation makes more sense in terms of both dollars and energy than buying a more efficient furnace, whether buying a more efficient refrigerator could save significant numbers of dollars within months or whether a woodstove is a sensible purchase no matter how efficient it is. Many apartment dwellers will also want this book because of its extensive charts that compare

the energy efficiency of appliances by brand-name and model. The Department of Energy will no longer publish such lists—it thinks that's not the proper role of government now—so commercial lists will be the only ones available for a while. Rothchild's ratings are among the best-informed. As Daniel Yergin said in the preface, "This is the right book at the right time."

—Mary Lou Van Deventer

Better Use of . . . Your Electric Lights, Home Appliances, Shop Tools—Everything That Uses Electricity, by Michael Hackleman, Peace Press, 3828 Willat Avenue, Culver City, California 90230, 1982. $9.95.

LAST YEAR author Hackleman, a well-known writer on windpower and other alternative energy topics having to do with electricity, was conducting a workshop when one of his students asked for a reference book that would tell her what she could and could not do with the alternative energy system she was about to build. Since no book like that had been written, he didn't have an answer. So he wrote this book to fill in the gap in information. The book is a primer on how to make the electrical components of a household run well using electricity provided by alternative energy systems—windmills, hydroelectric generators, solar electric cells and such.

Hackleman describes the advantages and disadvantages of appliances and tools built to use 12-volt, 32-volt and 120-volt DC current, as well as how to adapt regular appliances to DC current even though they were built to use 120-volt AC current. He talks not only about inverters, but also wiring adaptations (with appropriate cautions about further study of wiring and safety), different kinds of hookups, different arrangements of lightbulbs on a circuit and lots of other new ideas. He has plans for a way to use a refrigerator's waste heat to assist the water heater and provides many practical suggestions for the confirmed do-it-yourselfer.

Readers who are interested in self-

reliance or appropriate technology and who can put up with the excessively folksified tone will find a lot of practical information as well as innovative ideas that look as though they ought to work. —MLV

Funding for Renewable Energy and Conservation Projects, by the Office of Appropriate Technology, 1600 Ninth Street, Sacramento, CA 95814, 1981. Free.

THIS IS a 20-page guide to grants, loans, venture capital, federal assistance programs and information for people who have businesses, inventions or other projects having to do with renewable energy or energy conservation. Published by a state agency, it's aimed primarily at people in California; but it is also valuable to others for its discussion of federal programs and nationally available information. It does not, however, list private or corporate foundations, and it is slightly out of date even though it was revised in September 1981. Since then the Reagan administration has eliminated the National Center for Appropriate Technology, and the chances are pretty good that other programs mentioned in this booklet are targets of funding cuts. If you have something you think is fundable, ask for this publication—fast. —MLV

Opportunities in Environmental Careers, by Odom Fanning, National Textbook Company, 8259 Niles Center Road, Skokie, Illinois, 1981. $7.95, cloth; $5.95, paper.

THIS BRIEF BOOK ought to be required reading for every environmentalist. For young people, it outlines in satisfying detail the educational requirements, the duties and the opportunities associated with environmental concerns. For other readers this book demonstrates the extent to which environmental factors penetrate every aspect of commercial life today. For those who think environmentalists are limited to people who work in one way or another for the major conservation organizations, this is good news. The number of

environmental jobs is large—currently about 1,774,500—and is growing, the apparent intentions of the current federal administration notwithstanding. Environmental principles are not extraneous beliefs superimposed on the structure of American business and education; they are now intrinsic to our civilization and its corporations. Still, this book is not a philosophical treatise but an eminently practical guide to getting a job in this vital field. —DG

Water & Power, by Harry Dennis, Friends of the Earth, San Francisco, 1981. $4.95

IN JUNE THE VOTERS of California will decide by referendum the fate of the proposed Peripheral Canal, which would divert water from the Sacramento River Delta to satisfy southern California's "need" for increased water supplies. The canal is the centerpiece of one of California's most heated political battles, pitting the agricultural industry against city dwellers, state officials, recreationists and environmentalists. The proposed 43-mile-long ditch would deliver water from the Sacramento River to the San Joaquin Valley. Environmentalists estimate it would cost about $23 billion.

The California legislature approved the canal in 1980, but a massive petition campaign mandated a statewide referendum on the question. The battle has even divided conservationists; some argue that the proposed paper guarantees will be worthless to protect marshes and wetlands, others that the Peripheral Canal is the only way of staving off other environmental degradations that would be worse.

Dennis's book opposes the canal: a cover line announces "The $23 billion boondoggle—and how to stop it!" But the work is impressively documented. The author has done his homework, and his reasoning is persuasive and accessible to the ordinary voter. *Water & Power* is, so far, the best work published on this historic and sensitive issue, which may well determine the environmental future of California. —DG

History of a Bluegrass Activist

ROBERT IRWIN

When Kentucky farmer and horse breeder Carroll Tichenor decided to join the Sierra Club in 1965, he didn't realize he was about to set out on the "sixteen most satisfying and active years" of his life so far.

