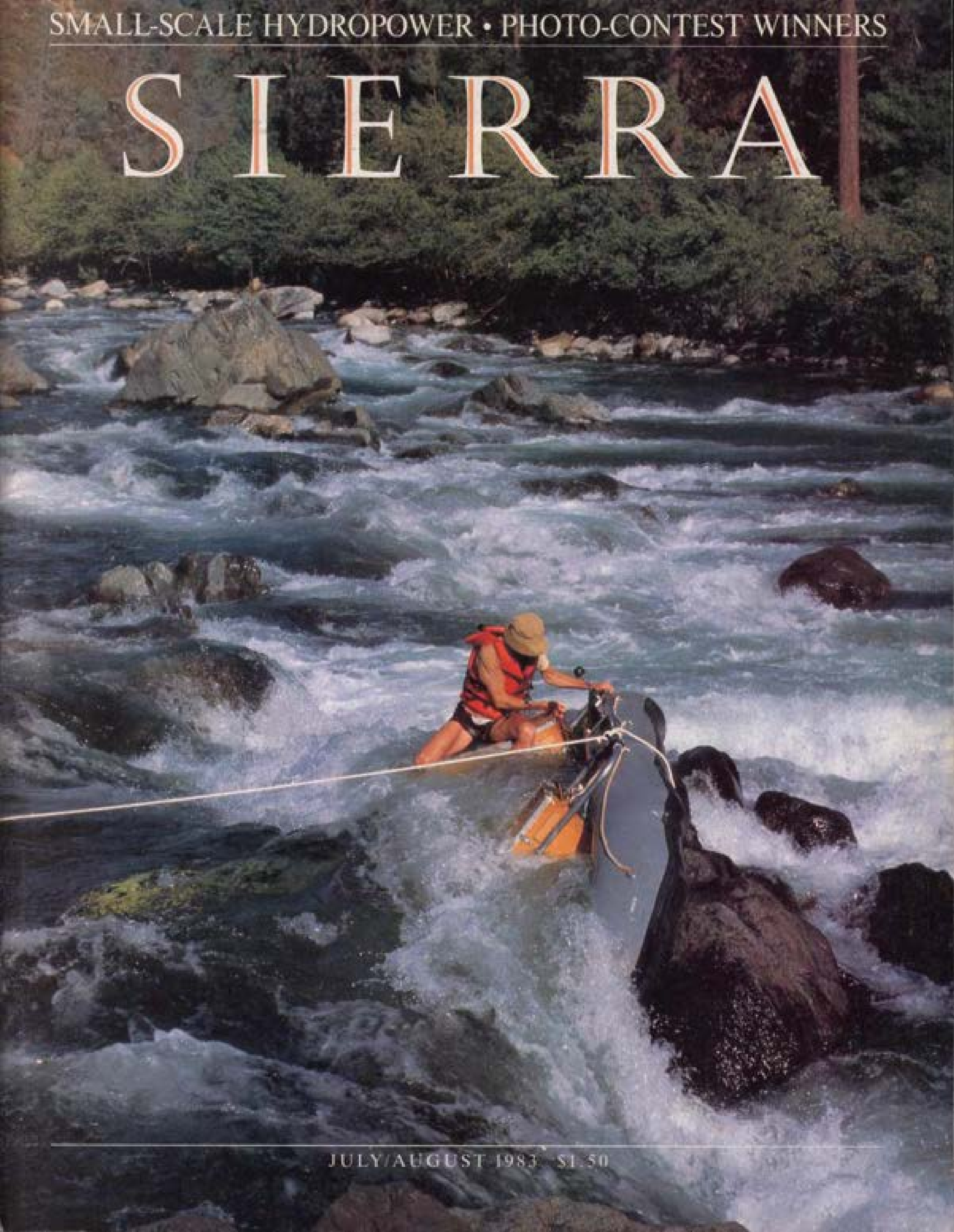
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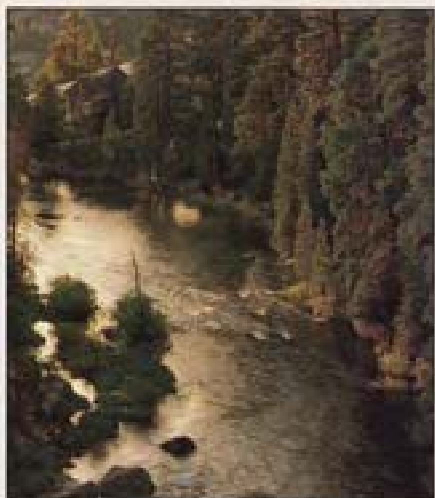

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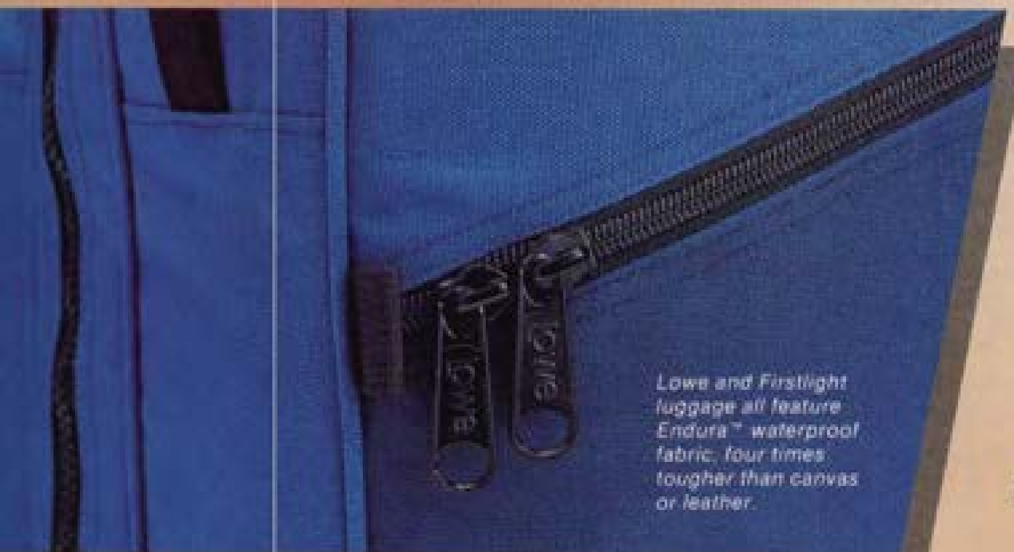

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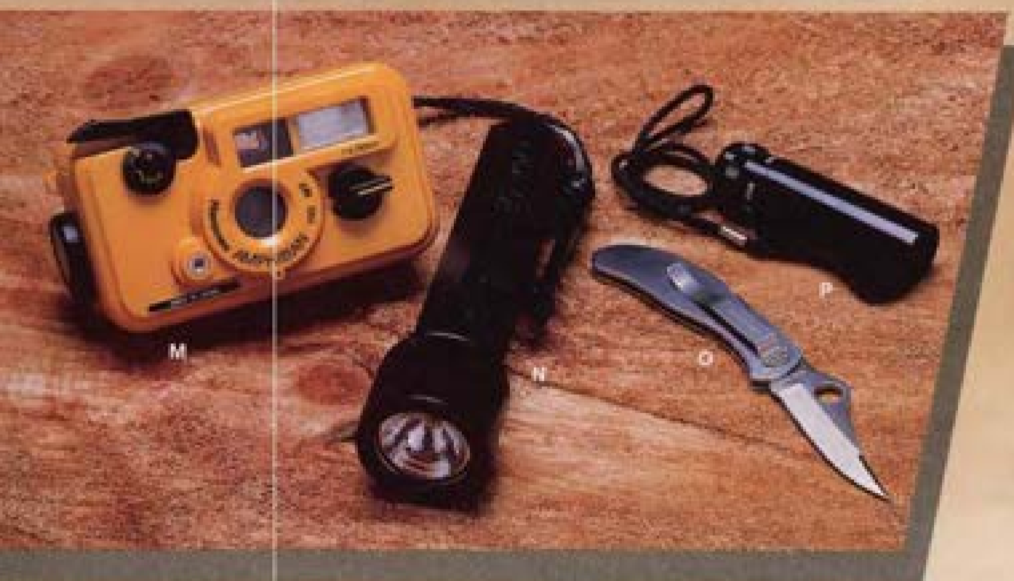

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THE HOT-STOVE LEAGUE

Ted Kerasote's primer on backpacking stoves (May/June, 1983) should help people decide which type of stove suits their needs. However, he should not have neglected to mention alcohol stoves.

I have used my Optimus alcohol stove three or four times a year for 10 years now, in temperatures from zero to 100 degrees, elevations from sea level to 14,000 feet, with wind, water, and snow to complement those extremes. It has served me faithfully and noiselessly. There are no spare parts to worry about and nothing to go wrong. The slower heating time is largely offset by the alcohol stove's ease of lighting, reliability, and better windscreen, particularly in winter. Finally, the windscreen system and stability of the stove/cook-kit combination are unequalled by other stoves.

Harold A. Schuck
Cincinnati, Ohio

How can a primer on backpacking stoves fail to mention our company's "Sierra" Zip Ztove? The "Sierra" model weighs only one pound, yet it will boil a quart of water in 195 seconds, according to *Outdoor Life* magazine. This compares quite favorably with competing models such as the Coleman Peak 1 (270 seconds) and the MSR Firefly (which costs twice as much as the "Sierra" but will boil your four cups of water only 15 seconds faster).

Fred W. Hottenroth
President, ZZ Corp.
Los Alamitos, Calif.

ALTERNATIVE TO IRRIGATION

I enjoyed Bruce Stokes' article, "Bread and Water: Irrigation Policies and Politics" (March/April, 1983). If we are really interested in helping the poor farmer, though, irrigation schemes might not be the best approach. As an agriculture worker in the Third World for many years, I've seen most irrigation water flow into the fields of the larger landholders, who have political clout.

I believe we could stretch our development dollar further through breeding programs geared toward crop genotypes that perform well under dry-land conditions. This is a form of aid that could be readily adopted by the peasant farmer without causing political upheaval.

William Schillinger
Davis, Calif.

THE ULTIMATE ENVIRONMENTAL THREAT

I was pleased to read John Birks' article "Darkness at Noon: The Environmental Effects of Nuclear War" (May/June, 1983).

It *is* imperative that all Sierra Club members become educated on this issue. Thus far, the strongest spokesmen for the continuation of life on this planet are physicians and the Catholic bishops. It is time we as a group also work toward the resolution of this problem.

The prospect of nuclear war is such a devastating topic for most of us that we would rather leave its resolution to someone else. In order to bring about a shift in the direction we are headed, each and every one of us must realize that the time is past when the human race can risk war as a method of settling differences. We must all hold forth a positive vision of the future, a future in which we cooperate and negotiate in a spirit of goodwill for the benefit of the whole earth.

Nancy Turley
Palo Alto, Calif.

THANKS FOR TREK TIPS

I found "Planning Tips for the Long-Distance Hiker" by David Green (May/June, 1983) both enjoyable and informative. Although I'm not planning any long-distance treks myself in the near future, I feel that much of his advice may also be applied to shorter outings.

Sondra Bobroff
Ypsilanti, Mich.

A HIT OR A MICH.?

I was very surprised to see a Mississippi congressman given a 100-percent rating by the League of Conservation Voters (*News*, May/June, 1983). I was even more surprised to see two Mississippi senators credited with 92-percent records. What especially sur-

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prised me is that I know of all three. Representative Howard Wolpe is a Democrat from Lansing, while Democratic Senators Don Riegle and Carl Levin are from Flint and Detroit, respectively. Unless things have changed drastically since my last visit home, all these cities are in Michigan.

As a native Michigander proud of my former home state's commitment to the environment, I ask that you give credit where it's due. (I certainly can't be proud of the congressional delegation from my present home!)

Kim Clegg
Salt Lake City, Utah

Thanks to you and the rest of the Michiganders who wrote us to set the record straight. Another alert reader pointed out that Rep. Michael Barnes (D), mentioned in the same story, is from Maryland, not Massachusetts.

User Fees and the TVA

"Putting a Price on the Ocoee" by Nancy Michel (May/June, 1983) points to an onerous bias on the part of the Tennessee Valley Authority in its management of the natural resources of the Tennessee Valley.

The position of the Ocoee River Council (a coalition of private recreationists and outfitters) is that any "user fees" associated with whitewater and other recreational opportunities should pay for maintenance of recreation facilities; they should not be used to reimburse TVA for lost power. TVA's position—that the Ocoee No. 2 hydroelectric project is a "single-purpose" project for power generation only—subordinates all environmental mitigation to the economies of power production.

TVA's bias is exemplified by its lack of interest in collecting "user fees" to pay for power losses on the Tennessee Tombigbee waterway. Water diverted out of the Tennessee Valley into Tenn-Tom will bypass generators at Pickwick and Kentucky lakes. Losses are expected to cost ratepayers some $1.5 million annually. TVA excuses these losses, claiming that navigation is a primary purpose of the agency. It is illogical to argue that a similar case cannot be made for economically viable uses of a navigable tributary stream such as the Ocoee.

The TVA board member quoted by Michel also failed to point out that the Ocoee No. 2 project, with its 4.5-mile-long wooden flume line, is being rebuilt to qualify for the National Register of Historic Places at a cost currently estimated to total $29 million. While TVA's attention to history may be commendable, we believe that recreation and mitigation of environmental damage deserve equal status.

If TVA were to forego just 5 percent of the hydropower generated by its "single-purpose" tributary projects, it would help to stabilize lake levels on these streams and provide quality recreation during the summer months. This would amount to the loss of only a small fraction of the 15 percent of TVA's total annual energy production represented by hydropower generation on the Tennessee River and its tributaries. Such mitigation would certainly be less noticeable than the estimated $4 billion to $6 billion already lost on deferred or cancelled nuclear reactors.

The Ocoee is perhaps one of the more abused watersheds in the country. With 40 square miles denuded, 15 miles of its length sterile between Copper Basin and Parksville Reservoir, high siltation (due in part to mud flushed from the Ocoee No. 3 reservoir), and four power projects in the space of 95 miles, there isn't much left to cheer about—except the 4.5 miles now used for whitewater recreation.

David L. Brown
Ocoee River Council
Ocoee, Tenn.

Caveat Bicyclist

"Rocky Mountain High: A Family Pedals the Great Divide" (March/April, 1983) was an alluring story, but readers planning similar trips should bear in mind that Colorado's high mountain passes are extremely dangerous for bicyclists. These mountain roads are traveled by heavy truck traffic, trucks often driven by people inexperienced on mountain roads. It is not unusual for these rigs to careen out of control on the downhill grades of the passes; thus the presence of runaway-truck ramps and repeated warnings that trucks use low gear and that tourists not stop in hazardous areas.

Combine this heavy truck traffic with the legions of motorists more interested in scenery than safety, and the dangers for bicyclists on these often narrow roads are very real. The trip may be worth the risks, but those with children need to know the full scope of possible hazards.

Kathleene Parker
Denver, Colo.

Concerned for California

I'd like to say thanks for your article on George Deukmejian ("California's New Governor: Bad News for the Environment?") in the May/June issue. I share the concerns of those who have experienced the vast geography and delicate ecosystems that *are* California and who worry over its preservation. I do not foresee any efforts being made in the direction of preservation by Deukmejian's administration, which has already: threatened to abolish the California

Coastal Commission through budget cuts; refused to appeal a U.S. district court decision invalidating federal protection for five wild rivers in the northern part of the state; and fired five environmentally conscious lawyers from the Tahoe Regional Planning Agency, replacing them with prodevelopment appointees.

It seems that Deukmejian is willing to stay the antienvironmental course along with the Reagan administration, no matter what the cost. Must we keep being reminded of the *real* motives behind campaign statements and promises?

Sean S. Doyle
Portland, Ore.

WHY URBAN PARKS?

William E. Mankin's recent article, "Chattahoochee NRA: How Much Is Enough?" (March/April, 1983), points out that the Chattahoochee River National Recreation Area (CRNRA) is in serious trouble. If we consider what's at stake in a broader context, however, the threat to the CRNRA has a dimension not addressed in the article—the ultimate value of so-called "urban parks."

When Congress created the CRNRA in 1978, it found the natural, scenic, and recreational resources along the river to be "of special national significance." Wildlife abounds, and rare plants are common in many areas. The river supports a renowned tailwater trout fishery and supplies drinking water to a third of Georgia's residents. The park now hosts nearly 700,000 visitors each year, who enjoy a great variety of recreational pursuits. But much more important than the values within the park itself is its proximity to a major metropolitan area; it is only minutes by auto from the heart of downtown Atlanta, a city of two million.

By making the wonders of the natural world so easily accessible and conveniently enjoyable, urban-area parks like CRNRA serve as an important reminder to urban residents of the value of protecting such resources. If we ever hope to preserve an adequate heritage of the earth's wild places, and the diversity of species and other life- and spirit-sustaining resources they harbor, there must first exist a constituency that appreciates such things enough to demand their protection. In order to appreciate something enough to become a committed constituent, one must first be able to see it, touch it, feel it or experience it in some personally meaningful way. To that end, in a world of steadily increasing urbanization, urban parks are absolutely indispensable.

Patricia Dunbar
Chair, Atlanta Group
Sierra Club

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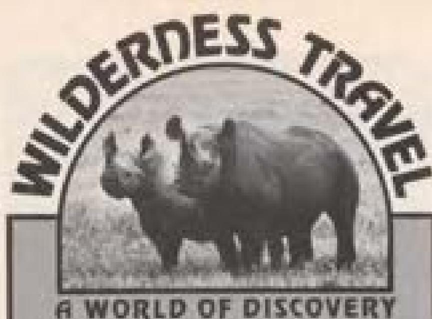

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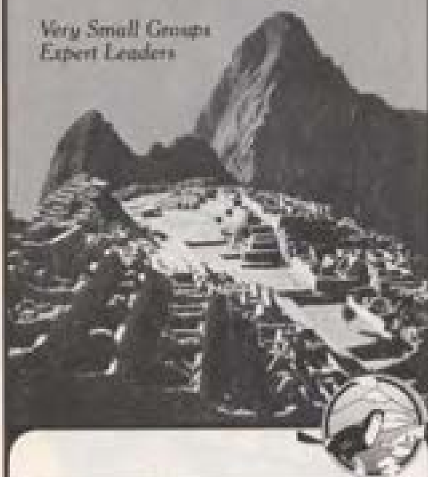

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G-O ROAD STOPPED

FOR NEARLY A DECADE, the Sierra Club has been working to protect the unique Siskiyou Mountains of Northern California. Conservationists think a significant portion of these mountains should be designated a wilderness area; such protection is included in the California Wilderness Bill passed by the House in April.

Meanwhile, Forest Service development plans continue to threaten critical portions of the Siskiyous. Among the gravest dangers to the area have been plans to harvest timber in the Blue Creek watershed, with access to be provided by the highly controversial Gasquet-Orleans Road (the G-O Road). The road has long been protested by environmentalists because its construction would endanger a fragile watershed of great importance as a salmon and steelhead spawning area. Native Americans also protested the road and the timber sales because the Blue Creek is the sacred "high country" of the Yurok, Karok, and Tolowa peoples.

Conservationists were gloomy about the prospects of stopping the G-O Road because of a series of previous legal and administrative rebuffs. But on May 25 a federal-district-court judge issued a permanent injunction halting further construction of the G-O Road and prohibiting timber harvesting in the Blue Creek drainage of the Siskiyous.

Conservationists were delighted: "Judge Weigel's ruling represents a sweeping victory for the coalition of Native Americans and environmentalists that has sought protection for this fragile and unique area," said Michael Sherwood, an attorney with the Sierra Club Legal Defense Fund, which argued the case for the Sierra Club and other environmental plaintiffs.

Weigel found that the Forest Service plan to construct the remaining segment of the G-O Road—the Chimney Rock Section—and to log Blue Creek was in violation of the First Amendment to the Constitution, the National Environmental Policy Act, the Wilderness Act, the Clean Water Act, and the Administrative Procedures Act. The judge set stringent conditions that would have to be met before the injunction prohibiting logging in Blue Creek could be lifted. These include a new Environmental Impact Statement and mitigation of damage to fisheries.

HOUSE VOTES MORE MONEY FOR E.P.A.

The House of Representatives, by a vote of 200 to 167, has adopted an amendment by Representative Tim Wirth (D-Colo.) to increase the budget for the Environmental Protection Agency by $220 million. The vote came on consideration of the Appropriations Bill for HUD & Independent Agencies, which included only a slight increase over last year's spending level.

The Wirth amendment provides the EPA with an operating budget of $1.3 billion, which was its level in FY 1981. The Budget Resolution adopted by the Senate, which will provide that body with a ceiling for its upcoming consideration of this appropriations bill, would allow a similar funding level; so there is hope that the agency will end up with sufficient funds to make some progress toward its goal of cleaning up the environment.