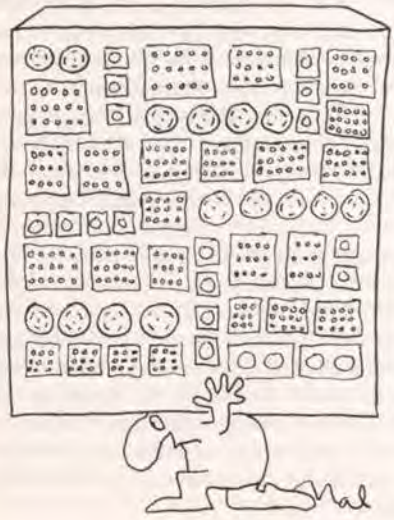
As far back as he can remember, he says, he had a love of nature. He recalls his boyhood fascination with blue racers and cow snakes, skinks that shed their tails when chased, the call of the elusive bobwhite, the wildflower displays and all the other natural things on his parents' western Kentucky farm. Despite that background, he confesses he joined so that he and his family could take part in a national outing and get some wilderness and backpacking experience. But they had to wait a year for an outing because of the great demand for space. By 1966 he, his wife Doris, daughter Karen and son Caylen managed to get on a Wilderness Threshold trip to Barney Lake in the Sierra Nevada. That was to be their sole Sierra Club experience—or so they thought.

Not long after that outing a tall, rugged-looking young man stopped at the Tichenor farm south of Lexington. He was Jim Kowalsky, a dedicated Sierra Club missionary who had recently moved from Wisconsin to teach at Union College in Barbourville, near the Tennessee line. He was the first Sierra Club member the Tichenors had ever seen or even heard of in Kentucky. Working from a list of Club members in the state—all 28 of them—Kowalsky was trying to stir interest in forming a Kentucky Group. It would offer outings and work on the state's conservation issues, he said, as did his old chapter, John Muir.

Before Tichenor knew what happened, he found himself teaming up with his visitor. Soon they had contacted all the other members in the state. In the meantime, the sprawling Great Lakes Chapter (which then included Kentucky) sent in help, both people and funds. Progress was swift. On a cold evening in the late fall of 1966 an organizational meeting was held in Lexington; 26 of the 28 members showed up. The Kentucky Group was in business. In little more than two years, on January 1, 1969, the Kentucky Group and all Sierrans in Tennessee became the 350-member Cumberland Chapter.

The prechapter days were exciting times for Tichenor, Kowalsky and all the other Cumberland Chapter pioneers. To become a chapter, a group first must have credible outings and conservation programs. Tichenor, as the group's outings chairman, worked on the first requirement, while Group Chair Kowalsky cast about for a strong conservation issue. Tichenor had heard of a plan the Army Corps of Engineers had for a dam in his and his wife's favorite backpacking and canoeing spot, the Red River Gorge; he suggested to Kowalsky that stopping the dam could be the issue they needed. In the spring of 1967 they called a meeting, and some 60 members declared the Kentucky group's opposition to the proposed dam, which the Corps had kept out of the public eye until then. But little time was left to marshal the opposition.

Tichenor, with his dirt-farmer background—raising feed crops, cattle and thoroughbreds on his 1000 acres, as well as operating the 300-acre family farm—could talk the language of the valley's farmers, who stood to be flooded off their land. Educating the public and dealing with the media were Kowalsky's special province. One evening Tichenor caught the tail-end of a TV newscast that showed "an elderly, woodsy type" leading a protest march of hikers



Carroll Tichenor relaxing, for a change.

down a shady pathway with a flock of media people tagging along. "Why can't we try something like that?" he asked himself, so he got on the phone and asked Kowalsky the same question. When Kowalsky checked it out he found that "the woodsy type" was U.S. Supreme Court Justice William O. Douglas, who was trying to save the towpath of the historic Chesapeake and Ohio Canal along the Potomac for use as a hiking trail.

Now, how to get Douglas into the Red River Gorge? They decided to send a postcard. Unlike a letter, it would be brief, open for all his staff to see and likely to land on the justice's desk sooner. Ten days later, Douglas's acceptance came back—on a postcard. The state's media turned out in force to report on Douglas's hike up the gorge with a troop of 400 protesters.

The Red River Gorge issue and Justice Douglas's hike stirred statewide and national attention and support. As a result the Club gained flocks of members, not only from Kentucky, but also from neighboring states. Saving the gorge became the Great Lakes Chapter's top conservation issue and hastened the rapid formation of new chapters in the Midwest. It certainly provided Tichenor, Kowalsky and all of the other anti-dam, pro-gorge workers with a crash course in recruiting and organizing volunteers, getting publicity, raising money, dealing with officials, lobbying and testifying at hearings.