CLUB TESTIFIES ON SODBUSTER BILL

"Enactment of Senator Armstrong's Sodbuster Bill will prevent the plowing of many acres of grassland and will prevent some of the air and water pollution that will surely occur if more grassland acres are put into cropland," testified Bob Warrick, Sierra Club Northern Plains Regional Vice President, at a Senate hearing.

The Senate Agriculture Committee was considering S. 633 by Senator William Armstrong (R-Colo.), which would deny such economic incentives as government price supports, crop insurance, disaster pay-

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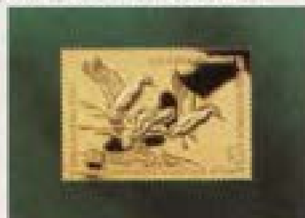
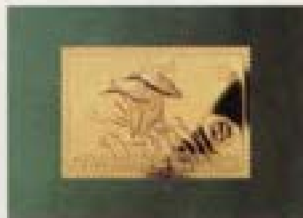
The 1950 "Trumpeter Swans" by Walter Weber is a majestic design by an artist whose work for the National Geographic Society has delighted millions.

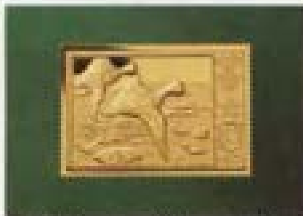


The 1971 "Cinnamon Teal" by Maynard Reece is popular not only for its design but also because this artist has created an unprecedented five Duck Stamps.

The 1979 "Green-Wing Teal" by Ken Michaelsen shows the artist at the height of his powers. It established him as one of the most gifted wildlife artists of our time.



The 1980 "Black Ducks" by Francis L. Jaques is among the rarest issues in the series. Its design is regarded as one of the most powerful on any Duck Stamp.



The 1949 "American Goldeneyes" by Roger Preuss, who has earned world-wide critical acclaim. He was the youngest artist ever chosen to design a Duck Stamp.

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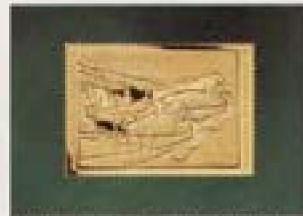

The 1960 "Redheads" by John A. Ruthven is a favorite of sportsmen and collectors, who admire it both for its artistic merit and for its mood of tranquility.

The 1934 "Mallards Dropping In" by Jay N. Darling is the historic first Duck Stamp issue, designed by the legendary artist who originated the Duck Stamp idea.

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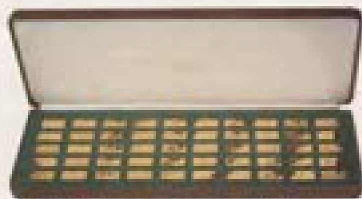

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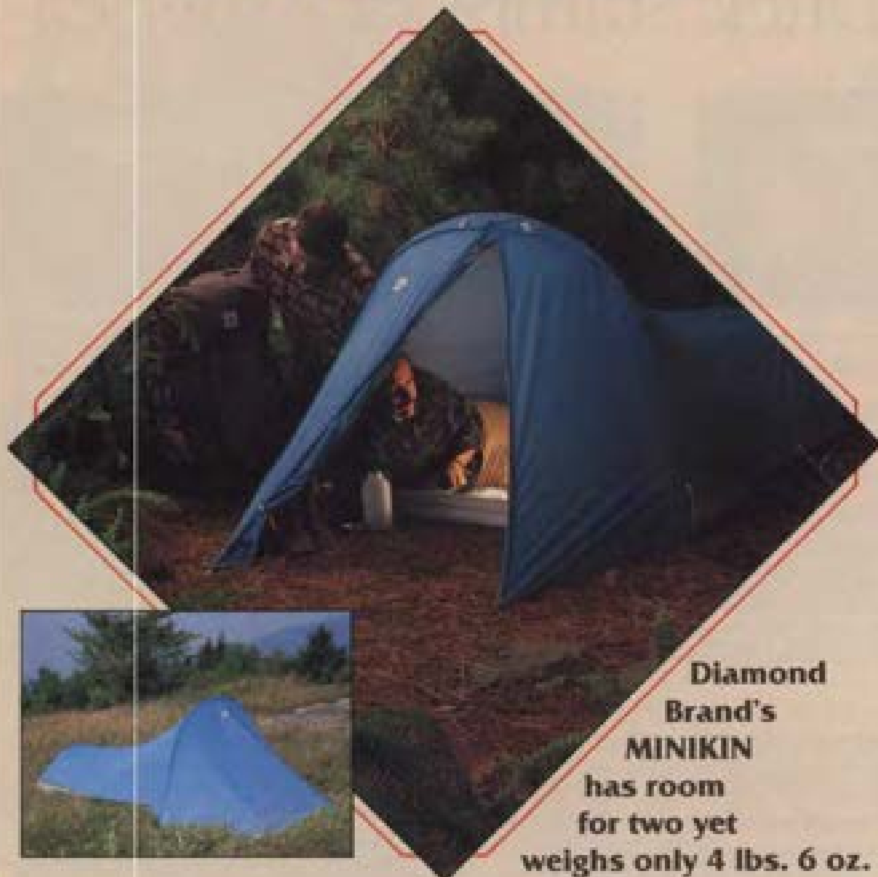

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According to the U.S. Soil Conservation Service, fragile grasslands are being plowed at an alarming rate. In the Northern and Southern Plains and the Rocky Mountain region there are 248 million acres of such highly erodible lands with the potential for conversion into cropland. The service estimates that erosion is resulting in the loss of 5 billion tons of topsoil each year.

Representative Hank Brown (D-Colo.) has introduced a companion bill in the House, H.R. 1077, but no hearing dates have yet been set for it. Concerned readers can urge their representative and senators to support these measures.

CALIFORNIA WILDERNESS CLEARS HOUSE

By an overwhelming 297-to-96 vote, the House of Representatives passed the 2.3-million-acre California Wilderness Act on April 12, only 48 hours after the death of Representative Phillip Burton, its principal champion.

As passed, H.R. 1437 is virtually identical to similar bills that passed the House in the 96th and 97th Congresses. Both died in the Senate because of the opposition of former California Senator S. I. Hayakawa (R).

Amendments to weaken the bill or to delete areas from it were defeated by the House before passage.

In the Senate, Alan Cranston (D-Calif.) has introduced S. 5, a bill very similar to H.R. 1437. California's new senator, Pete Wilson (R), has not yet taken a position on the legislation, and concerned readers in that state should be urging him to support the House-passed bill. (Address: Senate Office Building, Washington, DC 20510.)

MONO MONUMENT BILLS INTRODUCED

Nearly 100 witnesses testified at field hearings held in late March in the lakeside town of Lee Vining, Calif., on legislation that would establish Mono Lake National Monument. Representative Richard Lehman (D), whose district includes the area, testified in favor of H.R. 1341, as did the Sierra Club and many area residents. The Los Angeles Department of Water & Power, which has been diverting water from nearby streams that supply Mono Lake, asked for postponement of the bill's consideration.

The water diversions from Mono have resulted in a drop in water level, increased

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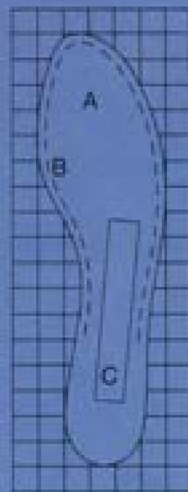

The thickness of the molded Asoflex insole is graduated to provide the optimum stiffness and flex pattern for each individual size, an important breakthrough in hiking boot comfort. An integral steel shank (C) provides longitudinal stability.

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salinity, and a loss of wildlife, particularly of the California gulls that breed at the lake.

Senator Alan Cranston (D-Calif.) has introduced an equivalent to the Lehman bill in the Senate, S. 1331.

Both bills would designate the land surrounding the lake and the nearby volcanic craters as a monument to be managed by the U.S. Forest Service. They would also authorize two studies, one on the use of Mono Lake water by the City of Los Angeles and the cost of alternatives, and the other to evaluate the water level needed to sustain the lake's wildlife populations.

Concerned readers can write their representative and senators in support of the Mono Lake Monument bills.

HERBICIDE ISSUE COMES TO A HEAD

Just as the U.S. Forest Service was about to begin its spring spraying season, a unanimous ruling by the Ninth Circuit Court in San Francisco stopped it, at least for the time being, from aerial application of 2,4-D or any other herbicide in any national forest in California. The decision was in response to an appeal filed by the Sierra Club Legal Defense Fund on behalf of the Club and two citizens' groups in Northern California.

In response to growing public concern about the effects of herbicides on human health, Representative James Weaver (D-Ore.) has introduced legislation to restrict the use of phenoxy herbicides. The bill, H.R. 2799, would prohibit the spraying of these herbicides on national-forest and BLM lands unless the chemicals are proven safe and local governments agree to the spraying.

The Sierra Club has just published a book about the spraying of phenoxy herbicides, *A Bitter Fog: Herbicides and Human Rights*, by Carol Van Strum (Sierra Club Books, $14.95).

WATT'S COAL LEASES UNDER FIRE

Interior Secretary James Watt is leasing huge reserves of federal coal to industry at "fire sale" prices, according to a report issued by the House Appropriations Committee. The report charges that Watt is leasing Western coal without regard to its fair market value, and despite Interior Department concern over a presale leak of important bidding information.

Ignoring the criticism, the department has announced a proposed sale of 10 billion tons of coal in FY 1984—more than five times the amount the Carter administration had

Photo: Jim Corwin

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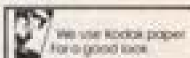

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Legislation has recently been introduced in both the House and the Senate to defer further coal leases for at least one year. S. 1297 by Senator Dale Bumpers (D-Ark.) and H.R. 3018 by Representative Morris Udall (D-Ariz.) would bar any further leasing of federal coal until the Interior Department amends its coal-leasing rules to ensure that the government receives fair market value for the leases.

Environmentalists generally hailed the proposed legislation, although the Bumpers-Udall bill does not address the controversies surrounding the department's changes in its coal-leasing regulations or its defective provisions for land use and environmental planning. Concerned readers can urge their representative and senators to support this legislation.

BLOWS AGAINST NUCLEAR POWER

In a unanimous decision that could slow the development of the already foundering nuclear-power industry, the U.S. Supreme Court upheld a 1976 California law that imposes a moratorium on new nuclear plants until state officials are satisfied that an adequate method is available for disposal of radioactive waste. The court ruled that since the Atomic Energy Act does not preclude the states' "traditional responsibility . . . for determining questions of need, reliability, [and] cost, California officials are entitled to regulate future atomic enterprises on economic grounds."

On June 9, by a margin of 3 to 2, the Nuclear Regulatory Commission voted to permit the controversial Indian Point nuclear facility near New York City to remain in operation while its emergency-preparedness plans are reviewed by federal experts. The commission had earlier announced that it would shut down the two reactors unless satisfactory plans to protect nearby residents were produced. In another action, the NRC fined the owners of the Salem, N.J., nuclear plant a record $800,000 for violations that resulted in a dangerous accident in February.

Finally, by the surprisingly large margin of 388 to 1, the House of Representatives voted to require the enactment of a cost-sharing plan before it will provide more money for the construction of the Clinch River Breeder Reactor. Even Clinch supporters voted for the provision, but it is very uncertain whether a cost-sharing formula satisfactory to everyone can be devised. This House vote may spell the beginning of the end for the controversial and outmoded reactor. □

CANYONLANDS OR NO-MAN'S-LAND?

A Proposed Nuclear-Waste Dump Threatens the Park

DEBORAH LANNER

NUCLEAR WASTE IS AN intensely controversial subject. Opponents of nuclear power often cite the possibly insoluble problem of disposing of wastes that remain toxic for very long periods of time. Proponents of nuclear power assert that the problems are merely technical and thus amenable to eventual solution. The nuclear industry correctly feels that the unresolved issues of nuclear waste are a great public-relations problem.

Pressure for a solution to these problems eventually led to the passage of a controversial bill, the National Nuclear Waste Policy Act, which was signed by President Reagan on January 7, 1983. The law established a new set of requirements for the Department of Energy's ongoing effort to find a safe geological site for the permanent disposal of high-level nuclear waste.

According to the new rules, the final repository location will be chosen from a pool of three sites after each has undergone in-depth investigation. The investigations will take three to four years and will involve drilling of exploratory mine shafts and the direct inspection of bedrock at the proposed repository depth. The pool of sites is small, and the studies will cost about $60 million each, so DOE's selection of any site for further study indicates a high degree of confidence that it will ultimately prove acceptable as a repository.

The law requires a complex series of steps. DOE must first publish an Environmental Assessment of the site, then assess the impacts of studying the site, and finally estimate the impacts of actually developing the site as a repository. Only then can DOE nominate the site for full-scale study.

There are a number of front-runners for the dubious honor of final selection as this country's first high-level nuclear-waste repository. Among them are sites in eastern Washington, Nevada, Texas, and Utah. When the Washington site's original Environmental Assessment was ruled inadequate, attention turned to the Utah site, Davis Canyon.

Public hearings on the site

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nomination have already been held in Utah at Monticello and Salt Lake City. The hearings drew large crowds and fanned the growing controversy over the proposed site. If Davis Canyon is nominated, site work could begin as early as this winter.

The canyon drains into Indian Creek, which in turn empties eventually into the Colorado River. Davis Canyon is less than a mile from the border of Canyonlands National Park. Eleven miles away, the Green and the Colorado rivers merge. Immediately adjacent to the proposed site is the Salt Creek Archeological District, listed on the National Register of Historic Sites.

GORDON ANDERSON

The Department of Energy's model nuclear-waste repository features a gigantic pile of salt (left) and, behind it, a storage area for "suspect railroad cars."

Construction of a nuclear-waste repository in Davis Canyon would mean big changes for a remote and undeveloped area. From the north, 37 miles of railroad track would weave southward through the geologically complex Canyonlands basin toward the dump. Trains hauling hundred-ton casks of spent fuel would cross the Colorado River and its tributaries at the rate of some 90,000 casks a year.

High-level nuclear wastes would also be transported by truck. A 1981 National Academy of Sciences study estimated there would be 9,000 truck shipments annually by 2004, moving on a twisting single-lane road. The repository would be open 24 hours a day, 365 days a year for 30 years.

Five hundred acres of buildings, towers, water-treatment facilities, and possibly a reprocessing plant would cover the site. Equipment operators would lower the wastes (in specially designed canisters) through a vertical shaft to a depth of 2,800 feet; from that point the materials would be distributed through tunnels radiating outward over a 2,000-acre area. The dump would use 1.5 million to 2.5 million gallons of water a day, about as much as it takes to supply a city of 5,000 people. In Utah's extremely arid climate, the source of this water is problematic.

Miners would excavate 21 million tons of salt and leave it piled at the site. When the dump shuts down, 60 percent of the salt would be used to cover the wastes and close the hole. This would be no easy process; salt would be used to backfill the chambers, passageways, and shafts. Leftover salt would be deposited somewhere in the basin, where floods or rains could gradually transport it into the already salty Colorado River.

Further impacts are likely. A power plant would be needed to provide electricity for the nuclear-waste repository; a coal-fired plant would emit air pollution into an area with pristine, "Class I" air. Another proposal would involve devoting an additional 100 acres to solar collectors.

Davis Canyon, a popular hikers' route into Canyonlands Park, is Bureau of Land Management property—but it looks and feels like the park. In fact, the canyon was included in the original 1964 park proposal. Today the only unnatural light in the basin comes from the headlights of a few late-night motorists or an occasional rancher headed home from town. A repository would be a bright and constant source of glare under the basin's night sky.

The dump would also be under tight guard. Says Terri Martin of the National Parks and Conservation Association, "Eleven hundred acres of the park will be controlled by DOE for security purposes. What will this mean for hikers? Floodlights at night? Helicopter surveillance? Body searches for backpackers?"

During the six-year construction period some 5,000 workers and their families would nearly double the population of the area. Most would settle in Moab, increasing the need for schools, housing, medical care, and water and sewage systems. After construction an estimated 870 to 1,250 people would remain to run the waste dump.

The relationship between the proposed repository and the national park poses some problems. The new nuclear-waste law requires DOE to consider—among other things—the proximity of any nuclear-waste site to parks, wildlife refuges, and other protected areas. In its proposed guidelines DOE states that it would not disqualify a site unless it were actually within a park. The Sierra Club, however, has argued that a site ought to be disqualified if it would impair the use of such an area.

Moab residents are divided on the issue of the nuclear repository. Unemployment is high in the region, and the facility would provide jobs. One Moab businessman threatened, "If we lose the repository because of the park, there'll be a campaign to get rid of the park." On the other hand, tourism is increasingly important to the region, and the repository would harm tourism. A National Park Service survey showed that, of 84 percent who felt a nuclear dump would affect future park visits, 97 percent said they would be less likely to return.

The Department of Energy takes a more hopeful view; a report by its prime contractor reads, "[A] repository which will be a temporary facility . . . and on land that will have severely limited use restrictions permanently, is quite compatible with the humanistic values for which the park was supposedly established."

For 25 years the conventional federal wisdom has been that salt deposits are safe for highly radioactive wastes because salt is apparently dry, stable, and easy to mine. Not everyone shares that opinion, however. (See "Why Salt Is the Wrong Medium for a Waste Repository," July/August, 1979.) Salt when wetted—the crystals themselves contain water—forms pockets of brine, and water under these conditions will migrate toward sources of intense heat. Nuclear-waste canisters are very hot (some 300 degrees Celsius) and take centuries to cool. Another effect of heat on salt would be to cause the salt to expand and fracture the strata above it, thereby opening pathways for groundwater to seep both into and away from a repository.

Richard Mattox, Texas Tech University geologist and an expert on the basin, thinks that "if the repository were invaded by brine, the heat would convert it to steam; this could escape to the surface through fractures or as a massive steam explosion. In either event the repository site and a large area surrounding it would be uninhabitable for thousands of years. In addition, the waters of the Colorado River would be contaminated and be unfit for any use by mankind." Mattox also notes that a brine well located north of Moab proves the presence of brine in the area.

Robert Dingman, geological consultant to the state of Utah, has further concerns. He questions DOE's failure to plan drilling inside Canyonlands Park in order to determine the direction, rate of movement, and point of emergence of groundwater. Permanent monitoring stations would have to be located in the park to detect groundwater contamination; this would be a difficult arrangement for DOE to sell to the public.

Political opposition to DOE's intentions is strong. Past experiences with open-air

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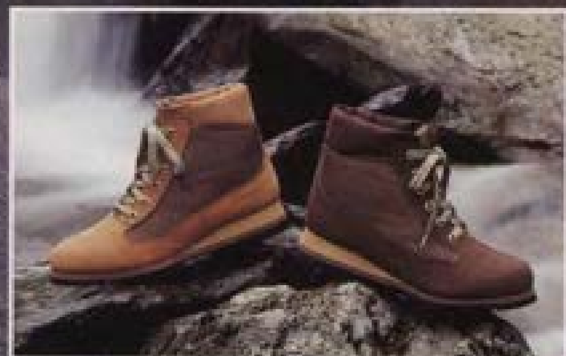

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nuclear testing and the MX missile have left Utahans feeling not a little mutinous. The proposed site's proximity to the park, the project's dependence on huge volumes of water, and the potential for contamination of the Colorado River are issues that many Utahans believe must be settled now, before millions of dollars are tossed at a scheme that can't work.

In July 1982 Governor Scott Matheson denied DOE the required state permits to begin testing activities because the department had not produced an Environmental Impact Statement. A coalition of environmental groups filed an administrative appeal challenging a BLM decision that let DOE proceed with testing, and backed up the governor's call for an EIS.

Under the provisions of the Nuclear Waste Policy Act of 1982, no EIS is required until a final repository site is chosen from among the small number of sites under consideration. This will be after large-scale investigatory activities have already taken place. In that case the public will have to rely on a more-limited Environmental Assessment of the impacts of exploratory shafts, and on the data gathered by a Test and Evaluation Facility on the proposed site. DOE for its part must enact guidelines specifying factors that qualify or disqualify a site for a repository, including "proximity to national parks" and "effects upon the rights of users of water."

A nuclear-waste repository on the proposed site near Canyonlands National Park would present a threat, both to the park and to the well-being of the people of southeastern Utah, now and into the unforeseeable future. Club members are urged to write to their congressional delegations and to state officials, urging them to ensure that the Energy Department adheres to Congress' clear intent to protect national parks from nuclear wastes. The nuclear-waste dilemma is certainly a problem for the Reagan administration—one it would dearly love to sweep under the salt flats and forget about. But it shouldn't be permitted to become a glowing tragedy for the American people for hundreds of generations to come.

Deborah Lanner is a Utah environmentalist interested in nuclear-waste policy issues.

GEOTHERMAL ENERGY:

Trouble Brews for the National Parks

BRUCE HAMILTON

WHEN the Lewis and Clark Expedition was returning homeward through what is now Montana, one of their number—John Colter—decided to stay behind and explore southward into the Yellowstone country in search of furs. What Colter discovered was so incredible that when he returned to civilization to report his findings he was regarded by most as an outrageous liar, by others as demented. Colter's report of a land of fire, steam, and seething earth was so outlandish that the area was for decades discounted as a mythical place.

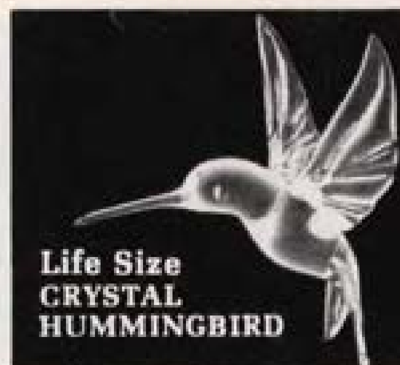
"But Colter had seen what he said he had," says Rick Reese of the Yellowstone Institute. "Colter's Hell was a land of explosive geysers, mud pots, boiling pools, steam vents, cauldrons, sulfur pools, travertine springs, and a variety of other phenomena. Had he covered the Yellowstone country entirely, he would eventually have encountered some 200 geysers and more than 3,000 other thermal features."

Other adventurers followed Colter, and word of the wonders of Yellowstone spread across the country. Finally, in 1872, during an era of intense exploitation of our nation's natural resources, Yellowstone was designated as the first national park in the world.

The fact that Yellowstone had "no particular pecuniary value" may have led a development-oriented Congress to consider the preservation option favorably. One of the bill's supporters, Senator Lyman Trumbull of Illinois, cautiously endorsed the park concept, saying, "At some future time, if we desire to do so, we can repeal this law if it is in somebody's way. . . ."

Today, repealing the Yellowstone Act is probably not on anyone's mind. But undermining the act is quite a different story.

Currently, there is a proposal before Interior Secretary Watt to lease underground geothermal resources on national forest lands on the western boundary of Yellowstone National Park. Some 200 lease applications have been filed on the 488,000-acre Island Park Geothermal Area (IPGA), which includes parts of Idaho, Montana, and Wyoming. If leases are secured, energy companies intend to drill deep wells in



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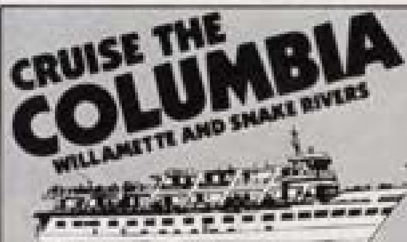

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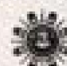

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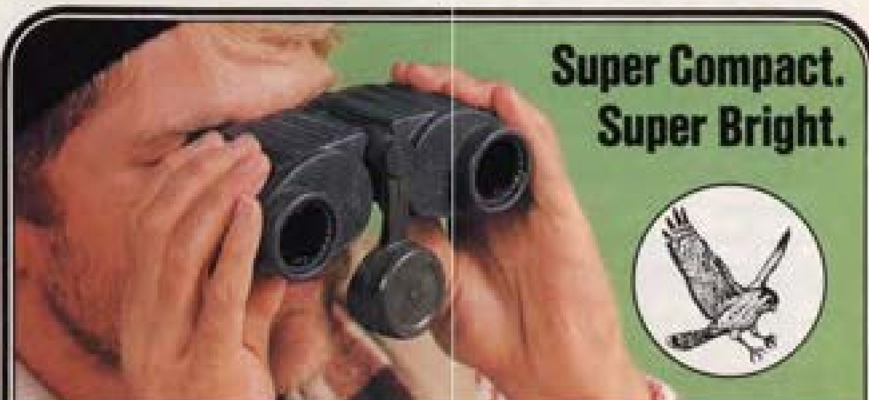

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Old Faithful Geyser, one of the world's most admired natural phenomena, is only 13 miles from the IPGA. Some of the park's lesser-known thermal features are as close as a mile to the proposed lease area.

Heavy industrial development so close to a park is cause for deep concern among conservationists. But in the case of Yellowstone a deeper concern has developed. What if the delicate and poorly understood plumbing system that keeps Old Faithful going extends beyond the park—and is liable to be interrupted by drilling operations in the IPGA?

The leasing proposal first surfaced during President Jimmy Carter's administration. During congressional hearings in 1979, then-Assistant Interior Secretary Robert Herbst testified, "We do not know how much of a connection, if any, there is between the proposed lease areas and the thermal areas inside the park. . . . Unless geothermal exploration and development is very carefully planned, monitored, and controlled, irreversible damage to the geothermal regime at Yellowstone is a distinct possibility."

Herbst noted that, of the 10 world-ranked geyser areas, only three (including Yellowstone) are essentially undisturbed, while four have been "adversely affected by man's activities" and three have been altogether destroyed.

Donald White, the U.S. Geological Survey's leading expert on geysers, says, "For any given geyser area, we have a choice of exploitation for geothermal energy, or non-exploitation for preservation of geysers. In general, we cannot exploit the geothermal energy of an area and also preserve its geysers."

White notes that Geyser Valley in New Zealand, once among the top 10 geyser fields in the world, was totally destroyed when the Wairakei geothermal area was developed. Perhaps more pertinent to the IPGA situation, production at Wairakei also destroyed an adjacent thermal area thought to be completely independent.

In this country the Beowawe geyser area of Nevada, once second only to Yellowstone in North America, was destroyed by geothermal exploration conducted in the 1940s and 1950s. Even though commercial development never ensued, all springs and geysers in the area had ceased flowing by 1961.

White says that these areas were destroyed because proper precautions weren't taken. Hot water was extracted, but no replacement water was injected to maintain pressure in the thermal area. Also, drilling was allowed within the geyser basins instead of being restricted to safer areas a sufficient

distance away. He believes that with a carefully devised system of buffer zones, and with staged development, mandatory reinjection of water, and careful monitoring, it might be possible to allow some exploration and development without significantly harming adjacent geyser fields.

The Forest Service, following the advice of White and other USGS scientists, has recommended both a buffer zone next to Yellowstone and an elaborate monitoring and reinjection program. In addition, the secretaries of Interior and Agriculture would have to agree that there would be no adverse effect on park thermal features before any leasing could be approved.

Energy developers have appealed the Forest Service's strict recommendations, thereby delaying their implementation. Ultimately, the decision to lease or not to lease—and on what terms—rests with Interior Secretary Watt.

A complicating factor is that the land surrounding national parks is seldom owned entirely by the federal government. In the case of Yellowstone, thousands of acres of state and private land in the IPGA have already been leased.

Mickey Beland, Forest Service coordinator of the Island Park study, says development on these nonfederal holdings could be far worse for Yellowstone than development on federal lands. The federal government can insist on protective standards for its holdings, but there is no guarantee that development would cease on nonfederal lands even if park thermal features were harmed.

The threat posed by development on private land was dramatically illustrated at Lassen Volcanic National Park in California in the late 1970s. Again, land adjacent to a national forest was being considered for leasing. But at Lassen there was a new and unfortunate twist: A section of private land within the boundaries of the park was being developed for geothermal energy. The private tract was right next to Terminal Geyser and within a mile and a half of Boiling Springs Lake. Conservationists expressed concern that private development might affect these and more distant geysers as well as hot springs and volcanic vents in the Devils Kitchen and Bumpass Hell areas.

It was not the first time this site had been eyed by developers. An exploratory well had been drilled within 50 yards of Terminal Geyser as early as 1962. Phillips Petroleum picked up the private lease on the site in 1977, and a year later the corporation opened the capped well and redrilled it to a depth of 4,000 feet. An area the size of a football field was cleared in the process.

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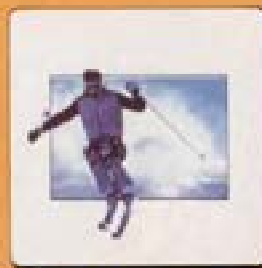

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Service. That agency was enraged, as were conservationists and an influential congressman—the late Phillip Burton (D-Calif.). Burton, in his capacity as chairman of the House Interior Committee's Subcommittee on National Parks, fired off a letter to then-Interior Secretary Cecil Andrus, demanding to know what his department planned to do about the situation. Finally, in April 1980, the Park Service condemned and acquired Phillips' inholding. Lease applications for the surrounding national forest land are still before Secretary Watt.

A similar drama is unfolding on the island of Hawaii, where developers have applied for a permit to build five geothermal power plants on private land next to Hawaii Volcanoes National Park. The Kahauale'a geothermal project is designed to generate 250 megawatts of power—nearly three times what the island of Hawaii now uses. Pipelines and wells would be strung out along the park boundary, some just a quarter mile upwind from the park.

The Hawaii Chapter of the Sierra Club and other local conservation groups have been fighting the proposal in proceedings before the state Board of Land and Natural Resources. George Winsley, a chapter leader from nearby Hilo, notes that at least five rare and endangered plants and animals inhabit the proposed development site and adds that the park's 1975 master plan earmarks the area for eventual acquisition for park expansion. However, Watt has put a virtual moratorium on park-expansion plans.

The Kahauale'a geothermal project would cover more than 25,000 acres. Most of the land is within a native forest that is zoned for conservation—a state land-use classification that should preclude heavy industry. The Park Service and local conservationists have objected to the potential for noise and air pollution, visual intrusion, destruction of native forest, and the inevitable introduction of exotic plants and animals. Some are proposing a land exchange to move the developers farther away from the park.

The Campbell Estate, owners and developers of the private lands adjacent to Volcanoes Park, has requested permission to explore for, develop, and produce geothermal energy. This winter the state Board of Land and Natural Resources gave the estate approval to drill exploratory wells to test the resource potential of the proposed site, but withheld development and production approval. Conservationists have appealed the board's decision.

Some local opponents of the project are now joking that Madame Pele, the mythical goddess of the volcano, appears displeased by the decision. The recent eruptions of Kilauea Volcano have opened a fiery rift in the heart of the proposed development site.

leading the project's opponents to question how the power plants would survive the fire, fissures, and molten lava. The developers remain undeterred.

Similar scenes may soon be played out at other parks as interest in geothermal energy grows. A Park Service survey notes that while the most conflict is likely at Yellowstone, Lassen, and Mount Rainier national parks, there are 21 park-system units with significant thermal features. In all these areas the parks remain unprotected from development on adjacent lands and on private inholdings.

Conservationists are promoting federal action to guarantee protection of the parks and some wilderness areas. Two separate legislative vehicles offer a measure of hope.

The Geothermal Steam Act Amendments of 1983 would facilitate leasing of federal lands. The bill has failed to pass Congress for the past five years, primarily because of disagreements over park-protection language. Conservationists have advocated guaranteed safeguards for all significant geothermal features in all National Park System units. Industry, working through Senator James McClure (R-Idaho), has resisted any provision for parks protection. Recently McClure softened his position somewhat by recommending protection for only one park—Yellowstone.

The National Park System Protection and Resources Management Act is a more comprehensive approach to the problem. It would enable the Park Service to deal with *all* threats of development on adjacent federal lands—not just geothermal leasing. Last year's Park Protection Act passed the House by a 319-84 margin, but it was never introduced in the Senate. Representative John Sieberling (D-Ohio), the leading sponsor of the bill, hopes it will be enacted in this Congress.

In all the debate over protection of the parks, the voice of their chief steward, Interior Secretary Watt, has been peculiarly silent. Watt apparently does not want to expand his office's protection powers, for fear future secretaries will use those powers to curtail development. At the same time, Watt is aware of the overwhelming public appeal of the parks.

On a tour of Yellowstone, Watt told reporters that he was being misrepresented in the press and that he had no intention of clearcutting, mining, or drilling within the parks. This can hardly be taken as a conces-

SIGHTINGS

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Larry Downing (right), newly elected board member from Oronoco, Minn., joins longtime director Edgar Wayburn at the May Board of Directors meeting. Wayburn, who worked tirelessly to help create national parks in Alaska, has recently been named Vice-President for Parks and Protected Areas.

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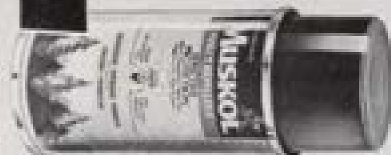

sion or a sign of good faith, however, because the activities he disowned are illegal in parks anyway.

But when a reporter asked Watt what he planned to do about threats from outside the parks, Watt simply smiled and replied, "It's a nice day. Let's enjoy the park."

Bruce Hamilton lives in Lander, Wyo., where he is the Club's Northern Great Plains Region representative.

A SLICK PROPOSITION: Why We Oppose OCS Leasing

MARK J. PALMER

In April 1981 Secretary of the Interior James Watt announced an unprecedented five-year plan to lease virtually the entire outer continental shelf (OCS) of the United States for oil exploration and production. "Speeding up exploration and development by offering high-quality acreage early and frequently should help reduce the nation's dependence on foreign oil and aid its economic recovery," stated the Interior Department's supplement to the plan's Environmental Impact Statement (EIS).

Environmental concerns were largely swept aside. "Our Interior Department biological scientists," Watt testified before the House Subcommittee on Energy and the Environment, "report that there have been no known significant, long-term damages to marine resources as a result of either of these spills." The secretary's reference was to two of the worst oil-well blowouts in history, California's 1969 Santa Barbara Channel disaster and the 1980 Ixtoc I platform blowout in the Gulf of Mexico.

Of the approximately 1,389 million acres of U.S. OCS recognized by Interior (the figure varies according to where one draws the line separating OCS from the true ocean floor), 920 million acres lie off the Alaska coast. The Atlantic coast has some 238 million acres of OCS, the Gulf of Mexico 139 million, and the Pacific coast 92 million.

The OCS area is the most productive zone for oceanic life. Nutrients, either in runoff from the adjacent land or brought from the relatively shallow bottom by upwelling currents, support floating plants and invertebrates, fish, and marine birds and mammals. The shallow waters also transmit sunlight to an abundant benthic (bottom-dwelling) flora and fauna. Most commercial and sport saltwater fisheries are found in OCS regions.

This nation is faced with a massive upsurge in leasing activities in the next five years. What do we know about the environmental impacts of offshore oil drilling?

One thing everybody knows: Oil and water don't mix—at least not to the benefit of living organisms. Crude oil contains many compounds dangerous to life—compounds that may adversely affect the health or behavior of marine creatures, inducing tumors and other cancers in or otherwise harming them.

Scientists estimate that fully 6 million metric tons of oil wind up in the world's oceans annually. Accidents, such as oil-tanker disasters or oil-well blowouts, usually account for less than 6 percent of this amount. Most of the total tonnage comes from such chronic polluting sources as runoff from land-based petroleum sources, routine oil-tanker discharges, and even airborne petroleum particles washed out of the atmosphere by rain.

But spectacular mishaps (the kind that oil companies like to describe as "atypical") can revise the world's annual pollutants inventory quite radically upward. For example, the massive Ixtoc spill accounted for 10 to 50

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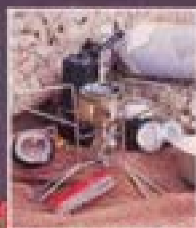

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times the amount of oil usually discharged each year by all offshore oil-drilling activities combined. Some 140 million gallons of oil entered the Gulf's waters in the 10 months that elapsed before the Ixtoc well was finally capped. Halfway around the world, the ongoing war between Iran and Iraq has halted efforts to stop a severe oil leak in the Persian Gulf that is causing great environmental damage throughout the region.

The oil industry is quick to point out that its operations limit the potential for accidents like Ixtoc. This argument is suspect for several reasons. The National Academy of Sciences released a report pointing out that the tremendous increase in oil-lease acreage provided for by Watt's five-year plan will require a proportionately massive increase in oil-production equipment and trained personnel within a very short period. Oil-spill accidents may increase because more drilling is occurring under the supervision of less-experienced technicians. Many of the new oil-lease areas are subject to more dangerous sea and weather conditions than has previously been the case. These areas may be geologically unstable, and many require drilling in much deeper water, frustrating any new technological advances.

The EIS for Watt's offshore leasing program estimates that 8.3 billion barrels of oil (and an attendant 39 trillion cubic feet of natural gas) will be recovered if the proposed five-year schedule is adhered to. Such estimates cannot be confirmed without extensive drilling. Within the 35-year period covered by the schedule, "around 13 [oil] spills of over 10,000 barrels and around 29 spills larger than 1,000 barrels could be expected, based on historical trends." However, the EIS adds that the number of oil spills that might be expected is "highly speculative." Indeed, there are suggestions that such oil-spill projections are quite low.

Oil enters the water at many points during the offshore drilling process. A catastrophic

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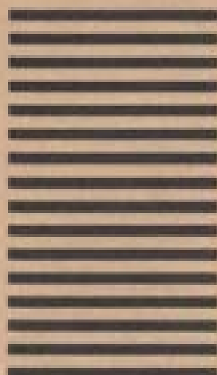

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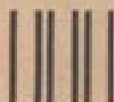

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well blowout is rare. But oil can, for example, be spilled from platforms during its transfer to a waiting barge or tanker. A pipeline could break or a pump might malfunction. Increased oil production means more oil-tanker traffic, which increases the likelihood of groundings, collisions, fires, and other tanker accidents.

The U.S. Coast Guard, responsible for monitoring oil spills, issues periodic reports summarizing such incidents. A list of spills from platforms and drillships in Southern California waters provides an interesting insight into the causes of chronic pollution in the immediate vicinity of oil operations. Spills are often caused by equipment failures: "Blocked filter"—84 gallons; "Broken undersea pipeline"—200 gallons; "Settling tank overflowed due to equipment failure"—20 gallons; "Production well pump failure during production ops"—210 gallons; "Dump valve on scrubber failed"—420 gallons. "Crack in nipple of pig launcher"—1,050 gallons. Human errors are a not-uncommon cause: "Valve mishandling during production ops"—25 gallons; "Valve left open on free water knock out vessel"—84 gallons; "Contaminated mud pumped into bottomless sump by mistake'—10 gallons.

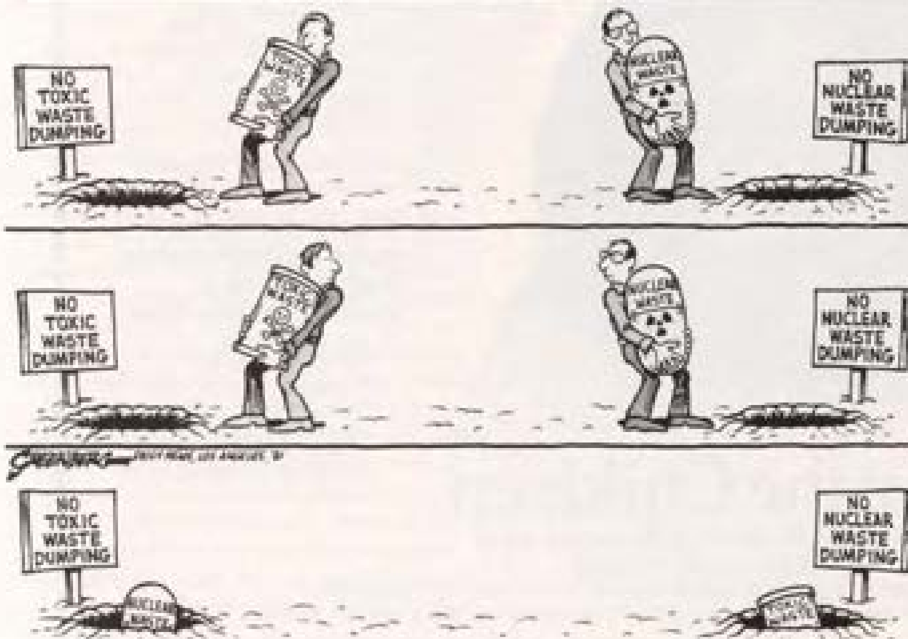
What happens to oil when it enters the water is determined by a number of factors. A large amount, perhaps as much as one third, may evaporate into the atmosphere. Some of the most toxic components of oil are also the chemicals most likely to evaporate. But the amount that evaporates will vary according to conditions—for example, whether the spill occurs in a warm tropical section of the Gulf or in the frigid waters of the North Atlantic or Alaska. Wave conditions may form a sort of protective buffer of water and oil around a slick, preventing much evaporation. And even the components of oil that enter the atmosphere don't just "go away." Eventually, such pollutants return to the sea as a form of fallout.