After the Red River Gorge dam threat had been successfully turned away, Tichenor couldn't go back to just enjoying outings. Though he and Doris continue to lead outings, chapter and Club responsibilities leave time for only one or two outings a year at best. He has served on the chapter's executive committee every year but one since 1969. He gave up his outings chair when he became chapter chair in 1971 (a post strictly limited to two years). Since then he has become increasingly involved in environmental and conservation issues, including hazards to the Ohio River from nuclear power plants; chromium released into the water by a tannery on Yellow Creek; protection of Mammoth Cave; stripmining's abuses of land and streams; and analyzing studies for RARE II and for designation of the state's wild rivers. During most of the period from 1971 through 1976, he also served as a chapter delegate to the nine-state Midwest Regional Conservation Committee.

A 1970 Sierra Club backpack trip in the Brooks Range fired him up on an issue beyond Kentucky and the Midwest—Alaska. An avid photographer, Tichenor came home with a wealth of slides from which he and Doris, who heads the home economics and community development divisions of the state's Cooperative Extension Service, developed a popular slide presentation on Alaska. Later, from 1977 through 1979, Tichenor headed the Alaska Coalition and the Club's Alaska Task Force in Kentucky.

As perhaps the state's foremost farmer/conservationist, Tichenor has been called on to speak before a wide range of audiences, including civic, environmental, farm and industry groups. Various boards concerned with state forestry, conservation and agriculture have sought his counsel or participation. His connection to farming has enhanced his effectiveness in lobbying on environmental issues in Washington, D.C., and in the state capital, Frankfort. Strangely, he says, his connection hasn't brought many other farmers to the Club, although a good number have given sub-rosa support. But his ability to understand the ordinary farmer helped to defeat a proposed dam in the Licking River Valley, one of the richest farmland areas in the state.

Tichenor has chaired the Sierra Club Council since May 1981. Now he has even less time for outings or other chapter programs. He served on the council in 1979, as a delegate from the Cumberland Chapter. The council, an advisory body to the board of directors, is made up of delegates from each of the Club's 53 chapters and is concerned primarily with the Club's organizational and internal matters, such as leadership training, dues, fundraising and membership. Tichenor chaired the council's committee on chapters and groups and became a member of the five-person executive committee in 1980.

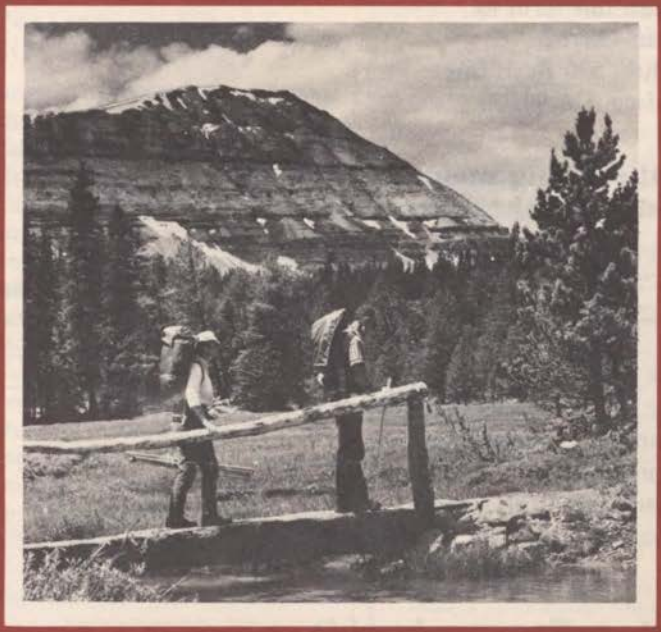
Over the years he has developed a relaxed but disciplined style, which is particularly valuable in a volunteer organization such as the Club. The way the Sierra Club works, he says, is unlike any other organization he knows of. Each member can contribute in any way he or she desires, and at any level, without feeling bossed. Unfortunately, he says, some leaders tend to forget that volunteers are not hired hands. The only pay leaders can provide is appreciation and encouragement. One of the hardest things in a loose structure such as the Club, Tichenor adds, is to avoid a breakdown in communications. Leaders need to tell members what they're saying and doing. Tichenor also urges members to communicate by letting their group or chapter leaders and newsletter editors know what's on their minds. Members should also contact their chapter's council delegate with their concerns, questions and suggestions on the national Sierra Club and its policies.

THE ENVIRONMENT AND NUCLEAR WAR: UPDATE

By now each chapter's executive committee should be preparing comments on a proposal for a national Sierra Club Committee on the Environmental Consequences of Nuclear War. A draft outlining the purposes and scope of such a body was mailed to all 53 chapters in late January by the Task Force on Environmental Effects of Military Projects, as authorized by the Club's board of directors last November. The board adopted two resolutions. The first embodied the first four points listed on page 76 of the November/December 1981 *Sierra*, asking for a halt to the nuclear arms race and a search for long-term solutions to reduce nuclear stockpiles. The second resolution deferred establishing a standing committee until the board's May 1982 meeting, by which time the task force's report would be in, along with the chapters' responses.

To develop the broadest possible Sierra Club consensus, Task Force Chair Mark

Help make a friend a member.



Since its beginning, the Sierra Club has demonstrated what can be accomplished by a committed grassroots membership. . . volunteers who give freely of their time and expertise.

You already know the special satisfaction that comes with Sierra Club membership. . .that's why we're asking you to "help make a friend a member."