A large fraction of the oil will disappear into the ocean waters, diluted and dispersed in a process called "weathering." Again, the oil hasn't really departed the ecosystem; it's just harder to detect.

Beaches have retained oil for up to five or six years after major spills. Oil will also sink to the bottom and enter sediment layers. Such oil may leak back into the ecosystem years later, causing new contamination problems.

While scientists agree that massive accidents cause widespread initial biotic mortality through the toxic and smothering properties of spilled oil, the scientific community is split over the question of long-term impacts of huge spills and chronic oil discharges. The National Academy of Sciences' June 1981 report could arrive at no firm conclusions, other than to propose further review of conflicting studies. Meanwhile, the offshore leasing process grinds forward—but by the time the damage it will likely cause is documented to everyone's satisfaction, it may be too late for the marine environment.

By an unremarkable happenstance, most of the studies that purport to show minimal environmental damage caused by offshore oil activities have been conducted by the oil industry itself. Other scientists have strongly objected to the methodology of these studies and to conclusions that are in conflict with the supporting data. Studies by reputable researchers demonstrate a wide variety of adverse consequences to animal and human habitats stemming from the intro-



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duction of oil into the marine environment.

Marine birds are often the most visible victims of an oil spill, depending as they do on the intricate structure of each individual feather, their overall feather network, and the natural oils of the body to provide insulation from and buoyancy in cold waters. Crude oil destroys these properties by interfering with the feather structure and network—the feathers "glob" together, as one veterinarian puts it. The loss of insulation is quickly lethal to a bird trying to maintain its normal body heat of perhaps 104 degrees in seawater not much warmer than freezing. Flight becomes impossible. Some birds, waterlogged and exhausted, simply sink and drown. Others, trying to clean their soiled feathers through the only means available to them, may swallow lethal amounts of toxic oil. Bird-cleaning efforts by volunteers and professionals may save a fraction of a spill's victims, but the offshore distances involved will prevent such well-intentioned campaigns from reaching many birds in time.

Along the California coast, and scattered among the islands of Alaska, roams the sea otter, whose dense fur coat is as vulnerable to oil damage as a sea bird's feathers. The U.S. Fish and Wildlife Service has designated the California sea otter population as "threatened" under the classification system of the Endangered Species Act, noting that "the remaining habitat and population is potentially jeopardized by oil spills." The Western Oil and Gas Association, representing many of the oil companies eyeing the threatened otter habitat for drilling, has filed a petition to remove the otter from the act's protection entirely. A major oil spill or chronic spillage from several oil platforms may also harm the bottom-dwelling invertebrates that form the otter's food base.

Whales and other marine mammals are abundant throughout much of the OCS area under consideration for leasing. Will such endangered species as the blue, gray, humpback, and bowhead whales swim around spills? Will spills interfere with whales' mating, feeding, or breathing? Nobody knows. Will ocean plankton (certain species of which constitute the main food source for whales) suffer from oil contamination? These are among the questions that go begging for answers as the oil-leasing plan expands.

Oil, it has been found, is far more soluble in animal body fats and tissues than in seawater; thus whales, seals, fish, or invertebrates that ingest oil-contaminated seawater are likely to accumulate potentially toxic oil compounds in their bodies.

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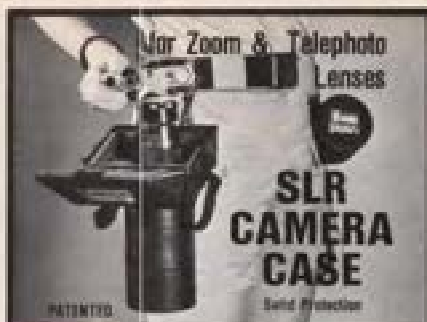

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scale fish kills are possible. But oil need not kill adult fish outright in order to disturb the fishery. Eggs and larvae of fish are far more susceptible to death by oil than adults are—and far less able to avoid an oil spill, because of their lack of mobility. Watt's oil leasing would extend to the valuable commercial fishing grounds of Alaska, California, and the North Atlantic's famed Georges Banks. By one estimate the fish catch in the Georges Banks is about 10 times greater than that in the Gulf for an area of similar size. Small wonder then that sport- and commercial-fishing organizations have joined with environmentalists in protesting the administration's offshore-drilling proposals.

The so-called sublethal effects of oil have not been well-studied. Oil contains many compounds that can alter an animal's behavior, or promote cancerous tumors, or interfere with its reproduction. In the long run the effects may be as crippling to the population as wholesale slaughter. Such subtle alterations in a population may lead to a crash without any clear sign of the cause. And oil's effects may be enhanced, with tragic consequences, by other forms of environmental stress, such as unseasonable water temperatures or other types of pollution.

Invertebrates of the ocean bottom—shellfish, corals, sponges—are particularly vulnerable to oil. Unable to move, except in some cases at a snail's pace, and dependent on filter-feeding of seawater for nourishment, these fauna are hit hard by a major spill. Oil kills bottom invertebrates both by smothering and through its toxic components. Growth of individuals and replacement by new generations of animals may be slowed or even eliminated altogether. Often more-hardy species will colonize a polluted marine community (just as weeds will pop up overnight on bare soil), giving the illusion of a healthy seabed. But in reality the stability of the ecosystem becomes endangered.

A measure of our ignorance of the sea (and consequently of what disasters we may cause there) is the number of new species being discovered in fundamental studies sponsored by the Bureau of Land Management, the Interior Department's lead agency in charge of offshore oil leasing. More than a dozen new species have been discovered off California recently (in the Santa Maria Basin), including new species of anemones and of segmented worms. We know next to nothing about how drilling operations will affect these creatures, which are new to science and therefore unstudied.

Oil is not the only life-threatening effluent of oil-drilling operations. The Natural Resources Defense Council reports that as many as 1,500 different industrial-chemical compounds used at various stages of drilling operations are ultimately disposed of at sea. Drilling muds, used to lubricate oil drills, may pose a serious danger to marine organisms. A wide variety of chemicals are mixed in drill muds, including heavy metals such as barium, chromium, lead, cadmium, and zinc. With as many as 4,000 barrels of drilling mud used per well, and as many as 40 wells per platform, the sheer bulk of drill muds dumped at sea—to smother and poison marine animals—is phenomenal. Too little study has been given to this problem.

Offshore drilling is conducted with heavy-duty diesel engines, which can generate significant air pollutants, such as carbon monoxide, nitrogen oxides, misburned hydrocarbons, and similar compounds dangerous to health. Air pollution from OCS operations is a significant problem off Southern California; the air quality of the Los Angeles and San Diego metropolitan areas, already

. . . And, now, James Watt and the Beach Boys. . . .

bad, will be further worsened by prevailing onshore winds.

Wild and sparsely populated coasts may become the targets of massive development. Onshore supply and docking facilities must be constructed in support of offshore exploration activities, while refineries, pipelines, and storage tanks come into use in the event of a find.

Indeed, the New England and California coastlines each supports a booming tourist industry—long-term, relatively stable industries that could suffer from the short-term oil boom (one that Interior predicts will go bust in 35 years).

Commercial fisheries too will suffer as oil contamination and the physical obstructions of oil rigs, tanker vessels, underwater pipelines, and well caps impede fishermen pursuing their trade. Louisiana's wetlands, the nurseries of the Gulf's fishing stocks (including the famed Gulf shrimp), have already suffered extreme damage caused by canals dredged to facilitate the barging of oil-drilling rigs into position above oil deposits.

The fragile marine environment and the coastal economies of several states require a far more cautious approach to offshore-oil activities than Secretary Watt and President Reagan are willing to offer. Surely our precious ocean resources should not be sacrificed for a few more barrels of oil.

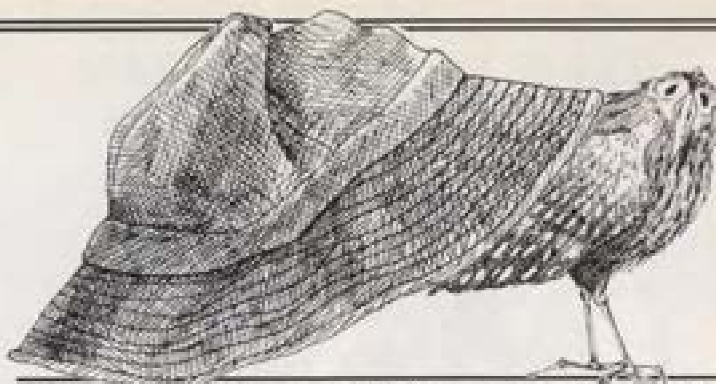
Mark J. Palmer works with the Northern California/Nevada Regional Conservation Committee. He also runs whale-watching cruises out of the Club's Bay Chapter.

TUOLUMNE RIVER: Wild & Scenic or Dammed Again?

PATRICK CARR

CALIFORNIA'S TUOLUMNE RIVER may be dammed again. That is the hope of the city of San Francisco and the Turlock and Modesto irrigation districts, which together plan a series of hydroelectric projects that would either flood or virtually dry up much of the river.

San Francisco and its partner districts have begun applying for the required licenses and permits, and Sierra Club members have joined local residents, fishermen, and whitewater boaters in working to preserve the river through its inclusion in the



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At the turn of the century, John Muir struggled to prevent the damming of the Tuolumne and the flooding of Yosemite's Hetch Hetchy Valley. (See "The Battle for Hetch Hetchy," November/December, 1981.) The issues are different today than they were during Muir's time. The river has been dammed four times since then, and San Francisco no longer lacks a water supply. The Tuolumne currently supplies drinking water to almost 2 million Californians, generates enough electricity to power 400,000 homes, and irrigates 230,000 acres of some of the richest farmland in the world.

Even with all this development, long stretches of the river continue free-flowing. The headwaters of the Tuolumne are among the most beautiful parts of Yosemite National Park. Each year 250,000 people visit the campgrounds and trails of mountain-rimmed Tuolumne Meadows, where the river meanders across the largest subalpine meadow in the Sierra Nevada. Farther downstream, granite walls tower almost a mile above the Tuolumne as the river crashes and roars through the glacial channels of its own Grand Canyon. The river comes to an abrupt halt behind O'Shaughnessy Dam, at Hetch Hetchy Reservoir. Today San Francisco proposes to increase electrical production by raising the dam 50 feet higher, flooding still more of Yosemite National Park.

Below Hetch Hetchy the river is unleashed. Here the main Tuolumne thunders down 27 miles of rapids before entering another reservoir. Three dams may one day scar this stretch, but today only two small roads wind into the rugged canyon. One of the nation's most challenging whitewater runs, this part of the river is often compared to the Grand Canyon and the Salmon River. And fishermen hail this stretch—particularly the Clavey Fork section—as containing one of the finest trout fisheries in the state.

[*Editor's note:* On March 30, the Federal Energy Regulatory Commission granted a preliminary permit for the proposed Clavey-Wards Ferry project, an element of the combined municipalities' hydroelectric plan for the Tuolumne. As this issue of *Sierra* went to press, the commission postponed consideration of a conservationist move to revoke the permit.]

Not all of the threatened stretches are as wild as the 27-mile whitewater portion. Much of the tributary South and Middle forks of the Tuolumne flow through quiet, rural valleys dotted by scattered resorts and villages. Several of these valleys are proposed as future dam sites by San Francisco and its partner districts. One especially ill-considered plan would leave the village of Harden Flat under 230 feet of water.

Local residents are unwilling to move to

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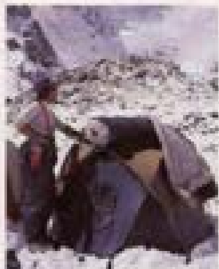
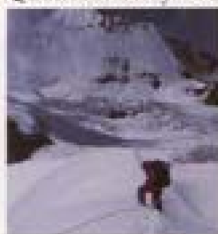


According to John Roskelley, professional mountaineer and member of the Everest team: "The bags were a little spot of heaven in a pretty hostile world. At times, I thought we were going to come to blows over who was going to get to sleep in the bags filled with Quallofil.* They were very popular, mostly because of the high loft underneath, which didn't collapse under body weight or from moisture. We could wear our damp clothing while sleeping in the bags, and in the morning it would have dried out from body heat. Even at 0°...in the cold, moist climate of post-monsoon Tibet...even under the worst conditions...sleeping bags filled with Quallofil* provided terrific comfort and warmth."



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satisfy what they consider to be the greed of distant developers. They point out that the projects are intended almost exclusively to produce electricity, much of which would be sold for profit by the Turlock and Modesto irrigation districts. San Francisco, which already makes a substantial profit from Hetch Hetchy water and electricity, is not as plainly motivated by the projects' moneymaking potential.

The irrigation districts claim their customers need the energy. But with electrical rates among the lowest in the nation, the districts have put energy conservation on a low back burner. "We don't like the idea of having to move when they could save more energy," says Shirley Vaughn, who has enjoyed life in Harden Flat for many years. "And it's not just people in Harden Flat who would be hurt. This county relies on tourism for much of its economy. Those dams will ruin some of the most popular resorts and fishing holes around here."

One such resort is the Berkeley Family Camp. Operated by the city of Berkeley, Calif., but open to the general public, the camp is located on the site of the proposed Harden Flat Reservoir. Each year since 1922 it has provided modestly priced vacations for hundreds of families, many of whom return year after year. Michael McEneaney has been coming here for 32 years. "The Berke-

JEFF GNASS

California's Tuolumne River, seen here threading its way through Yosemite National Park, may lose its status as one of this country's premier whitewater rivers if proposed irrigation and hydroelectric projects are approved for its upper reaches.

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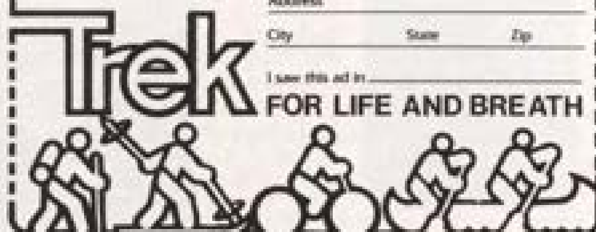

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ley Camp has become quite an institution for many of us," he says. "To lose it would create a big hole in a lot of people's lives."

To keep that hole from opening, McEneaney joined forces with the Tuolumne River Preservation Trust, an organization formed in 1981 to coordinate the efforts of the wide variety of people opposed to the dams. Two Sierra Club members, Robert Hackamack of Modesto and Dr. Alvin Greenberg of the Club's San Francisco Bay Chapter, are leaders of the organization.

"It was 1968 when all this really started," Hackamack says. "That's the year San Francisco and the districts began publicly talking about building more dams on the Tuolumne, and coincidentally the year Congress passed the Wild and Scenic Rivers Act. Even then we knew that one of those two options would become the river's future."

Fortunately, San Francisco and the districts moved slowly in developing their plans, until spurred to action by the energy crisis. But in 1975 Congress temporarily halted further development by asking the Interior and Agriculture departments to study the river's eligibility for the Wild and Scenic Rivers System. The study concluded that the entire 83 miles of river that flow through Yosemite National Park and the Stanislaus National Forest possess "outstandingly remarkable scenic qualities" and should be included in the system. President Carter's recommendation in 1979 that Congress preserve the river began another period of temporary protection, but no bill was passed. Today, with that protection gone and development plans proceeding, the river is more threatened than ever.

Yet there are hopeful signs. Interest in preserving the Tuolumne is growing, and is widespread even in San Francisco. The prestigious San Francisco Planning and Urban Research Association, a civic organization comprising business and community leaders, strongly supports Wild and Scenic designation. Mayor Dianne Feinstein has also endorsed the measure, and even as the city's Public Utilities Commission proceeds with development plans, its Board of Supervisors has asked Congress to renew the river's temporary protection.

Dr. Greenberg of the Tuolumne River Trust explains the apparent contradiction: "Most people in this city's government would probably like to leave the Tuolumne as it is. Unfortunately, others are convinced that if San Francisco doesn't pursue these projects, the irrigation districts—or others—will do it on their own. And if the river is going to be someone's private cash register, they'd rather it be San Francisco's."

Perhaps that kind of thinking worked well in the wide-open days of the nation's early history, when water and other resources lay waiting for the strongest or quickest grabber. But certain events and trends—the recent defeat by California voters of the Peripheral Canal, widespread interest in the plight of Mono Lake—indicate the same concern over the environmental costs of water development that led to the creation of the Wild and Scenic Rivers System. As the number of hydroelectric proposals mounts across the country, this system and the rivers eligible for it may come under increased attack. The Tuolumne may well provide a test of the public's commitment to the concept of wild and scenic rivers.

What you can do: Two pieces of current legislation may affect the future of the Tuolumne River. Senator Alan Cranston (D-Calif.) has introduced S. 142 to establish Wild and Scenic protection for the Tuolumne. He has also proposed including the Tuolumne River canyon in the areas protected by the California Wilderness Act. Readers can contribute to these efforts by writing to Senator Pete Wilson, U.S. Senate, Washington, DC 20510, to urge his support of these measures. □

Patrick Carr, an intern at Club headquarters in San Francisco, also works part-time as a mental-health therapist.

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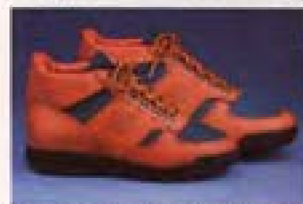

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IT'S TIME TO SAVE THE COLUMBIA RIVER GORGE

SENATOR BOB PACKWOOD

Bob Packwood (R-Ore.) is chairman of the Senate Committee on Commerce, Science, and Transportation. He was instrumental in the fight to save Hells Canyon of the Snake River.

WE FROM the Pacific Northwest know that the majestic Columbia River Gorge, which forms part of the border between Washington and Oregon, is a national treasure. But the Gorge, already visited by millions of people each year, is threatened with despoilment by thoughtless residential and industrial development. Congress now has the opportunity—with your help—to enact tough legislation that will protect the Columbia Gorge by making it a National Scenic Area.

I have introduced a bill in the U.S. Senate (S. 627) to guarantee that protection. The bill mandates preparation of a single management plan for the Gorge's assets and provides for participation in the planning process by federal, state, and local government agencies. The plan will ensure that future economic development of the region is consistent with preservation of the scenic and natural resources of the Gorge.

We still have the opportunity to save this area of unsurpassed splendor, but we must act now, for its natural, cultural, and scenic values are under siege at this very moment. The completion of a major interstate bridge at the western end has opened tracts of pristine land in both states to the prospect of new suburbs and industries. It is inevitable that urban and industrial sprawl will continue to spread into the Gorge from the Portland-Vancouver metropolitan area in the absence of a stringent land-preservation program.

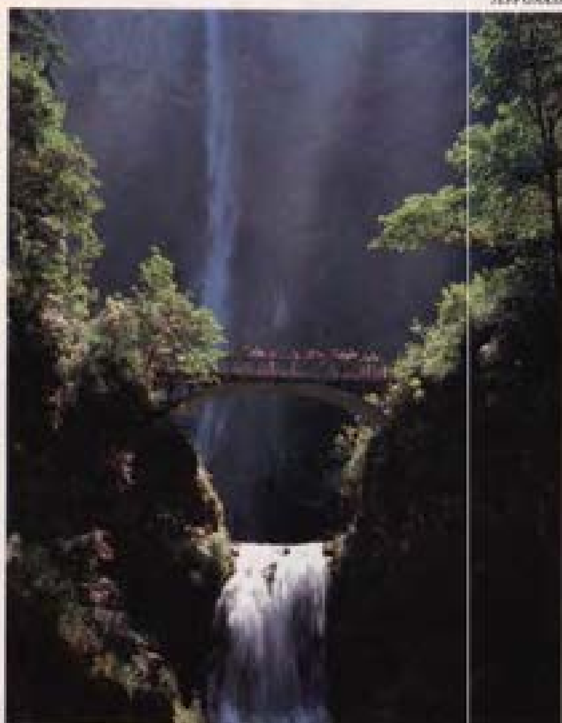
Stretching for some 85 miles from just beyond Portland, Ore., to Maryhill, Wash., the Columbia River has carved a natural wonderland as magnificent as any found on earth. With no change in elevation, the transition from rain forest to sagebrush is compressed into these few miles of outstanding geological features.

Traveling eastward into the Gorge, we pass beneath massive cliffs, admiring the lush vegetation and thundering waterfalls. Landmarks such as Beacon Rock, the second-largest monolith in the world (only the Rock of Gibraltar is bigger), and Multnomah Falls punctuate the journey. As we continue eastward the terrain evens out a bit, with rolling hills and vast meadows dotted with wildflowers. By the time we arrive at The Dalles, the historic western terminus of the Oregon Trail, the landscape has become arid, marked by sagebrush and sand dunes.

The Columbia River Gorge is home for many rare plant species. The National Park Service reports that nine of them are found only there, while many others are rare enough to be listed as endangered.

The wildlife of the Gorge is equally varied, with more than 25 species of mammals, including black bear, mountain lion, and

JEFF GNASS



Crowding the footbridge for a spectacular view of Multnomah Falls in Oregon's Mt. Hood National Forest.

DAVID MUENCH

In the middle stretch of the Columbia, rain forests give way to oak and grassland. Continuing eastward, sagebrush and sand dunes predominate.

elk. There are literally dozens of bird species, several of which are recognized by the Oregon Department of Fish and Wildlife as threatened or endangered, including the northern bald eagle and Arctic peregrine falcon.

The human species too has been an important inhabitant of the Gorge for at least 11,000 years. The area was home to various native peoples whose villages lined the river for ease of access to the bountiful salmon runs. Their descendants now live on surrounding Indian reservations.

This unbroken history of human habitation means that the Gorge contains extensive archaeological sites that bind the story of ancient lives to that of our own. Two of these are Memaloose Island, with its sacred Indian burial ground, and the Wishram archaeological site, widely noted for its petroglyphs—many of which now lie buried beneath the backwaters of The Dalles Dam.

The Columbia Gorge figures prominently in modern history as the gateway of America's westward movement. The campsites of the Lewis and Clark Expedition still may be viewed, as may sections of the Old Oregon Trail and parts of the 1856 Oregon Portage Road. The development of the railroad is documented in several places, such as the north shore portage railroad at Bonneville Dam. The first locomotive built in the Northwest, the Oregon Pony, was used on the water-level Oregon Portage Road in 1862, and is today displayed in the city of Cascade Locks.

The substantial steamboat traffic that once traveled the Columbia River through the Gorge is recalled by the huge pilings still visible at several former steamboat landings along the river. Conscious of this heritage, the Port of Cascade Locks soon will inaugurate sternwheel-steamboat excursions along the river.

The Gorge also features the scenic Columbia River Highway, the first paved highway in the Northwest. In many places the roadway is carved into the cliffs along the river, special care having been taken during its design to preserve natural features along the right-of-way. When Theodore Roosevelt saw this highway, he said, "You have in the Columbia River Highway the most remarkable road engineering in the United States, which for scenic grandeur is not equalled anywhere."

Generations of citizens in the Pacific Northwest have wanted to preserve and protect the Columbia Gorge. We can risk no further delay. If we take no effective action now to save this natural treasure, it will be lost to us forever.

Please join me in our fight to protect the Gorge. Write to your senators now and urge their support of S. 627. □

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WHAT PRICE "FREE" ENERGY?

The Headlong Rush to Develop Economical Hydroelectrical Projects Could Have Staggering Environmental Costs

by Tim Palmer

EARLY IN THE NINETEENTH CENTURY, New Englanders built dams to tap the power of the region's many rivers. Those dams turned the waterwheels that helped provide power for the Industrial Revolution. Soon other dams were being built for city water supplies, and then for navigation, irrigation, and flood control.

Subsequent technologies based on fossil fuels supplanted the role of hydropower, leading to the development of a nationwide grid system of energy generation and distribution. Yet today we appear to be entering a new era of dam-building in the United States, as entrepreneurs and communities attempt to provide hydroelectric power for the energy-hungry 1980s.

An "old" technology is thus being dusted off and adapted to changing times. But as with the very newest "frontier of science" energy technologies, a dilemma exists: There is enough potential power in our streams and rivers to help meet our projected electrical needs; but at the same time that development could lead to the destruction of America's few remaining free-flowing watercourses.

Two recent historical developments help account for the surge of interest in hydropower. The Public Utility Regulatory Policies Act of 1978 (PURPA) provides economic incentives to small-scale energy producers, and has spawned thousands of private small- and micro-hydro proposals. (Small-hydro is defined by the Department of Energy as generating 15 megawatts or less, while micro-hydro generates less than 100 kilowatts.) On a larger scale, the oil shortage of 1973, which made the use of fossil fuels for electrical generation an increasingly expensive proposition, led public and private utilities to plan for large dams on some of America's outstanding wild and scenic rivers.

PURPA requires utility companies to buy power from hydroelectric producers at the utilities' "avoided cost," which usually means the cost of oil-generated power that is avoided through the use of hydro. This mandatory-purchase provision has been the major motivating force behind the recent boom in small-scale-hydro permit applications because it seems to guarantee a profitable market for many hydroelectric projects. Developers may now receive full value for power they feed to an electrical utility—power that previously would have been fed to the utility at a price established by that utility. This price historically represented only a fraction of an energy unit's market value when generated by the utility and supplied to the utility's own customers.

This significant opportunity for profit from small-scale electrical generation means (among many other things) that the Federal Energy Regulatory Commission (FERC), which received 18 applications for new hydroelectric projects in 1978, received 100 times that number in 1981. The hydro rush of the 1980s is akin to the Gold Rush of 1849 in the speculative exploratory fervor it inspires; in the race to beat other applicants to the FERC office where site claims are staked, some developers study only topo maps of prospective locations before requesting a permit, or a number of permits. Most plans are for small-scale projects, and many refer to existing dams that have either fallen into disuse and disrepair or are functional but unequipped for hydroelectric generation. The largest number of pending applications are for streams in California, followed by New England and the Northwest.

Small-hydroelectric development has been supported as one soft-path approach toward energy generation. (Flowing water is, after all, the epitome of a renewable resource.) Micro-hydro often requires dams only several feet high. Provided enough water is left flowing evenly in streams for fish and the rest of the ecosystem, the environmental impacts of micro-hydro may be slight (see box on page 44).

As suggested above, one very attractive possibility is the retrofitting of existing dams that have never been developed for hydroelectric generation. The Ohio River, for example, is already dammed for its 981-mile length. Hydraulically it is comparable to the Rhone of France, but hydroelectrically it is not: The Rhone generates 3,000 megawatts; the Ohio, only 180. Power production on this already industralized waterway may raise few objections. In the West, the flow of water through irrigation canals could provide thousands of nickel-and-dime contributions to the energy supply.

JOHN V. YOUNG

Drowning cottonwood, photographed just after Glen Canyon Dam was completed in 1963, graphically portrays the dilemma environmentalists face over hydroelectric power. On the one hand it is a renewable, relatively clean source of power—on the other, it destroys rivers.

Many environmentalists lent support to PURPA when they thought the bill called for development incentives at existing dams only. But the relevant regulations included new dams, and concerns have grown that even the smallest of these can pose important ecological threats.

In assessing the site-specific impacts of a given small- or micro-hydro development, one may conclude that its effects are relatively insignificant, perhaps involving only the alteration of insect and fish habitat for a brief stretch of river. But this ignores the cumulative effect on a river that a large number of these developments may have—an oversight easily compounded by the fact that very little is known about such cumulative impacts. (Nor will very much be known unless and until the construction of numerous new dams provides the benchmark data . . . by which time, of course, it will be too late to do much about it.) And when an entire river is affected, the effect must radiate out to larger elements in the overall ecosystem. Thus, as small-hydro kilowattage adds up to a total worth considering, so do the small impacts of each additional project.

Russ Shay, the Sierra Club's California and Nevada representative, says, "Proposals are being made for new dams and diversions . . . with potentially devastating effects on fisheries, wildlife, wilderness, recreation, and water quality. Even though they are small projects, the building of any large proportion of them would drastically alter the face of the West." The Natural Resources Defense Council reports that 62 new projects in California would be built on rivers of "remarkable natural value." This would cause those rivers to be ineligible for protection as National Wild and Scenic Rivers, as hydro development is permitted only on those rivers categorized as "recreational" by NWSR legislation.

In New England, hundreds of proposals call for new generation at many of the region's existing low dams. A proportion of these would impose only minor, local impacts, but the American Rivers Conservation Council reports

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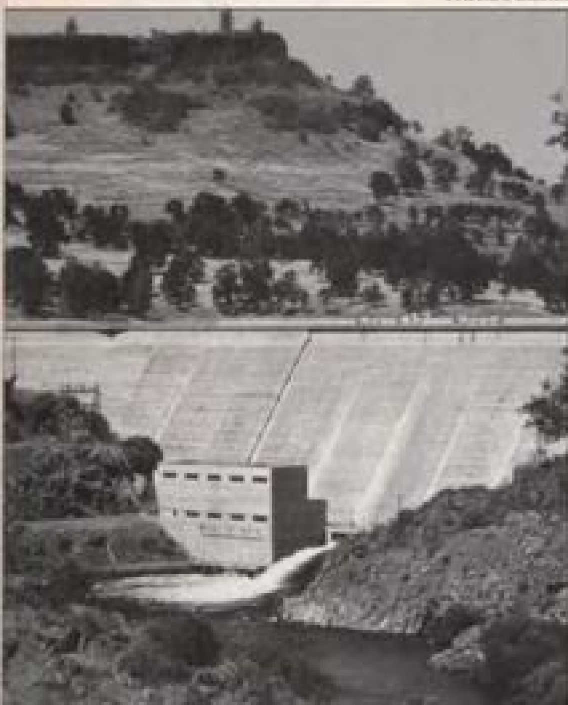


Tulloch Dam on California's Stanislaus River, a facility originally developed to help irrigate the state's vast Central Valley, has been retrofitted for hydropower.

that half of the proposed renovations involve diversion of water into penstocks (pressurized conduits), improving generating capacities but sometimes markedly reducing streamflow for 1,000 feet or more.

The side effects of repairing or adding turbines to existing dams—especially large ones—can likewise be significant. Diversion of water through a pipe can cause a bone-dry streambed. Releases below the power plant may alternate from a trickle (when water is stored) to a small flood (when water is released to make electricity). New turbines for Glen Canyon Dam on the Colorado River, for example, would cause erratically high flows that would erode beaches in the Grand Canyon.

WHILE SMALL-SCALE dam and retrofit projects cannot always be dismissed as environmentally benign, proposals for large dams are far worse, threatening some of the country's most outstanding rivers. Following the oil-price escalation of 1973, public and private utilities drafted hydropower plans, and many of the proposed projects are now moving toward construction.

The Army Corps of Engineers says that 641 new large hydropower dams are feasible nationwide. Among the important proposals pending:

- New dams on the West Branch Penobscot and Kennebec rivers in Maine would eliminate salmon habitat and two of the East's most outstanding rafting runs;
- Asotin Dam on the Snake River would flood the lower 10 miles of Hells Canyon—the deepest gorge on the continent. In a draft report, the National Park Service recommended National Wild and Scenic River status instead of the dam;
- The Army Corps of Engineers proposes a hydroelectric diversion for three miles of West Virginia's Gauley River, also recommended by the National Park Service for Wild and Scenic River status;
- Canaan Valley of West Virginia, an upland bog recommended as a wildlife refuge by the Fish and Wildlife Service, would be flooded by the Monongahela Power Company in a case where the Department of the Interior and the Army Corps of Engineers oppose the federally licensed dam on the Blackwater River. The Sierra Club has joined with Interior and the state of West Virginia in an appeal of the FERC permit for this project;
- A power company has proposed to dam Oregon's Illinois River, a favorite among West Coast river enthusiasts, and a river recommended for NWSR status.

"In the 1960s it looked like we were going to save a lot of streams," says Stanford Young, chief of Rivers and Trails Studies for the National Park Service in the Northwest. "Then came the rush for hydro dams. Now it looks like it will be tougher to keep rivers free, and we'll have to fight for places we thought we had already saved."

New dam proposals are cropping up in all river-and-mountain regions, but few places have attracted as much interest as the Sierra Nevada, where water drops as much as 8,000 feet in 50 miles or less. Stream segments totaling more than 2,000 miles would be adversely affected if the FERC approves 600 pending applications for California sites. Five of the sites would dam the last rafting and kayaking reach of the Tuolumne River, one of the best whitewater runs in the nation. (See related article on page 33.)

The search for energy sources has led planners to consider alternatives to new dams and other high-impact installations. Energy-use patterns suggest several approaches that might be taken. For example, most hydropower is generated to meet peaking demands (the several hours a day when energy is needed the most). Peaking demands are the easiest kind to alleviate without widespread new construction.

Sacramento, Calif., has begun to implement one form of peak-load management: Electrically controlled devices are wired to air conditioners, and on hot afternoons the power company transmits a signal that shuts down the air conditioners for 10 minutes, cutting the peaking demands these devices make by one-sixth for every hour this is done.

Tests in three California cities indicate that energy needs can be reduced by from 10 to 20 percent through peak-load-management programs. Additional savings can result from related strategies: imposing higher rates during peak hours; alternative scheduling of industrial processes; nighttime pumping of irrigation and community water supplies; and educating the public in conservation techniques.

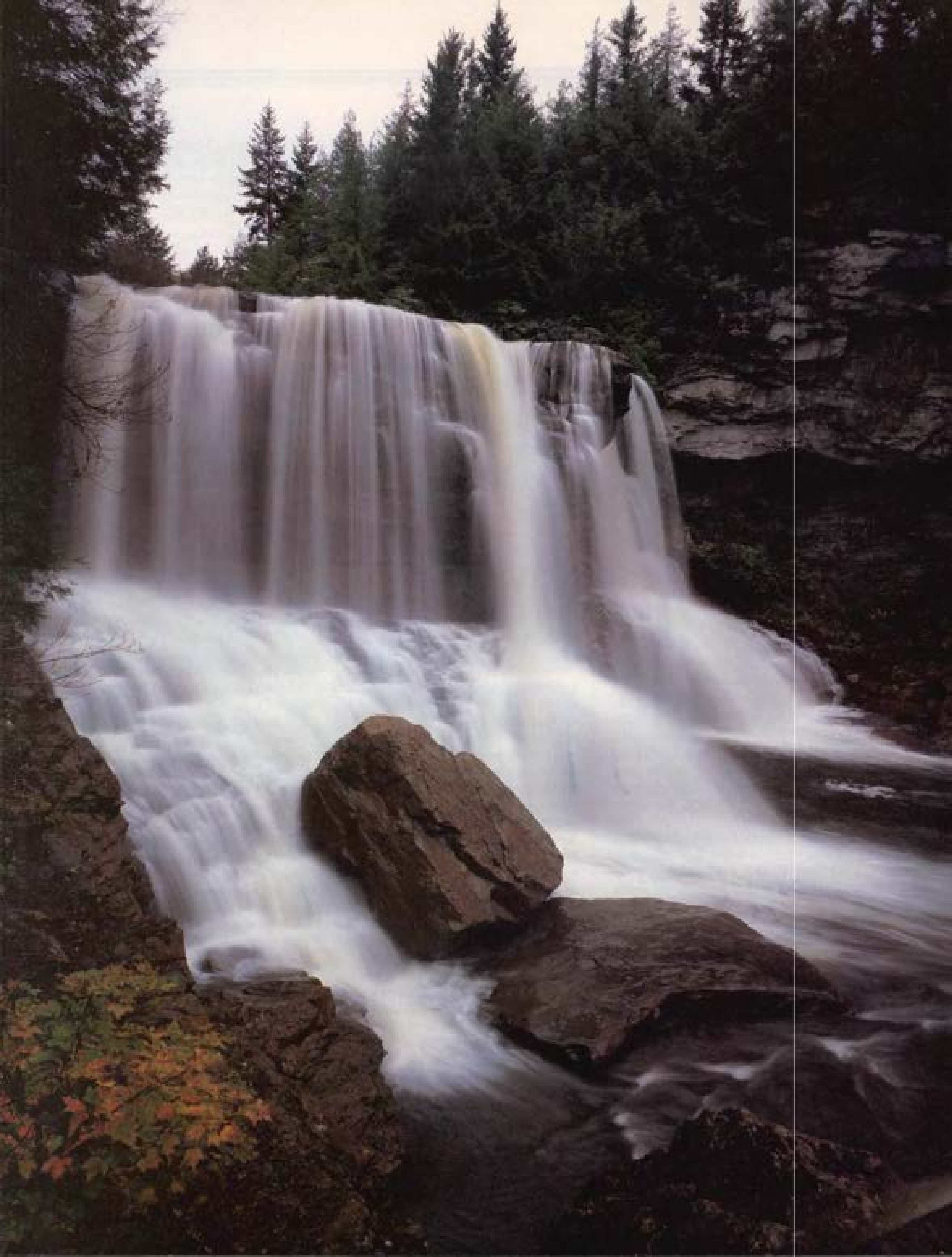
Conservation may provide a partial solution in conjunction with the application of new technologies. Annual energy use nationwide decreased in 1980, while electricity use remained nearly constant. The Council on Environmental Quality concluded that conservation and soft-energy paths (e.g., solar heating, or the conversion of waste material to liquid or gaseous fuels) can meet many of this country's projected energy needs by the year 2000, while the Natural Resources Defense Council reported that California can meet its energy needs by the year 2000 without new coal, nuclear, or hydroelectric projects.

Reallocation of fiscal resources might well be explored as an alternative to widespread dam-building. It has been estimated that if the money earmarked for the Dickey-Lincoln dams in Maine (recently deauthorized) were used to install storm windows in New England homes, the investment would repay itself in seven years—instead of the 50 years the Army Corps said the dams would take to pay for themselves.

No one yet knows how many, if any, of these alternatives will be pursued on a scale sufficient to keep our free-flowing rivers and streams free from obstruction and ecological

Blackwater Falls, one of West Virginia's top attractions, could be affected by releases of water from the proposed Davis power project four miles upstream.

DAVID MUENCH



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Oregon's Illinois River (above), a popular recreational stream proposed for National Wild and Scenic River status, may yet be dammed for hydroelectric generation.

damage. Meanwhile, some threats to the rivers—the dams proposed on the Tuolumne below Yosemite, for example—will attract national attention and will be fought with lawsuits, grassroots letter-writing campaigns, and legislation. Yet while most rivers do not attract as much attention, the threats to them continue to grow.

Jerry Meral, deputy director of California's Department of Water Resources during the Jerry Brown administration, says, "Besides the traditional sponsors, proposals [for hydroelectric projects] now come from public-utility agencies. Unlike private companies, water or irrigation districts can finance as they go by selling tax-deductible bonds, and they can raise rates whenever they want to—unlike private utilities, which need approval from the public-utilities commissions. Ratepayers assume the risks, not stockholders, and it makes a big difference as to what can be financed. Then the water districts turn right around and sell the power; it amounts to public bonds to provide power to private utilities."

Even with the constraints imposed by peak-load management and economic reforms, many dams may still be profitable. The question comes down to the age-old dilemma of public good: What are the rivers for? Who owns the power of the rivers?

Brad Welton, an attorney with Friends of the River, says, "Dams have provided enormous benefits to the developing sector, but now we need to save some rivers for the spiritual and recreational needs of people, for history, for wildlife, and for natural productivity."

Hydro—The Environmental Impacts

HARVARD AYERS

THE GENERATION OF hydroelectricity on whatever scale—large, small, or micro—presents an interesting dilemma to the environmentalist.

On the positive side, hydropower depends on a renewable energy source that is provided on a regular (if variable) basis by cyclic natural forces—i.e., it's free (at least in theory). It neither pollutes the air nor requires environmentally damaging mining processes, as do nuclear- and fossil-fuel-based technologies.

There are likewise a number of negative impacts, some measurable and others merely speculative, that relate to the following factors:

- A dam creates a reservoir, drowning part if not all of a stream and resulting in a drastically altered biotic habitat;
- The dam interrupts streamflow both above the reservoir (through diversion) and below it (by channeling water through a penstock), which likewise has biotic impacts;
- A dam may present severe structural impediments to the upstream migration of spawning fish;
- Possible dam breaks pose a severe hazard to downstream communities, definitely including humans;
- A dam generally imposes structural and aesthetic intrusions upon the landscape through its associated pipelines, powerhouses, and access roads.

While the negative impacts of large-scale hydropower can be significant, many smaller projects being contemplated today would greatly reduce some types of environmental impacts. This is not surprising considering the difference in scale between a large, canyon-wide dam capable of generating upward of 30,000 kilowatts per hour (kwh) and a micro-hydro diversion structure designed for a 100kwh installation that will provide power to only 30 families.

Many small-scale sites that produced limited amounts of hydropower in the past were abandoned in the 1940s and 1950s because of competition from large fossil-fuel plants. Many of these are in or could be brought up to serviceable condition. Most of the potential micro-hydro sites on steep streams have never been developed; new pipe technology (PVC and plastics, for example) has made this type of project much more practicable. The increasing cost and limited supply of renewable fuels have made it worthwhile to consider developing the hydropower potential of abandoned dams and possible pipe-the-pressure sites (where turbines are turned by the natural force of water coursing through a penstock).