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Sierra Club Membership

A way for all of us to help

Membership forms are also available elsewhere in this issue.

Palmer asks that individual members tell their chapters' executive committees and other local Club leaders what they think.

The purpose of such a committee, according to the draft, would be "to educate the Sierra Club leadership and the public on the interconnections between conservation practices and world security, and the threat of nuclear war to the environment that sustains us." Its activities would include periodic mailings of educational materials on the issue to the Club's volunteer leaders and preparation of a booklet on the environmental consequences of nuclear war, with translations into five languages. The task force emphasizes that it is *not* recommending that the board make the issue a top priority for the Club in 1982. Mark Palmer would appreciate receiving copies of any comments or suggestions. Mail them to him at 6014 College Avenue, Oakland, CA 94618.

CANADA'S SIERRANS MOVE FOR UNITY

As this issue goes to press, three preliminary steps will have been taken to prepare the way for an all-Canada Sierra Club. Last year this column pointed out (see pages 118-122 in the January/February 1981 *Sierra*) that the two Canadian chapters, Western Canada and Ontario, suffer from poor east-west communications. Also, because they focus on their own provinces, they find it difficult to deal with issues on the federal level. The first step was taken last September 5 and 6, when four easterners met in Vancouver with seven westerners to discuss mutual problems and explore the possibility of setting up an all-Canadian Regional Conservation Committee. Later they broached the subject to Club President Joe Fontaine, who agreed to present it to the board of directors at its January meeting. The board autho-

"Whatever it is, it's not native to our area."

rized a task force to work out details. Four Canadians, three delegates from neighboring U.S. RCCs (including one from Alaska), and staff people met in San Francisco in mid-February to draft a plan that will be presented to the Club's directors in May.

If a Canadian RCC is established, it should make the Sierra Club more effective in Ottawa, both with Parliament and with federal officials, according to Ron Burchell, the Ontario Chapter's delegate to the Sierra Club Council. Furthermore, he says, it should greatly improve east-west cooperation and communications. Jim Bonfonti, Western Canada's chapter chair, agrees. He adds that it should also give the Club a more prominent and clearer image in Canada. The Sierra Club still has too much of an American imprint for most Canadians, he believes. That's one reason the two Canadian chapters have not shared in the phenomenal U.S. membership growth over the past year. Ontario's membership remained at about 750, and Western Canada's hovers at slightly more than 1000. In contrast California, with its population about equal to Canada's, has more than 107,000 members.

Mike McCloskey, the Club's executive director, attributes a great part of the Club's recent net gains of more than 10,000 members a month to a very effective mailing program. But that hasn't helped Canadians much, says Bonfonti, because: (1) the messages are primarily aimed at Americans, not Canadians; 2) the months-long postal strike cut off all mail into and within Canada; and 3) Canada has no James Watt.

Bonfonti hopes the Club will be able to come up with some equally effective recruiting-by-mail drive that will appeal to Canadians. In the meantime, the two chapters have put together *The National Sierra Report*, available from either the Ontario or Western Canada Chapters.

PHOTOGRAPHY CONTEST REMINDER

Don't forget *Sierra*'s photo contest. Look for details on page 150 of the January/February issue. All entries must be postmarked by midnight April 1. Black and white categories are: the urban environment, nature, and abstracts in nature. Color categories are: wildlife, people in nature, abstracts in nature, and the meeting of land and water. The environmental statement category is open to both black and white and color. Send no more than two black and white glossies or color transparencies for each category. Winning entries will appear in the July/August *Sierra*. Send submissions to *Sierra* Photo Contest, 530 Bush Street, San Francisco, CA 94108.

ELECTION UPDATE

By the middle of March, all eligible Club members should have received their ballots for the board of directors election. Ballots must be returned to the National Election Committee and must arrive no later than noon, April 10, 1982.

Two candidates submitted sufficient signatures on petitions by December 30, 1981, to be added to the ballot: Steve Rauh and Shirley Taylor. The seven candidates selected by the Nominating Committee are, in alphabetical order: Phillip Berry, Richard Cellarius, Ann Duff, Brock Evans, Elizabeth Meyer, Howard Saxion and Sanford Tepfer. Five of the nine will be elected to serve on the board.

Election results will be announced at the end of April.