Although not enough is known about the cumulative impact on downstream ecosystems of numerous small-scale upstream hydropower installations, this much can be said: Whereas pipe-the-pressure hydro reduces water flow in a stream over the length of the penstock (usually less than a mile), projects that store water in a reservoir or other catchment both increase and decrease flows over the full length of the stream, from dam to ocean. Pipe-the-pressure hydro thus has its most directly perceptible effect on the biota inhabiting the immediate area of a hydro site, while larger-scale developments clearly contribute more to major systemic environmental impacts.

"I found that by providing knowledge and skills to many volunteers who work on specific issues I can influence every conservation issue the Club tackles and not just one. Besides, I believe that I have the best job—close working relationship with the members all across the country."

MARTY!

EDUCATION:
B.S. Education, Biology and English; Ohio State University 1963
M.S. Outdoor Recreation & Field Biology, Central Michigan University 1974
WORK EXPERIENCE:
Teacher: Biology and English 10-12 grades
Farmer: 1300 Acre Farm, Fluharty Farms; Isabella Co., Michigan
VOLUNTEER EXPERIENCE:
National Sierra Club
Board of Directors, Fifth Officer 1978-present
Volunteer Oversight
Volunteer Training Program Development
Grassroots Training
Programs for volunteer leaders and members in twenty states
Sierra Club Council, Executive Committee 1975-1978
Author of Chapter and Group Handbook
POLITICAL AFFILIATION:
Republican

A profile of Marty Fluharty. . . Educator, Farmer and Sierra Club member

- Sierra Club Board of Directors
- National Membership Committee
- Sierra Club Council Executive Committee
- Chapter Chair (Mackinac)
- Group Chair (Nipissing)
- Member since 1969

Marty, and her husband, Jack, have a construction business and a 1300 acre farm in Rosebush, Michigan. They raise corn, soybeans and wheat. She credits her family for supporting her Sierra Club "career."

Marty Fluharty is a great example of a Sierra Club volunteer in action. Share the excitement and knowledge that, as a Sierra Club member, you too can make a difference.

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Is there hope of preserving intact any river when profits can be made from its potential power? National parks, monuments, and Wild and Scenic rivers may be safe; yet Texas congressmen have tried to withdraw the Rio Grande from the national rivers system, and a bill for a Grand Canyon dam was reintroduced in 1982. Stanford Young of the National Park Service says, "We're going to see more challenges by people who want to carve up the parks and decommission the national rivers."

Where people stand to lose their homes, new dam proposals are being fought. Brumley Gap in Virginia is one such case; 120 families would have been displaced by a massive pumped-storage hydro facility that was termed "unnecessary, conceptually

WILLIAM A. BAKE

This micro-hydro installation on North Carolina's Laurel Creek supplies 17 kilowatts of pipe-the-pressure power to a dozen local customers while imposing only a three-foot "head" and a 1,000-square-foot impoundment on the stream.

Much research is needed in this area, but it's likely that hundreds of small- and micro-hydro applications now before the FERC (see main story) will be acted upon before such research is done. It is nonetheless clear that the major environmental advantage to using a natural stream drop is that only a very small dam or diversion structure is required to collect water for introduction into a penstock. Capacities of from five to several hundred kwh are feasible with this technology; most such projects would fall into the micro-hydro range (less than 100kwh).

These small dams, as a rule, need not be more than two to three feet high. Since such projects are necessarily on streams with steep gradients—usually greater than five feet of drop per 100 feet of stream—the resulting impoundments are small indeed. (Upstream migration of fish is often possible at high water.) Typically, a potential pipe-the-pressure stream has natural vertical waterfalls of greater height than any the required dam would create.

A pipeline that drops in elevation may supplement the head developed by a dam. (The "head" of a dam is the distance water falls between its highest and lowest points.) Pipelines may also produce the bulk of the pressure necessary to turn a turbine when the elevation drop of the pipeline is much greater than the (usually small) dam height. An almost-level canal may then be constructed to feed into a pipeline that directs water to the turbine. These water-delivery systems, excepting the canals, can be either aboveground or buried. In terms of environmental impact the aboveground pipeline is usually preferred, involving at worst only a small degree of ground disturbance. If PVC or plastic pipe is used, no machinery is required to lay the pipe, which may be supported by cable lashed around posts in pairs on either side. The visual intrusion of aboveground pipelines may be lessened somewhat by either painting the pipe a neutral color or planting vegetation next to it.

Other environmental impacts of micro- and small-hydro developments depend primarily on whether hydropower capacity is "built in" to an existing dam, or if the entire installation is built from scratch on an unimproved stretch of water. In the former case, hydroelectric capacity added to an existing dam will not have major new impacts related to the impoundment of water (habitat modification, destruction of prime agricultural land, or the like). Environmental concerns then focus on the effects of pipelines, powerhouses, access roads, and very small new dams, as well as on the effect of stream-flow variations caused by peak and off-peak power-production cycles.

Construction of powerhouses and access roads may well cause the most significant environmental impacts of many small hydropower projects. Access roads may lead to the dam, the pipeline, and/or the powerhouse. Many hydropower sites require such roads because they are in rural areas. This is especially the case in mountainous regions, which typically provide the steep drops required for pipe-the-pressure hydroelectric generation. To reduce the environmental impacts of new roads, dam and powerhouse sites should be chosen to make the best use of existing roads. While a pipeline or small dam may not necessitate an access road, a powerhouse with its heavy turbine and generator probably will.

Small-scale hydropower at existing dams and pipe-the-pressure hydropower, if they are developed with environmental sensitivity, are likely to combine good power potential with minimal environmental risks. These technologies provide a preferable alternative to more conventional electrical-power technologies, including the construction of new large dams for hydroelectric purposes. □

Harvard Ayers chairs the Renewable and Conservation subcommittee of the Club's National Energy Committee. He is an instructor in the Earth Studies Program at Appalachian State University in Boone, N.C.

wasteful . . . and without economic merit" by the citizens' coalition formed to fight the project. (The Appalachian Power Company, a subsidiary of American Electric Power (AEP), withdrew its application for a feasibility-study permit at Brumley Gap on grounds of "economic uncertainty.") The Blue Ridge Project on North Carolina's New River would have moved 3,000 residents if the New had not been added to the National Wild and Scenic Rivers System in 1976. (It was this blow to AEP that led the utility to consider Brumley Gap as an alternative site.)

Yet hundreds of rivers are special places known by few people—and opposing a dam can be a complex job.

Because preliminary permits to study dam sites provide only that a feasibility study be conducted, permits are granted by the FERC without assessment of the need for the power in the selected areas, and with little concern for environmental issues. Individuals or groups sufficiently agitated by the prospect of a hydro development at a given site can hire a lawyer and intervene in the review process, attempting to reverse or defer an FERC decision to grant the permit. When a construction license is later requested, these people can intervene again, but by then hundreds of thousands of dollars may have been spent by the developer. Thus it is difficult to object to the preliminary permit (because environmental data are not yet collected) and difficult to fight a final permit (because the sponsor is so committed). The FERC views its role as one of promoting maximum development; yet appealing to this commission is sometimes the only chance a citizen opposed to a development has to influence critical decisions.

(Appeals by citizens to Congress and to the administration can have great influence on the FERC, and some of the classic dam fights—such as the New River, and Hells Canyon of the Snake River—were won through intensive lobbying of Congress, which passed laws superseding FERC licenses. To do this, however, requires a major nationwide legislative campaign.)

Taking a different approach to the issue of river preservation, the National Park Service completed a Nationwide Rivers Inventory, identifying streams eligible for the National Wild and Scenic Rivers System. Some 61,700 miles qualify on the basis of their scenic, fish and wildlife, geologic, historical, cultural, and outdoor-recreation values, compared to the 6,943 miles now in the system and out of the more than 3 million miles of streamflow in the nation. A 1979 presidential directive called for federal agencies to develop alternatives to projects that would damage the eligible streams, and to consult with the Department of the Interior about conflicts. On a number of rivers this procedure has not been followed by the FERC.

Even if FERC officials wanted to comply, they would have a difficult time of it: Deregulation has brought about cutbacks in both their functions and their staff. Deskbound bureaucrats in Washington, D.C., attempt to frame permit decisions on the basis of reports they receive of "consultations" between developers and the various state and federal resource agencies charged with seeing to it that hydro projects conform

Large dams (above, Bonneville) impound vast acreages of water, radically altering local ecosystems. Summersville Lake (right), an impoundment on West Virginia's Gauley River, is seen here at low level during its drawdown phase.

© GARY BRAASCH

to environmental-protection standards guaranteed by legislation such as the National Environmental Policy Act, the Wild and Scenic Rivers Act, and the Federal Water Pollution Control Act. Negotiation of disputed points is left to the resource agencies, which as a rule are up to their in-baskets with the flood of paperwork the small-hydro boom has generated. Among FERC reviewing agencies, the Fish and Wildlife Service is the only one that regularly comments on hydro applications; it likewise is swamped with work. And the Nationwide Rivers Inventory? Even the Interior Department ignores it.

How then may development of new dams be controlled? State-required permits are one means. "In California, it's the state that's holding the lid on," says Greg Thomas of the Natural Resources Defense Council. The state's concern may well have evaporated with the passing of the Brown administration, as Governor George Deukmejian has shown no real inclination toward river preservation.

In Maine, a state inventory resulted in an executive order by the governor opposing permits for dams on 16 streams. Yet the state's control is weak, because the Federal Power Act could preempt state regulations. Also, water-quality permits—administered by the states—are sometimes needed for dams and can limit projects the FERC would otherwise approve.

In opposing destructive hydro dams, one focus of the American Rivers Conservation Council is to ensure that the FERC adheres strictly to licensing requirements mandated by the Federal Power Act—requirements that have already been substantially eased in certain areas. (The administration has further proposed giving the FERC discretion to waive license requirements for any development of 15 megawatts or less—85 percent of the applications backlog.)

ARCC director Chris Brown says, "Through helter-skelter hydro development we could see a great setback in the river conservation work of the last 20 years. Power generation competes with many other river uses. The rivers are a public resource, and the ways they are used should be a public decision. The stripping of FERC procedures will leave the public and other government agencies with no voice."

The rush to build the new hydro projects was temporarily slowed by a court case. Utilities filed suit against the FERC's "avoided cost" regulations, and the District of Columbia federal appeals court ruled that the regulations should be rewritten. But when the case was appealed to the Supreme Court, the justices upheld the regulations by a vote of 8–0.

Today mountain rivers may be more threatened than ever by proposed dams. It will help to protect these rivers if the federal government reforms the incentives—tax breaks, investment credits, and regulatory advantages—that are enjoyed by public developers such as Western irrigation and water districts. Other approaches are to maintain environmental regulations and to regard the Nationwide Rivers Inventory seriously.

Yet all of this may not be enough. To save a valley or canyon, its river might need to become a major conservation issue, attracting many people who are politically active, determined, and creative. With only 2 percent of our rivers remaining undeveloped and eligible for the National Wild and Scenic Rivers System, and with new hydroelectric dams proposed on many wild and scenic streams, the coming years will show who owns the power of the rivers. □

JACK MONAKER

Tim Palmer is a river activist living in Beaver, Penn. He is the author of Stanislaus: The Struggle for a River, *published last year by the University of California Press.*

SIERRA'S FOURTH ANNUAL

Sierra is once again pleased to announce the winners of its annual photo contest. Each year's contest reaffirms our conviction that *Sierra* counts some top-notch photographers among its readers. We thank everyone who participated. All but one of the winners appear on the following pages; the second-prize winner in the "People in Nature" category, taken by Alan Stern of Oakland, Calif., appears on the cover.

The grand-prize winner, Neil R. Keller of Forest Hills, N.Y., will receive a Nikon FG 35mm SLR camera with a 50mm f/1.8 Nikon lens *and* a six-day cruise for two aboard a Windjammer sailing vessel. First-place winners will receive a pair of 9x25CF Nikon binoculars; second-place winners receive a pair of high-quality sunglasses from Vuarnet-France. All prizes were donated by the participating companies.

Prize-winning entries will go on display at the Club's national headquarters in San Francisco. They may also appear in *Nikon World* magazine or at the Nikon House gallery. After their showing at the Club, the winning photos will once again be available for display by Club chapters, which may contact the Information Services Department (530 Bush Street, San Francisco, CA 94108) for details.

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Robert McKenzie
Redding, California

PHOTO CONTEST WINNERS

GRAND PRIZE WINNER

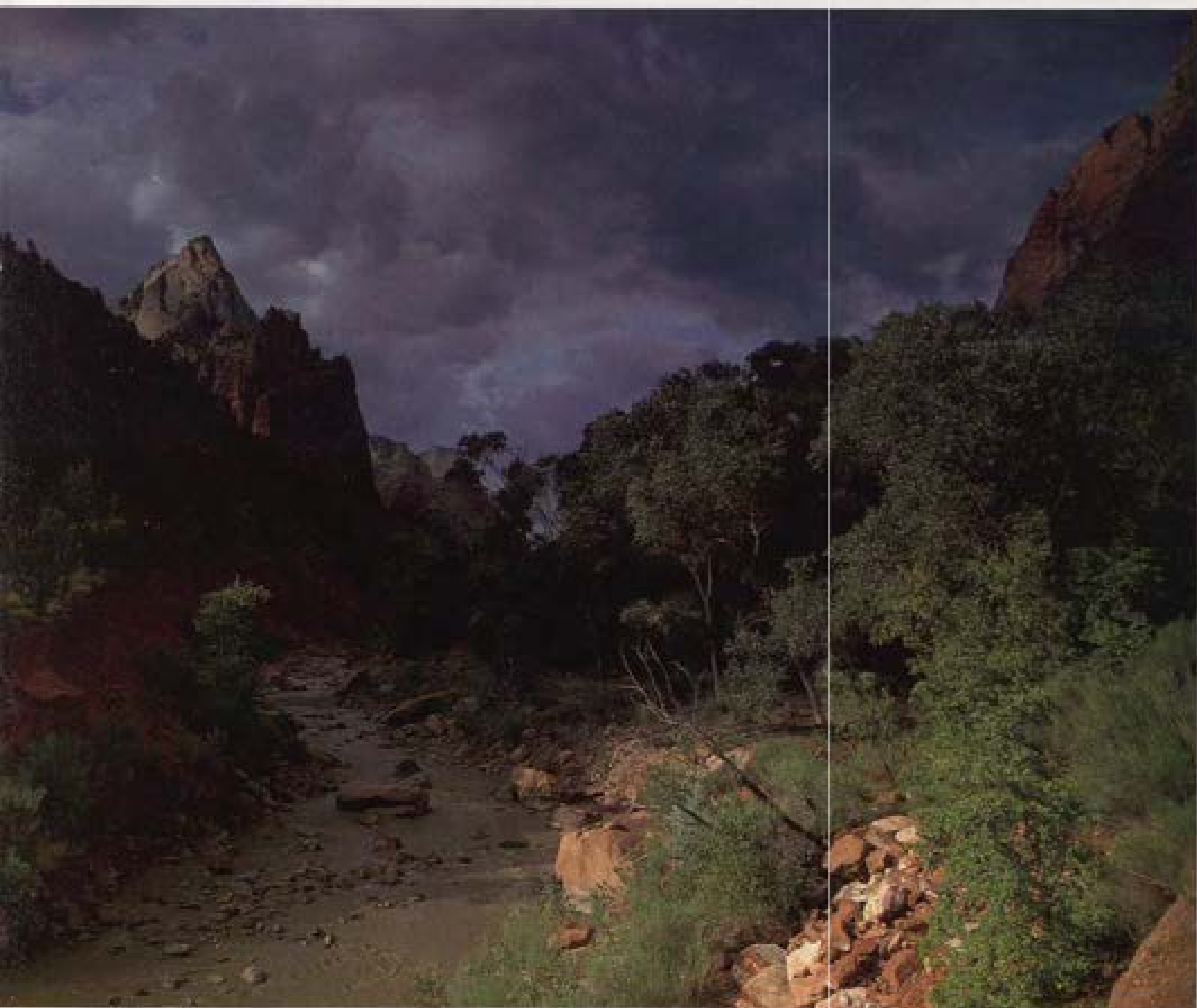
IN THE WILD

FIRST PRIZE

Virgin River, Zion National Park

Neil R. Keller

Forest Hills, New York



WILDFLOWERS
SECOND PRIZE
Lobster claw (Heliconia humilis Jacqueline)
Akaka Falls State Park, Hawaii
Curtis Cureton
Pebble Beach, California

WILDFLOWERS
FIRST PRIZE
Columbine (Aquilegia elegantula)
near Grizzly Reservoir, Colorado
Doug Lee
Woody Creek, Colorado

"Nature spreads [a] banquet constantly, with no thought of whether anyone will actually attend. If I were receptive enough, perhaps I would see it in everything. But I can't, so photography is one of the tools I use to concentrate, to look deeply, to block out with the lens all that is extraneous and see that which is essential." *Dewitt Jones*

WILDLIFE
FIRST PRIZE
Charging one-horned rhino, Nepal
Lawrence S. Burr
El Cerrito, California

WILDLIFE
SECOND PRIZE
Pelican near Adelaide, South Australia
Nicolas (Nika) Temnikov
San Francisco, California

PEOPLE IN NATURE
FIRST PRIZE
Amish on Florida coast
Leslie J. Golden
Ketchikan, Alaska

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Canoe Camping on Labrador's Ugjoktok

JOHN D. SCHULTZ

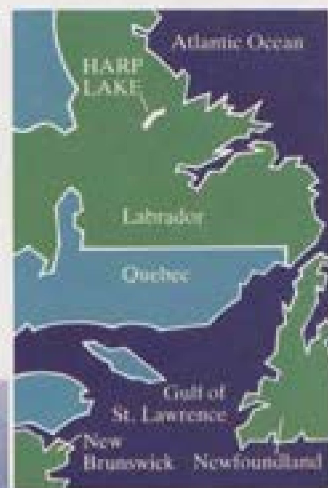
ONE HUNDRED FIFTY miles northwest of Goose Bay, Labrador, lies Harp Lake. This 30-mile-long glacial scar in the eastern slope of the Canadian Shield, the world's greatest expanse of billion-year-old rock, is a relatively young lake, gouged by Laurentian glaciers only 12,000 years ago. The lake is especially impressive because it's bordered along its entire length by granite cliffs that rise on both sides to 2,000 feet.

I first caught a glimpse of Harp Lake in the early 1970s, while on a rafting trip along a portion of the nearby Ugjoktok (Seal) River. Much of the next decade was given over to anticipating, and finally planning, my return to the brooding beauty of this harsh wilderness . . . and its reputedly sensational trout fishing.

By June 1982 I'd recruited a like-minded party to accompany me on a five-week canoe-camping excursion. The heart of the trip was to be a two-week descent of the Harp and Ugjoktok rivers to the foot of Adlatok Bay, a char- and salmon-fishing ground 35 miles west of the Innuit settlement of Hopedale. My companions included Otto Spielbichler, a college instructor; his wife, Vivian, a junior-high guidance counselor; Lou Grotke, an attorney; and Pam Lee, an elementary-school art teacher. The five of us—urban professionals all, but experienced canoeists with a passion for whitewater and wilderness—drove two cars loaded down with three canoes and 400 pounds of dehydrated food and assorted gear to North Sydney, Nova Scotia. There we chartered two light float planes, an Otter and a Cessna, for the trip to Harp Lake.

In planning the trip months before, we'd selected the southwest end of Harp Lake as our put-in point. But now, winging out over an awesome trough of black water, we scanned the shoreline in vain for evidence of wind cover for three loaded canoes. Quickly we decided to touch down at our alternate site, a sheltered bay 10 miles north.

Minutes after the planes receded into the bright haze, the five of us had organized the chaotic mounds of gear they left behind. A few yards behind our tents a fissured wall rose abruptly 1,500 feet. A mile east, soaring cliffs on the far side of Harp Lake seemed close enough to touch. There were nine miles of open water to negotiate before we'd reach a sheltered dogleg four miles from the outlet of the Harp River, so we decided to push off at 5 a.m. to beat the anticipated late-morning wind.



The next morning we slid, single-file, along the base of the towering north shore and out into the lake. The quiet was broken only by the rhythmic dip of paddles and a soft, gurgling whoosh. A boatlength from the south wall, bouquets of tiny blue and yellow wildflowers appeared in small crevasses. At several points enormous granite slabs plunged vertically into the water, their grainy surfaces melting into the blackness 30 feet below.

We approached the lake's only bend in a light drizzle. A snow-patched

The Harp River valley from the north shore. Author John Schultz sweeps along the swollen river far below while Lou Grotke surveys the scene.

OTTO SPIELBICHLER

dome of rock stood 1,200 feet above the surface directly ahead. Rounding a pyramid of sparsely treed rock on the south shore, we came upon 200 yards of sand beach. A small stream curled out of a wooded draw at the far end, and we could see two-foot-long forms darting across the shallows. Twenty minutes of pleasant work with a willow-leaf spinner added four two-pound lake trout to the evening menu.

A cold rain kept us close to camp all the following day. As we broke camp the second day, a faint rumble downlake exploded into a piercing shriek as two F-4 Phantom jets, bearing the black cross of the Luftwaffe, burst from behind the hill to our left and roared north, 40 feet above the water. We had been told that West Germany has a contract with the Canadian government to conduct low-altitude test flights over an uninhabited zone of northern Labrador. In 10 minutes these planes could cover our two-week canoe route. Their intrusion was a reminder of how fragile the solitude of deep wilderness really is.

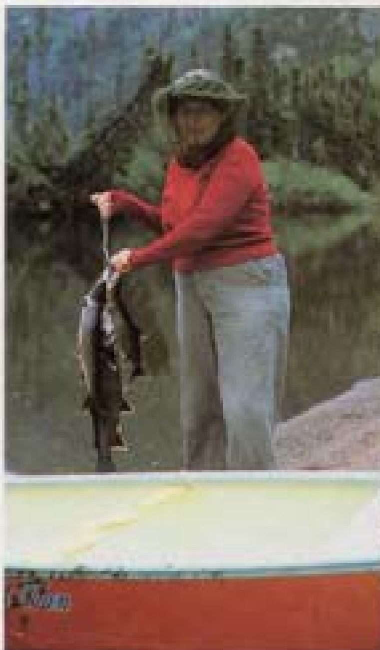
Two hours of paddling under clearing skies brought us to a wide cobble beach at the outlet of the Harp River, where we munched on granola and cold trout and frolicked in a shaded snowfield. A few feet to our right the river, 100 yards wide and only seven miles long, began at a dead run. Swift, quiet, and clear, it was the prettiest water I'd ever seen.

Swollen by runoff, the current drove us along at seven or eight knots. Glimpses of the sandy ridges on both shores became more hurried as we swept through set after set of choppy drops, where the river descended sharply between level sections.

Soon the river claimed all our attention. Long stretches of solid whitewater kept us busy maneuvering the boats away from the three-foot rollers—reversal waves that break back upstream—that commanded the channel. In six and a half miles of headlong flight our concentration was broken only once—by a tributary that thundered out of a rock basin above the left bank and fell 30 feet into the river.

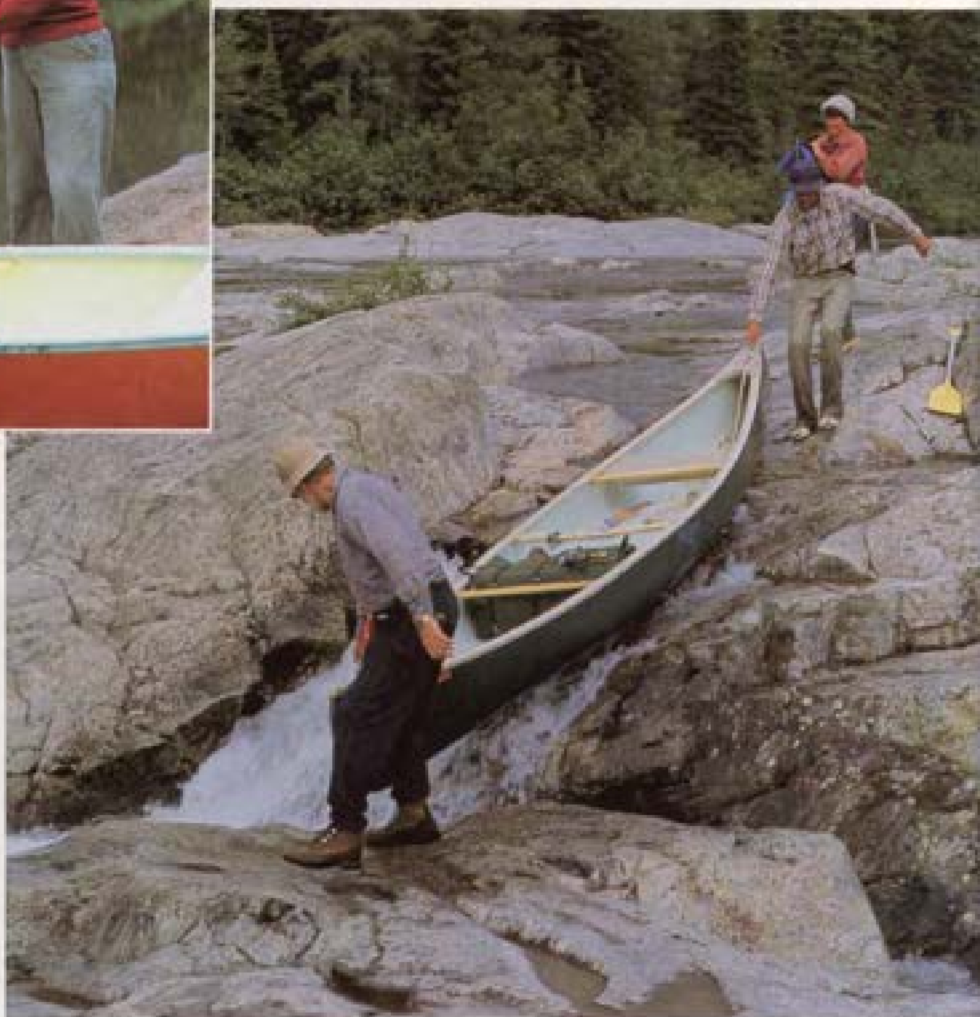
Half a mile beyond that point we shot over a flooded delta into the mile-long pool that forms the confluence of the Harp and Ugjoktok rivers. After we set up camp on a sandy beach, Otto slipped away in the small-

OTTO SPIELBICHLER



PAMELA LEE

The Labrador canoe-campers chartered two float planes in Goose Bay to carry their boats, tents, and other gear to Harp Lake. The $1,500 bill persuaded them to arrange for a cheaper return, however! (The total portal-to-portal cost of the expedition was about $950 per person.) Vivian Spielbichler (left) smiles through her headnet at the prospect of trout for dinner one evening. Right, three comrades negotiate a six-foot drop in a small stream that skirts heavy water in the Ugjoktok.



OTTO SPIELBICHLER

est boat to explore the area by water. The rest of us rode an eddy half a mile back to the base of the pool and then hiked to a point 500 feet above the river. Otto's red canoe was a speck on the broad pool below us. Beyond the wooded ravines and sandy ridges to the west, snow-flecked mountains rose in tiers to the horizon.

After returning to the canoes, Lou and Viv went back to camp while Pam and I skulled down to the Ugjoktok. A 20-inch lake trout drifted slowly over a sandy shoal two yards to our right. Its yellow iris, the rays of its orange ventral fins, and every white spot and gradation of green on its back and sides came into sharp focus in the stunningly clear water. As happens toward the end of a strenuous day, aesthetics ultimately took a back seat to appetite. The fish struck savagely three times before the hook on my tiny spinner held. En route to camp we intercepted two more trout softly plucking ants from the glassy surface. An hour later a panful of filets sizzled softly above Lou's Coleman Peak-1.

Next morning, in windless overcast, we eased into the Ugjogtok, following it eastward. Bordered by sandy embankments bristling with flood-toppled spruce, the river whispered along over polished cobble at five or six knots. The boats zipped along, guided by only an occasional corrective draw stroke.

The spell was broken by a low rumble and the appearance of several columns of mist ahead. From a mossy rise on the right bank we watched the river boil through five breaches in a ragged spine of granite and gather into a rolling string of six-foot haystacks that danced and spit for half a mile. This is the kind of bank-to-bank violence that spells "portage" all the way. After some appreciative study and a little finger-pointing at this or that special cauldron of turbulence, the drudgery began. Three hours later the heavy water was behind us.

A light rain was falling as we approached another stretch of whitewater a mile and a half downstream. Heavy water crowded the right shore; it seemed impossible to run. A dense wall of alders forced us into the 50-degree water for the reconnaisance.

We elected to paddle 150 yards of broken channel at the upper end, eddy out, and track the remaining 400 yards—that is, walk the banks and guide the canoes downstream with lines attached to bow and stern. When we reached the base of the rapid we adjusted our gear, cinched up the tie-downs, and pushed off in silence, studying both shores in vain for a level, wind-protected site. We scouted and ran two short rapids a half mile apart before locating a suitable beach at the north end of a small island. A quiet, rainless sunset, steaming mounds of curried chicken, rice, and chutney, and dry down bags transformed tense fatigue into relaxed rest.

The following day, fine weather and a prevailing spirit of leisure sent us ashore at 2 p.m. At 8:30 the next morning we swung into swift water under rainless overcast. As we accelerated away from and then cleared the island we'd chosen as our campsite, we were assaulted by a loud, solid roar. Three hundred yards ahead the river funneled into a short succession of four-foot drops before falling into a narrow chute that released a string of mountainous rollers into a long pool.

After a three-hour portage over fractured masses of granite on the higher right bank, we powered the boats through a monstrous eddy and made a precarious ferry back to a beach on the left shore, at the tail of the chute. After lunch, in what amounted to a triumph of spontaneity for a seasoned (and slightly compulsive) group, we unanimously decided to spend the night, scarcely half a mile below our previous site!

A few yards above camp, adjacent to the roaring chute, a millennium of action by gravel and high water had ground and polished several tub-sized basins in the pink granite. Four feet deep and marbled with black intrusions, they were more inviting than anything I've seen by American Standard. I shucked off my cotton duds, sent a couple hundred mosquitoes into the air with a well-practiced but by now unconscious sweep of the hands, and slid below the surface. The malicious murmur of disappointed mosquitoes was faintly audible above the din of whitewater. In this country each small pleasure has its price.

At 7 A.M. Lou pushed his head through the snow vestibule of our tents to report cloudless skies and a light southwest breeze. After carefully trimming the boats and securing our gear, we pumped through a long eddy to the tail of the pool. We were scarcely under way when we heard a low rumble ahead. Flecks of foam danced and spit against a dark backdrop of spruce.

A quick reconnaisance along the alder-choked left shore revealed an unrunnable staircase that tumbled through a treacherous rock garden for half a mile before swinging right. Lining the loaded canoes past clinging alders, around head-high boulders, and through deep, narrow sluices was the work of half a day. Only once did we swamp and nearly pin a boat.

In the water again, our velocity quickened as the river swung sharply left. Ahead to the southeast a knob of spruce stood 200 feet above the right bank; half a mile beyond, 1,200 feet of bald granite dominated the near horizon. The map showed this to be the approach to a three-quarter-mile horseshoe of rapids that ended in a wide, island-studded shoal at the Ugjoktok's confluence with the Shapio River.

The rapid began with a long, slick tongue of very fast water, converging 200 yards down in a welter of four-foot standing waves. Otto and Viv ferried left at the top of the V, maneuvered through some standing waves, and eddied out a quarter mile below. Pam, intimidated by the volume of water moving past us, chose to walk around.

Lou and I, meanwhile, were quickly overpowered by the current and swept headlong into the standing waves. An icy wall of water pounded across my chest as we plowed heavily into the first of them. As successive waves poured over the forward gunnels, it seemed for a few tense seconds that the river had committed us to the unscouted turbulence downstream. But some determined draw strokes freed us from the heavy water, and we limped in behind the first boat, a bit shaken—but very grateful to be afloat.

Confident the worst was past, we decided to renege on our resolution to scout all whitewater. With just a flicker of misgiving, Pam and I fell in behind Otto and Viv and set a diagonal course for the inside of the bend on the far shore. With alternating sweep and draw strokes, each tandem threaded neatly through the widely spaced rocks. But as we slanted toward shore, a garden of tightly placed boulders forced us back toward mid-channel. Two-foot waves became three-footers, and we began to take water.

The lead canoe bucked violently as if on a huge moving fulcrum. Pam and I sent a flurry of low braces into the peaks of four-foot rollers, probing in vain for support. A huge slab of brown granite raced toward us from the bottom of a deep trough. As the stern heaved up, I scanned ahead for a rescue point and braced for impact. In a split second the bow reared up, pitched through the trough, and buried itself in the huge wave beyond. The speed and volume of water had helped us clear the rock!

Awash, but stunned by our dumb luck, we nursed our canoe out of the channel and eased into a shallow eddy on the right shore where Otto and Viv were bailing. Lou, who had also collected a lot of river in the high-riding 15-footer, swung in behind.

A shallow riffle rode the right bank for 300 yards past a small island and into a large, circular pool. As we coasted down into the pool, the turbulence behind faded to a whisper. Shapio Falls thundered into view from the left, crashing 40 feet through broken granite to a wide gravel delta. Opposite the falls we spied a narrow spit of sand, backed by alders and a low ridge, with all the properties of a perfect camp: It was sheltered from the wind, it was on the water, and it offered a

spectacular view of the falls and the stone massif beyond.

It was *too* good. As we leveled tent pads among the alders, a high-pitched hum closed around us. Our activity had stirred up an enveloping mist of mosquitoes. By the hundreds they probed every unsecured closure on shirts and pants. Tight columns of black flies—the Labradorian adventurer's number-one tormentor—escalated the siege with unnerving persistence, settling hungrily on every sliver of exposed skin. Headnets and wool shirts appeared; vials of repellent circulated.

Tents up, Otto and I fled the scourge by paddling to the foot of the falls to fish. Riffles spilling out into the pool teemed with small brook trout. After releasing a dozen or so we returned to camp for chicken and dumplings, each spoonful tucked carefully up under our headnets. Our nightly ritual of murdering the hundreds of black flies and mosquitoes that rode into the tents on clothes and hair, usually 20 minutes' work, took an hour. Having shaken the remnants of our slaughter from the sleeping bags and swept them into a neat pile, Lou and I drifted off to the sounds of determined swatting from the neighboring tents and the subtle drone of the hordes outside.

The morning sun flushed us out of the tents and into the flies for a hasty breakfast. Our decision to abandon this lovely place was unanimous . . . and quickly made.

Though the river still ran swift and clear, its character changed dramatically. Low, bald ridges melted away to north and south, and the water took a zig-zag course between high banks and wide sandbars. A pair of ospreys spiraled down from their huge stick nest to scream at us for invading their solitude. Paddling under a bright summer sun against a bug-free east breeze, we swung into the Adlatok branch. Here a third of the Ugjoktok River's volume flows northeast for about 15 miles; then, with a final flourish, it drops through a narrow canyon into Adlatok Bay.

Early in the afternoon we chose a sandspit on the north shore, at the confluence with a small tributary, for our last campsite on the river. That night two beavers repeatedly cracked out a message of anger and frustration on the pool near our tents, no doubt hoping to hasten our departure from their home.

Clear weather held the next day. We swung lazily with the channel from bank to bank; the ubiquitous spruce forest crowded in behind a fringe of alders and extended to the base of worn gray ridges a mile or so out on each side. Three huge owls—two young and an adult—peered at us at close range from their perch on a leaning spruce as we raced quietly by. In a flurry of excited speculation, Pam and Viv, after repeated consultation with Roger Tory Peterson, concluded we had seen great gray owls, a species not previously reported in this area.

A mile from the bay the river narrows sharply and burrows through a tiny canyon in a three-quarter-mile loop of falls and pools, its last hurrah. After a warm and buggy lunch at the head of the canyon, we harnessed up for the mile-long portage to the bay. Except for 200 yards of uneven rock at the upper end of the canyon, it was easy going over gently rolling, tundralike terrain. After three and a half hours of forced labor, with a little mild cursing directed at an ardent entourage of horseflies, we reached the bay. The contoured carrying thwarts I'd installed on two of the canoes more than paid for themselves here.

We chose a small island half a mile offshore to wait for the prearranged launch from Hopedale, due to pick us up in two days. An abandoned gray-slabwood cabin stood in a clearing at the south end of the island. We set up nearby, a few feet from a row of giant rhubarb, vestige of a long-neglected garden.

Our waiting time was devoted to sunshine and leisure: bathing, reading, birdwatching, and exploring. Although we had eaten fresh fish during our two weeks on the river, the basic regimen of freeze-dried food triggered fantasies of fresh meat and fruit. In the stillness of a blazing sunset, Mackey, the "Newfie" guide from a nearby VIP fishing camp with whom we'd visited briefly after coming off the river, skimmed across the bay in a 16-foot runabout—like a genie to grant our wish—with a fresh 10-pound salmon, enough grapefruit, oranges, and apples to go around twice, a pound of bacon, a dozen eggs, and cookies.

By midafternoon a 28-foot fishing scow was chugging cautiously through several acres of rocks exposed by a receding tide. Abraham Winters and his wife had arrived for our gear. I joined them for the five-hour ride to Hopedale while the others took up the camp host's offer to join his pilot for the 20-minute helicopter flight.

The Winterses spoke quietly of their life in Hopedale. They talked about seasonal salmon and char fishing, caribou hunting, and then other matters more familiar to us: unemployment, the cost of living, and the quality of education in the village school.

The one-cylinder engine throbbed along at a snail's pace. Sea ducks and nesting gulls crowded tiny islands. As we eased through one narrow channel, a school of capelin covering several acres moved below us like an undulating carpet in the sparkling water. Millions of these foot-long fish support spawning cod, salmon, and char.

I had mixed feelings as the forlorn little settlement appeared in the fading light. I was sad that I would probably never again see the austere beauty of this unforgiving land; but I was comforted that I would carry knowledge of its existence with me always. □

Otto Spielbichler (left) and John Schultz track one of their party's three canoes down a spur of the Ugjoktok River opposite a stretch of unrunnable whitewater.

PAMELA LEE

John D. Schultz, an avid canoeist, fisherman, and hiker, lives in Bethesda, Md.

Purifying Water in the Wild

DAVID M. KNOTTS

ILLUSTRATION BY RON CHAN

WATER, ONE CAN SAY with some certainty, is the one backcountry provision that cannot be packed in a dehydrated or freeze-dried form. Furthermore, it is extremely heavy—a gallon weighs about nine pounds. As a result, an individual can carry only a limited amount of water for any length of time. Inevitably, a hiker or backpacker out in the wild for more than a day faces the necessity of replenishing his or her supply from available sources. And while drinking water straight from a cold mountain stream or clear spring has tremendous aesthetic appeal, nowadays one runs the risk of developing an uncomfortable or even incapacitating case of lower-GI distress—even in the remotest, most pristine areas.

With increasing numbers of people taking to the backcountry, the "purity" of most available water supplies is questionable, and the odds of encountering lakes and streams contaminated with viral, bacterial, or parasitic pathogens have increased greatly. So before drinking from free-flowing water sources, it's best to remember the old saw about an ounce of prevention.

While the threat of disease from such waterborne bacteria as *campylobacter*, *salmonella*, and *shigella* can be eliminated

through standard methods of field purification, a relative newcomer to the backcountry scene, the protozoan *Giardia lamblia*, survives most of these procedures to give the unwary camper a severe case of the miseries, which in addition to diarrhea may include loss of appetite, dehydration, cramps, and, in rare cases, vomiting.

Although occurring worldwide, it's only been in the last decade that *Giardia* has become widely regarded as a problem in the North American backcountry. Researchers estimate that from 3 to 20 percent of the U.S. population are carriers of the organism. Couple that figure with the influx into wilderness areas of people who practice poor sanitation habits, and it's not hard to see why *Giardia* is so widely disseminated. Additionally, studies by the Wild Animal Disease Center at Colorado State University in Ft. Collins have identified more than 30 species of animals as carriers of *Giardia*, among them beavers, dogs, cattle, coyotes, deer, muskrats, cats, marmots, and ground squirrels. While the *Giardia* that infect these species may not all infect humans, a number of these animals contribute to the problem, even in the upper reaches of watersheds.

A variety of water-purification methods are aimed at preventing waterborne disease, but since health officials currently recognize giardiasis as the number-one problem facing users of water in remote country, an evaluation of these procedures should consider their effectiveness against *Giardia* as its measuring stick.

The first step in purifying water is to pour it through a cloth to filter out solid particles and organic matter—an unnecessary step for clear, clean-looking water.

Health officials and researchers agree that water maintained at a rapid boil for at least 10 minutes should be safe to drink. Research has shown that, at sea level, boiling water for one minute effectively eliminates *Giardia* and bacteria, but not viruses. However, at higher altitudes water boils at lower temperatures and should therefore be kept boiling longer—5 minutes at 10,000 feet, for example. The flat taste of boiled water can be improved by pouring the water from one container to another a number of times, or by adding a pinch of salt to each quart of water boiled.

When boiling is not practical—it is often awkward and inconvenient—hikers and backpackers often consider chemical disinfection a satisfactory alternative. This may not be the case. In fact, some researchers studying *Giardia* insist that there are too many critical factors to make chemical treatment reliable.