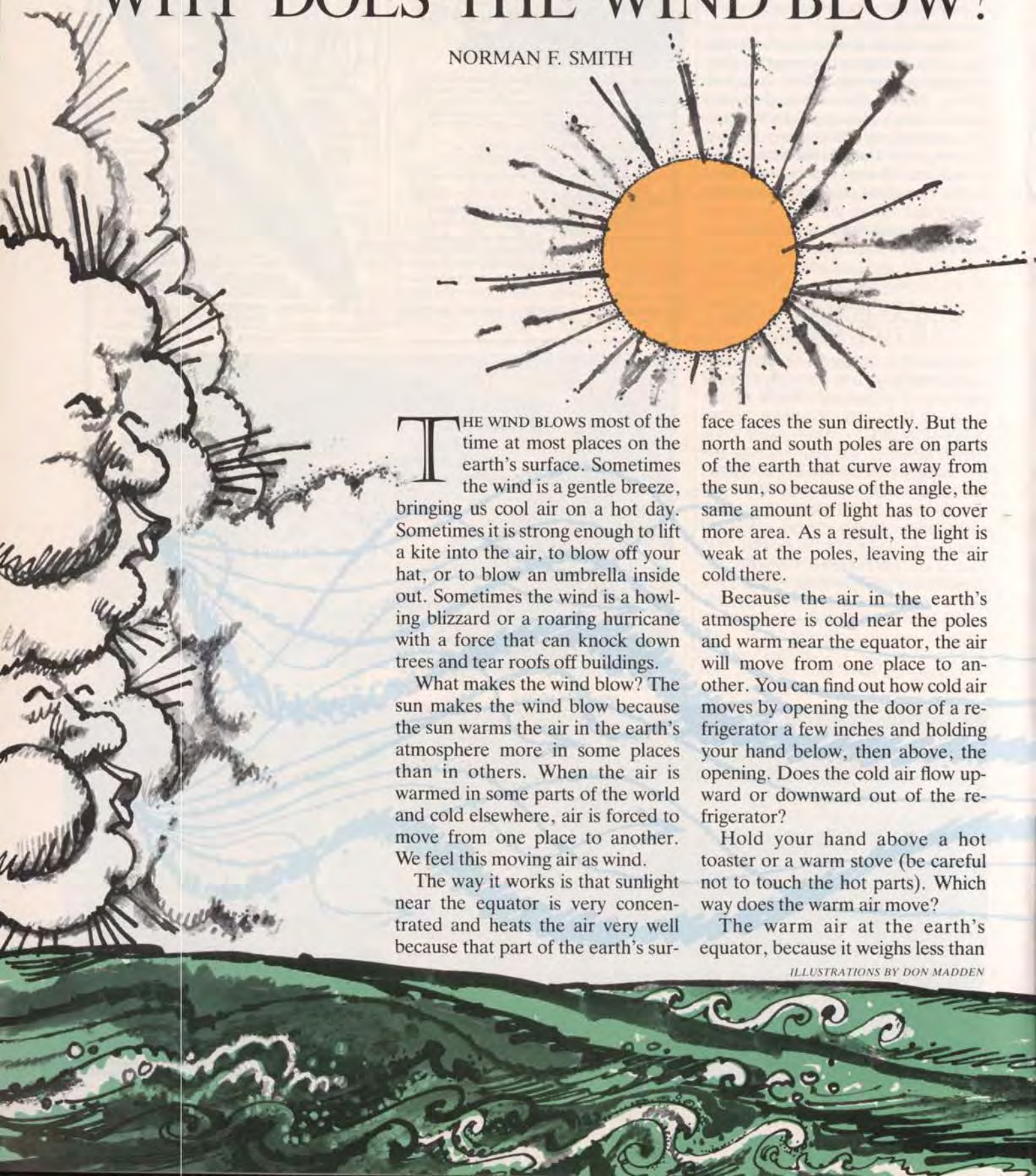
ANNUAL DINNER TO BE HELD ON MAY DAY

The Sierra Club Annual Dinner will be held on Saturday May 1 at A. Sabella's, Taylor at Jefferson on Fisherman's Wharf in San Francisco. The social hour will begin at 6:30, dinner an hour later. After dinner Louis Harris, author of The Harris Survey and noted analyst of public opinion, will speak; and annual honors and awards will be presented. Tickets are $15 each. Please send your check and a self-addressed, stamped envelope to: TICKETS, Sierra Club, 530 Bush Street, San Francisco, CA 94108. Requests should be received by Friday, April 23. For further information, call Linda Hubbard at (415) 981-8634, extension 500. □

For Younger Readers

WHY DOES THE WIND BLOW?

NORMAN F. SMITH



THE WIND BLOWS most of the time at most places on the earth's surface. Sometimes the wind is a gentle breeze, bringing us cool air on a hot day. Sometimes it is strong enough to lift a kite into the air, to blow off your hat, or to blow an umbrella inside out. Sometimes the wind is a howling blizzard or a roaring hurricane with a force that can knock down trees and tear roofs off buildings.

What makes the wind blow? The sun makes the wind blow because the sun warms the air in the earth's atmosphere more in some places than in others. When the air is warmed in some parts of the world and cold elsewhere, air is forced to move from one place to another. We feel this moving air as wind.

The way it works is that sunlight near the equator is very concentrated and heats the air very well because that part of the earth's surface faces the sun directly. But the north and south poles are on parts of the earth that curve away from the sun, so because of the angle, the same amount of light has to cover more area. As a result, the light is weak at the poles, leaving the air cold there.

Because the air in the earth's atmosphere is cold near the poles and warm near the equator, the air will move from one place to another. You can find out how cold air moves by opening the door of a refrigerator a few inches and holding your hand below, then above, the opening. Does the cold air flow upward or downward out of the refrigerator?

Hold your hand above a hot toaster or a warm stove (be careful not to touch the hot parts). Which way does the warm air move?

The warm air at the earth's equator, because it weighs less than

ILLUSTRATIONS BY DON MADDEN

the cool air around it, rises in the atmosphere like the air above a warm stove. The cool air at the earth's poles does just the opposite. Because this air is heavier than the air around it, it sinks downward in the atmosphere like the cold air flowing out of an open refrigerator. The cold air moving downward at the poles spreads over the earth toward the equator, while the warm air rising at the equator flows in the other direction, toward the poles.

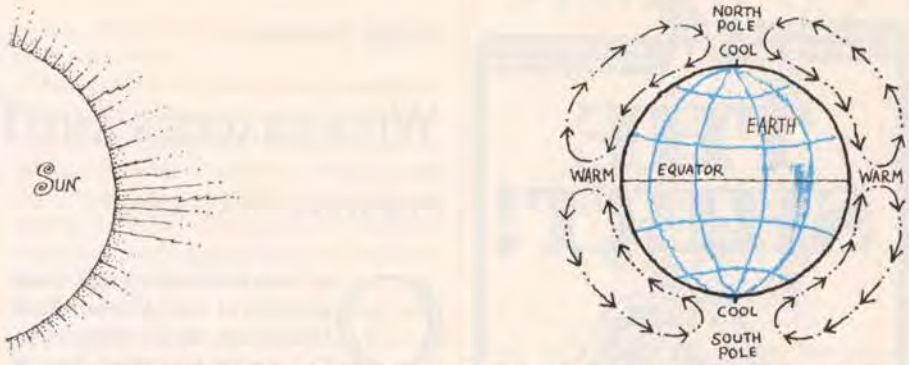
If the earth were *not* rotating, the air movements between the poles and the equator of the earth would look like the drawing at the top of the page.

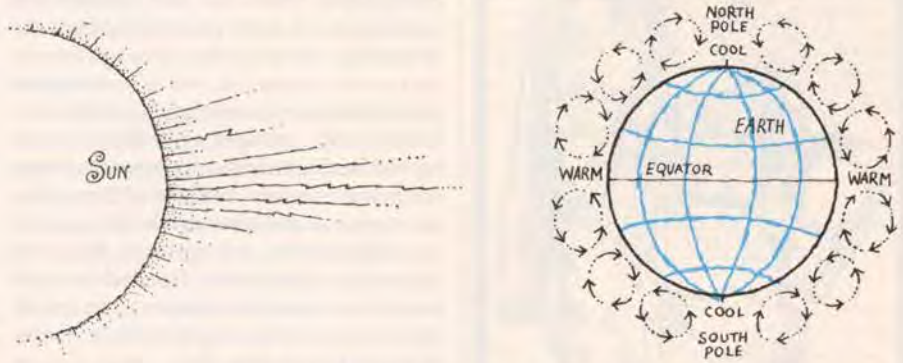
But the earth *does* rotate, and the rotation causes these wind patterns to break up into three whirling cells between the equator and each pole that look like the middle drawing.

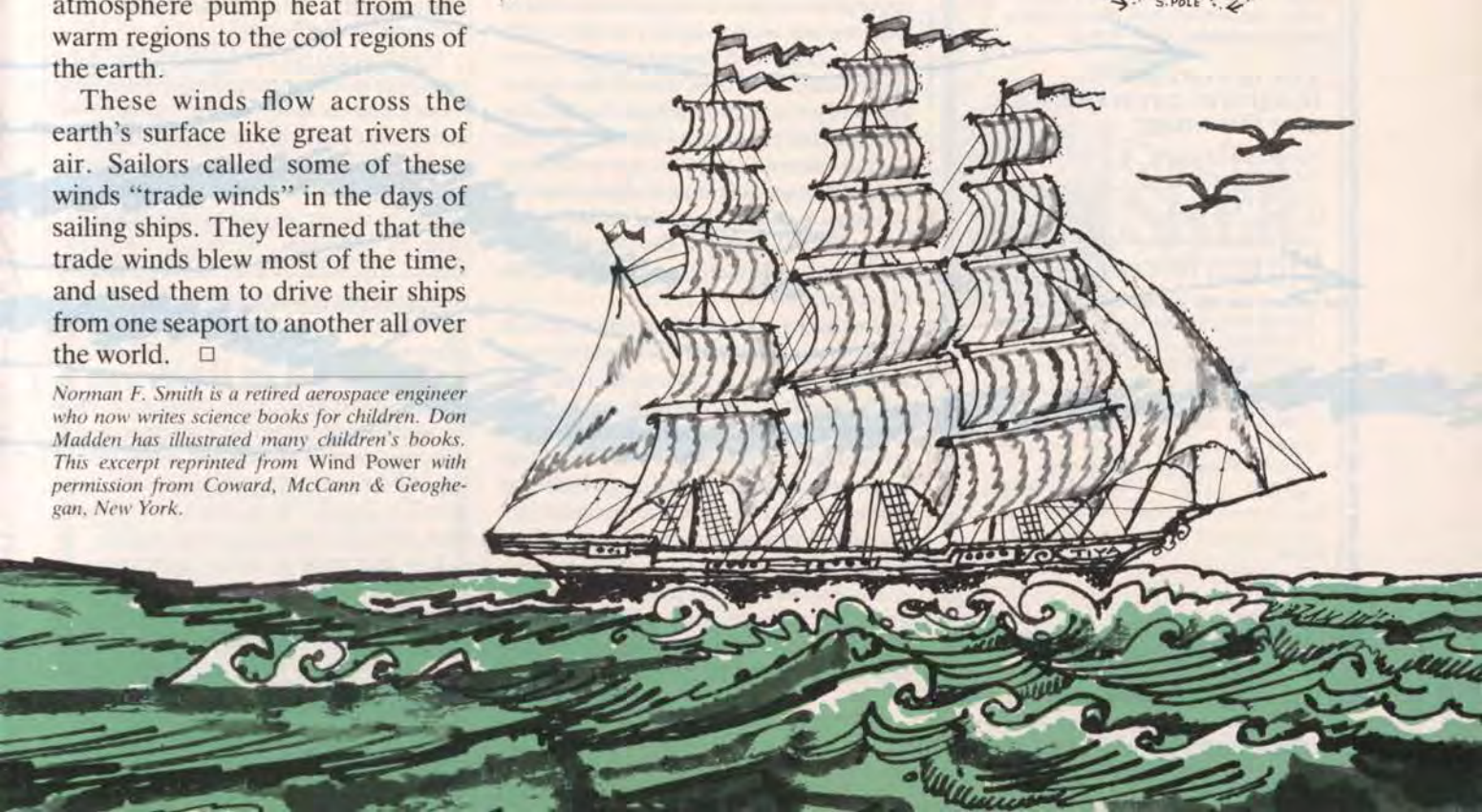
Heat is carried from one cell to the next from the warm equatorial region to the cooler regions toward the pole. The earth's rotation also twists the whirling cells so that the flow of the wind over the ground and over the ocean's surface looks like the bottom drawing.

Like a giant pump, powered by the sun, the winds in the earth's atmosphere pump heat from the warm regions to the cool regions of the earth.

These winds flow across the earth's surface like great rivers of air. Sailors called some of these winds "trade winds" in the days of sailing ships. They learned that the trade winds blew most of the time, and used them to drive their ships from one seaport to another all over the world. □







Norman F. Smith is a retired aerospace engineer who now writes science books for children. Don Madden has illustrated many children's books. This excerpt reprinted from Wind Power *with permission from Coward, McCann & Geoghegan, New York.*

GUEST OPINION

WINNEBAGOES AND BACKPACKERS

CLIFTON C. HAWKINS

ONE AUTUMN, when I was backpacking in the Glacier Peak Wilderness, an old friend startled me by suggesting that we backpackers, with all our ultramodern equipment, are really no different from the Winnebago owners who converge on our parks every season. We, too, are just tourists passing through an area, gaping at the view, usually congregating in a few areas, unwilling and unable to deal with our surroundings on their own terms, and instead depending on expensive and elaborate technology for our appreciation and survival. With our lightweight packframes, freeze-dried delicacies and breathable rainwear, we are far closer in spirit to our neighbor the Winnebago owner than to John Muir.

My friend's viewpoint ignores some important considerations—backpackers have minimal impact compared with recreational vehicle users, we do experience the wilderness more directly and we must keep in good physical shape, at least to some minimal extent.

Yet there is something to be said for the view that many backpackers' attitudes resemble those of RV owners. Too often we hike through areas as tourists, perhaps admiring the view, but having neither appropriate respect for or understanding of what we are seeing—never, in fact, really seeing it at all. This limited perception and appreciation can be as true of the experienced hiker as of the weekend backpacker who totes beer and a radio. We often seem to use the wilderness to prove our endurance, rather than learning from it. How often do we measure our trips by miles walked or feet ascended? "I walked the Pacific Crest Trail," we say proudly, or "I did the John Muir Trail."

Backpacking is certainly a legitimate form of exercise—many of us enjoy getting out in beautiful scenery and pure air and "just ripping," exhilarated by the blood coursing through our veins, our hearts pounding, our bodies really working. No doubt we benefit from the quasi-solitude and unspoiled vistas that allow us to rethink our problems in a serene and inspiring environment or to relax with old friends.

But if we are to be more than "Winnebago backpackers," our wilderness experience can and should be more. We can also enjoy just sitting under a tree, by a lake or stream or just about anywhere, and abandoning ourselves to a feeling of oneness with our surroundings until the distinction between us and the lakes and forests and peaks and their inhabitants disappears, if only for a moment. If this sensation is fleeting, its impact is enduring, and we carry its influences forever.

One technique to help encourage the sensation is to turn on your senses one by one. To do it, wander off the trail, away from the points where people congregate, and make yourself comfortable. Then really concentrate on using your senses, one at a time, until you attain a direct, overwhelming impression of the totality of the environment and are able to immerse yourself in it.

First, see the things around you—not just the spectacular vistas, but also the plants, soils and creatures that surround you. Don't settle for just an overall impression. Look one by one at the green moss, the funny-looking bird, the towering peak. Notice the different shades of green in the moss and the way it grows; the differences in color on the bird; the configurations of the peak's vegetation, its rocks, its pattern of sunlight and shadow, the crevices where water runs down. Look not simply at the beautiful lake, but at the reflections in the water, the wind-driven ripples, the lines of the shore, the surrounding vegetation.

If we stay put for even a short time, long enough to see the surroundings both in their totality and in many of their details, we notice something very important: this marvelous picture is continually changing while we watch. It is becoming something else minute by minute, season by season, millennium by millennium. We can go on an extended trip without ever moving, just by staying in one place watching the constant and kaleidoscopic changes, some subtle, some dramatic.

That experience will probably teach us more and satisfy us more completely than the usual arduous trek. Sitting near a mountain meadow can provide the same kind of experience as floating gently down a slow stream in a canoe. We can let the world come to us, if we are willing to go to it in spirit.

It is also good to survey each scene or object from different angles. Looking at a single tree from a ridge above, while standing in front of it, and while lying beneath it gives us different impressions that, com-

bined, may in some small measure approximate the reality.

But seeing is only part of the experience. We can also sensitize ourselves to the sounds around us, consciously trying to hear as much as possible. There are so many sounds that blend into one undifferentiated murmur if we aren't paying close attention—small but sweet sounds such as insects or birds singing, leaves or pine cones falling, wind-swept grasses brushing against each other and the earth. Some sounds become overwhelming—trees rustling, water gushing, distant rocks or snow sliding. But no sound is a single one at all, but instead is part of a symphony emanating from different locations.

Listening can tell us a great deal about what is happening around us and, like our visual impressions, what we hear always changes. The longer we sit and listen, the more we hear, not only because we are becoming more attuned and aware, but also because there is a continual influx of new sounds. If we are alert, we can hear dusk and dawn arriving just as surely as we can see them coming.

We can do the same with smell and touch and, to the extent possible, with taste. It is more difficult to gather a range of these sensations while sitting in one place, but we can wander a bit and run fingers over the barks and grasses, crumble the soils, splash in the water, feel the wind or even venture into the rain to be out in the rain instead of inside a tent. All these natural events and living things have their own distinctive smells, tastes and textures that are as much a part of them as their appearance, providing us the opportunity to learn about them on different levels. More than the obvious flowers can delight our noses.

But important as it may be to get in touch with our senses, that is only the beginning of what can be a life-changing experience. Regardless of how long we sit and watch, we cannot really understand or appreciate what is happening around us without a background of information that both informs us about conditions and situations that temporary observation could not, and also sharpens our abilities to reason out what is happening and to find relationships that the untrained mind would never notice.

For example, when we go either into high country or into foothills, we see spectacular geological formations whose beauty is enhanced if we understand how they came to be, what forces are even now changing them and what the configurations have been in the past and might well become in the future. When we see a lake, meadow, stream or granite face, we can see them not merely as physical objects of great beauty, but as integral parts of an ecosystem relating to and

affecting everything around them.

Noticing such relationships provides an inexhaustible source of intellectual pleasure that can divert and exhilarate us whether we are walking or standing still. When we ascend from 6000 to 12,000 feet, we travel through many distinct ecosystems, each incalculably complicated in its interactions both within itself and with the systems that border it. The trees grow thinner and less frequent, but they also change in species. The surrounding flora and fauna also change, partly because of their intricate interdependence with the trees and partly because of the different climatic conditions at different elevations.

Figuring out why certain grasses and trees go together and how animal species at different levels interact with them provides endless enjoyment and challenge. Observe two marshes or meadows at the same elevation, and notice first their differences and then the underlying similarities that make them different from marshes and meadows at a different elevation. It can be a remarkable experience, as can seeing how the marsh slowly but surely transforms itself into a meadow and then into a forest. In an instant we can see the progression of the millenia.

The more we know about plants, rocks, land and water, the more we really see them. Even the ability to identify what we see helps us to perceive. If, instead of merely memorizing names, we learn properties and structures and become able to learn about a plant from its location and structure, we see even more. If we learn how various plants fit into the total picture, what effects they have on their surroundings and what conditions nurture them, we begin to arrive at a real sense of what we are seeing. We find significance and beauty in details we would have been oblivious to before. When we become really adept, we can see part of a habitat, make an accurate surmise about other parts, and know what else to expect there and where to find it.

Acquiring an understanding of the environment not only helps us appreciate the areas we frequent but also lets us take a real joy in areas we wouldn't have liked before. We begin to see the beauty in every ecosystem, the untold treasures each offers us at no cost except learning to appreciate it.

As a consequence, when we have time to backpack, we may not always choose spectacular spots that will be almost as glutted with Winnebago backpackers as Yosemite Valley is with recreational vehicles. We may instead go to see the magnificent beauty in all sorts of unexpected and out-of-the-way places. □

Clifton C. Hawkins is a freelance writer who regularly leads backpacking and canoe trips.

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