The two chemicals commonly used are iodine and chlorine. Both have an uncertain effect on *Giardia*, depending on the temperature and pH (acid/alkali balance) of the water, but with proper application they will kill most other disease-causing agents. Practitioners of these methods should recognize that chemical purification depends on the temperature of the water, the concentration of the chemical, and the amount of time the chemical is allowed to work. In general, the higher the temperature and the longer the contact time, the better. You can raise the temperature of treated water without building a fire or breaking out your camp stove—simply placing your canteen in a sunny spot or in the bottom of your sleeping bag overnight will make chemical treatment more effective.

You can chlorinate drinking water by using common household bleach or commercially prepared tablets, such as Halazone. The latter offers the advantage of convenience and the safety of a premeasured dose. Most commercially prepared tablets are chemically unstable, however. Halazone, for example, has a relatively short shelf life—when exposed to heat and air, it loses much of its potency. If you plan to use Halazone, take a new, unopened bottle on each trip. Other water-related variables—low temperatures, the presence of organic matter, a pH above 7—severely reduce Halazone's effectiveness. As with all commercial disinfection chemicals, follow label directions carefully.

Before using common household bleach as a disinfectant, read the label to determine the percentage of chlorine in the solution. Check, too, to make sure that the bleach contains no active ingredient other than sodium hypochlorite. Then follow the proportions indicated in the chart accompanying this article. The treated water should be stirred or shaken thoroughly and allowed to stand for *at least* 30 minutes or longer—preferably overnight. The water should have a slight chlorine odor or taste; if it does not, repeat the procedure and allow the water to stand for an additional 15 minutes. If the treated water tastes too strongly of chlorine, let the container stand uncovered for a few hours, or pour the water from one clean container to another several times. Dissolving a vitamin C tablet in the container will also reduce the chlorine taste and odor.

Water can also be purified by using commercially prepared iodine tablets, tincture of iodine, or iodine crystals. When applied in proper dosages, iodine will kill algae, viruses, bacteria, spores, and most infective cysts, and will somewhat weaken the effect of *Giardia*. Potentially, the user will be protected from most of the harmful organisms that may be present in the water, but, again, water temperature and contact time are important variables. Compared with chlorine, iodine is more effective over wider temperature and pH ranges. Iodine residue does have a disagreeable taste, however.

As with Halazone, commercially prepared iodine products such as Globaline provide the consumer with a convenient premeasured dose, and they must be protected from heat and exposure to air if they are to remain effective. Again, label directions should be carefully read.

When using a 2-percent solution of tincture of iodine—the type found in many medicine chests and first-aid kits—add 10 drops to a quart of clear water and 20 drops to the same volume of cold or cloudy water. Shake well and allow the solution to stand

Amounts of water purifiers to use

Two of the water-purifying agents described in the accompanying article, iodine crystals and liquid chlorine bleach, must be applied differently, depending on the temperature of the water (for iodine crystals) or on the strength of the solution (for bleach). The tables below indicate the amount of each that should be added to a quart of water under varying circumstances.

Iodine

Water Temperature (degrees Fahrenheit)	*Capfuls* of Solution to Be Added*
37	8–10
68	5–6
77	5
104	4

**A single capful from the 1-ounce bottle will contain about 2.5 cc.*

Chlorine

Liquid chlorine bleach usually has 2 to 6 percent available chlorine. Read the label to find the percentage of chlorine in the solution; then follow the treatment schedule below.

Percent Solution	*Drops of Bleach (clear water)**
1	20
4–6	4
7–10	2

**Double the number of drops and increase the contact time for cloudy, cold water.*

for at least 30 minutes—longer if possible. To purify water using iodine crystals, take a one-ounce vial containing four to eight grams of crystals, fill it with water, and shake it vigorously for 30 to 60 seconds. After the heavy iodine crystals have settled to the bottom, pour a small amount of the solution (see accompanying box) into a canteen or drinking container. *Do not introduce the iodine crystals directly into the canteen.* Let the now-treated water stand for at least 30 minutes to an hour to allow time for the disinfectant to act. The crystals can be re-used up to 1,000 times, and, unlike iodine tablets, they have an unlimited shelf life.

It is important to note that using iodine for water purification has one potential drawback. The chemical is toxic, and accidental poisoning, though rare, can occur. Persons who have a specific sensitivity to iodine or have been treated for hyperthyroidism should avoid this process altogether.

Iodine crystals are of particular concern. Advocates of the crystals recognize the toxicity of iodine but claim that it is "remarkably low in the concentrations used for disinfection" and that "the only significant danger of the iodination procedure is the inadvertent ingestion of iodine crystals."

Recent questions raised by researchers about the effectiveness of the crystals suggest other disadvantages. Studies have found that the strength of the saturated solution varies from one mixture to the next. The same studies indicate that the saturated solutions are less effective against *Giardia* cysts in very cold water; for best results you'll have to warm it up.

Additionally, iodine is highly reactive and can oxidize most metals, plastic, cloth, and paper. If a small bottle of iodine crystals or other iodine product were to break or spill in a backpack, the pack and its contents could be damaged by charring.

Tablets of the compound tetraglycine hydroperiodide (TGHP), known commercially as Globaline, Coughlan's, or Portable-Aqua, have been used as water-purification agents for at least 25 years. Recent lab tests have shown TGHP to be 99.8-plus percent effective against *Giardia*, but that figure may be misleading. Researchers such as Tom Suk of the University of California at Davis point out that "current methods for testing the viability of *Giardia* cysts are crude. Anything less than 100-percent effective should be questioned seriously. The figures tossed around by manufacturers are derived from laboratory tests performed under ideal conditions, not from field data using a canteen full of cold mountain water."

The greatest attraction of TGHP tablets is their safety. Each tablet contains a pre-measured dose of iodine (8ppm). Also, TGHP tablets are more stable than chlorine-type water-purification tablets—when packaged properly, the tablets are stable for extended periods of time even under adverse climatic conditions.

Portable water filters may just make all the fuss about chemical purification methods academic. In the past, such units have been the subject of controversy among backcountry water users. Some manufacturers have made claims that far exceed the capabilities of their filters and have misled consumers. The problem with many of these filters is their failure to trap objects as tiny as *Giardia* cysts and other microorganisms. Straw-type disposable filters, for example, use a 10-micron filter and an iodine medium to "purify" water. Experts point out that the filter openings are too large, the contact time with the iodine too short, and the iodine concentration too low for these filters to be completely reliable.

"While drinking water straight from a cold mountain stream or clear spring has tremendous aesthetic appeal, nowadays one runs the risk of developing an uncomfortable or even incapacitating case of lower-GI distress—even in the remotest, most pristine areas."

The Environmental Protection Agency has divided water-treatment devices into three distinct categories. The first two include those devices that make water more palatable by removing odors and in some cases grit, sand, and other particulates. Only category-three filters are classified as *water purifiers*, and these are the only devices intended for use on raw or potentially polluted water.

One such portable purifier is General Ecology Inc.'s First-Need. Chosen by a number of federal agencies for field use, the First-Need weighs a scant 12 ounces and will purify between 800 and 1,600 pints of water at the rate of one pint a minute. A unit's lifespan depends on the clarity of the water being used. According to the manufacturer, the purifier employs a three-stage process in its replaceable filtration canisters: water passes through a .4-micron micro-strainer capable of removing *Giardia* cysts and other bacterial pathogens; the micro-strainer is impregnated with an absorption medium that draws pesticides and other toxins from the water; and the canister's "insides" have plus and minus electrical charges to amplify the unit's purifying ability.

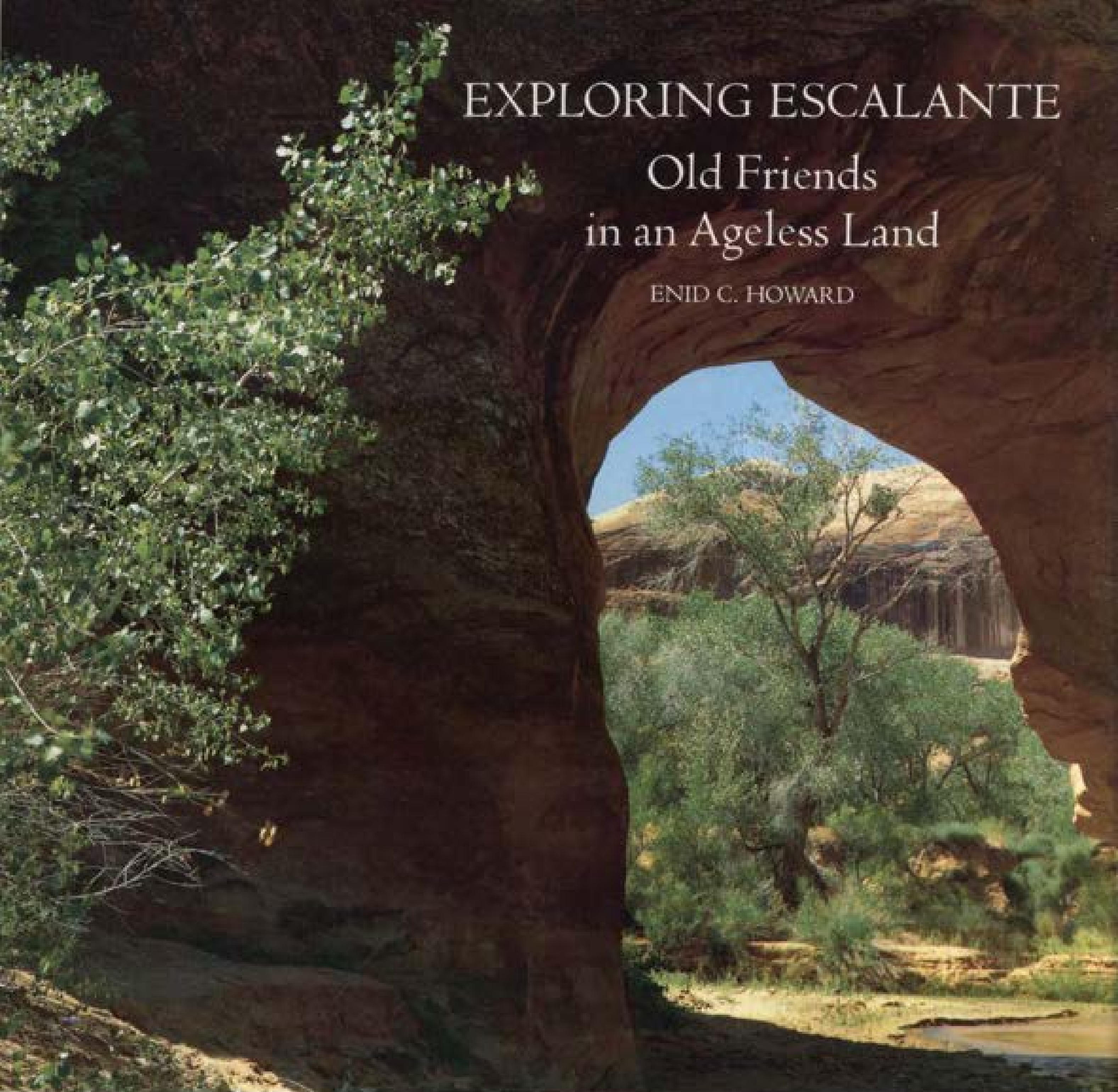
Just recently available commercially, First-Need costs a recommended $39.95; replacement canisters run $24.95. The 3"x3" canisters will "tell" you when they need changing—water will no longer pass through them. Cautious campers will want to carry an extra on longer hikes.

A larger but still light and compact unit is the Katadyn water filter. A staple item with NATO armies and the International Red Cross, the Katadyn filter relies on a fine, porous ceramic material impregnated with silver to filter out suspended matter and disease pathogens. The filter is about the size of a standard flashlight and weighs 23 ounces. The advantage of the unit is its ability to fulfill the water needs of several people. Used with a hand pump, the filter can process about one quart of drinking water a minute.

The Katadyn filter is expensive—it retails for $150. Each unit is equipped with a cleaning brush and comes with instructions on how to maintain the filter for maximum efficiency.

All backcountry travelers have an obligation to prevent the further spread of existing disease pathogens or the introduction of new strains. This means practicing proper field sanitation when disposing of human waste, restricting pets from water sources used by people, and educating the general public about threats to the purity of our free-flowing sources of water. □

David M. Knotts is on the faculty of the School of Forestry at Stephen F. Austin State University in Nacogdoches, Texas.



EXPLORING ESCALANTE
Old Friends in an Ageless Land

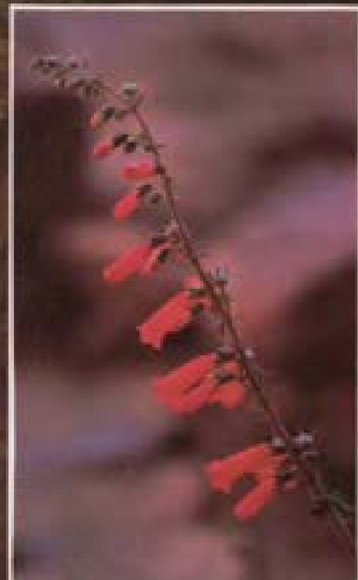
ENID C. HOWARD

THE ESCALANTE RIVER in southeastern Utah begins its course in the high country of the Aquarius Plateau and the Dixie National Forest. It gathers its waters from a topsy-turvy section of the vast watershed including Death Hollow and Hells Backbone, dashes south past the historic Mormon town of Escalante, then swings southeast to capture the water of Calf Creek. From that point the river literally wriggles its way through an eroded mass of sandstone formations in which it has cut chasms 1,000 to 2,000 feet deep. Before Lake Powell was created by Glen Canyon Dam, the river twisted and turned in tight loops—never finding a straight path to its destination, the Colorado River.

Glen Canyon Recreation Area encompasses the river from Calf Creek to Lake Powell. The lake has inundated Escalante Canyon and its tributaries as far upstream as Coyote Gulch. Nevertheless, the canyon above Coyote Gulch is still a backpacker's delight.

My good friend Kent Frost guided hiking parties into the Escalante as early as 1960. His first impressions of the inner gorge are recorded in his book, *My Canyonlands*:

There was a strange quality of expectancy to the canyon from the moment we entered, and it grew more so. Temperatures were over 100 degrees every day, but we soaked ourselves in the river with our clothes on—even our shoes. We hiked until we were dry—



Coyote Creek flows through Coyote Natural Bridge, a striking formation of Navajo sandstone. A penstemon (inset) glows in light reflected from the walls of a narrow tributary of the Escalante River.

PHOTOS © GARY LADD

perhaps a half hour—then we soaked again.

There is a fairy tale quality to that canyon. Escalante is sliced from beautiful rock that has been sculptured on a grand scale. Every side canyon conceals an arch, cave, or vault in sandstone colors of cream, beige, salmon pink and red browns. The bottom is gentle and generous, with green plants, willows, cottonwood trees beside the river.

The strange promise that hung in the air fulfilled itself each day at places like lovely Hamblin Arch in Coyote Gulch, mighty Stevens Arch on the skyline, Coyote Natural Bridge, the awesome Cathedral in the Desert, Broken Bow Arch in Willow Springs Canyon. There are few places with more gifts to give.

A small corps of regulars has backpacked with Kent for many years. I've walked unmeasured miles with him for 12 years, others longer than that. Most often a group will consist of two to four people. When Kent writes, "Let's go! I've found something," we gather. Not one of us is under 50; some are pushing into their 70s, like myself at 71. Kent is 65 and still a slim 150 pounds of spring steel—agile as a goat, unflappable, good-humored, untiring, always innovative. A superb outdoorsman.

Our trip to Escalante Canyon was scheduled for early June. Three of us—Kent, Miriam Krogman, and I—began at the confluence of Calf Creek and the Escalante River at state highway 12, about 14 miles from the historic town of Escalante, Utah.

Kent had a surprise for us. He decided we would enjoy our walk more if we didn't have to carry packs. He had brought along two truck-tire inner tubes, which we inflated, then lashed together with a frame of willow branches tied with nylon rope. We were in business.

Our "ship of state" carried all our equipment. Large plastic bags fit over the packs to keep everything dry. We walked in the river with our cargo carrier on a rope leash. We guided it around rocks, lined it through rapids, and pulled it over sandbars. In smooth water we let it float free, and it swirled gaily around curves, twisting and turning with all the grace of a ballet dancer. We walked the riverbank whenever we could, but the willows grew so thick it was easier to stay in the water.

We had given much thought to the type of footgear we would wear, knowing that our feet would be wet all the time. Our choice was a high-top basketball shoe that laces over the ankles, with a heavy, thick sole. We opted for two pairs of socks—the inner one 100-percent cotton, the outer one heavy wool. We laced our shoes comfortably tight. The idea was to keep the sand away from our feet—it would have rubbed them raw. The socks got wet, of course, as did our shoes, but we came through with no foot problems—nothing worse than wrinkled toes and clean feet.

The canyon, narrow at times, flared out to small meadows on the incurves of the stream. The walls increased in height as we progressed downriver—pale-red cliffs of Navajo sandstone, deposited during the Late Triassic Period (180 million to 225 million years ago), and reddish-brown siltstone from the Carmel Formation of the Jurassic Period (135 to 180 million years ago).

The river had cut off two large meanders, abandoning its old course and leaving a "rincon," a former river channel. These rincons often contain large river-eroded alcoves. If wind has not filled them with sandhills, they make excellent campsites.

The time passed too quickly. Four days of hiking brought us to Silver Falls Canyon, which enters the Escalante from the Circle

ILLUSTRATIONS BY

JOSEPH HOLMES

Cliffs area east of the river. We made an early camp under a shallow overhang. It felt good to remove wet shoes and socks and walk barefoot in the clean, dry sand.

We rested and discussed whether to continue downriver to Coyote Gulch or walk out Harris Wash, which was slightly downstream from our camp. The water level of the river was dropping one to two inches a day. Another two inches and we would not be able to float our raft.

By morning the river *had* dropped two

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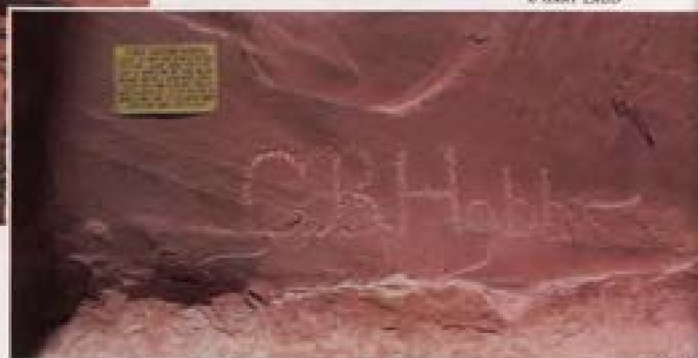


The Escalante twists and turns (left) on its way to the Colorado River, carving deep chasms in the sandstone. A hundred years ago a traveler caught in a snowstorm in Silver Falls Canyon did some carving of his own, chiseling his name into the wall of the cave that sheltered him for five days.

Tips for the Older Backpacker

SHIRLEY BLUMBERG

AGE IS NO BAR to enjoying the wilderness. Like many other senior citizens, my husband and I go forth every summer to explore the beautiful mountain trails of this country. There's no reason you too can't continue to backpack if you are in good health and condition. If you enjoy the wilderness but have considered giving up backpacking because the pack now seems too heavy, your legs get too tired, or because it's no longer much fun, all you may need to rekindle your enthusiasm are a few special techniques and a willingness to adapt to new schedules that meet your changing physical needs.

Some of the suggestions below hold true for backpackers of any age and are well-known to all with backcountry experience. But though the young can often get away with ignoring energy-saving techniques, the older hiker does so only at risk of excessive fatigue or other unpleasant physical reactions.

HOW TO WALK. Walking and breathing are abilities that we take for granted, but their optimum performance in hiking is an art—probably the most important of all to learn if you want to enjoy the mountains.

First, like the tortoise, seldom change your comfortable, steady pace. Instead, vary the length of your stride. Keep a normal stride on level stretches, and shorten it—even to tiny steps—going uphill. Your stride will lengthen naturally on the downhill stretches.

Second, in addition to maintaining an even pace, adjust your breathing to the difficulty of the hill. Although breathing patterns are an individual matter, many hikers find on the steeper stretches that deep and audible breathing of one complete respiration for every two steps helps get them up the hill without repeated rest stops. According to one expert, shallow breathing or panting supplies oxygen to only stomach and chest muscles. It takes deep breathing to get enough oxygen from our lungs to our legs.

Before I learned these pacing and breathing techniques, I would have to stop every few minutes to rest—and I was younger then. Find out how deliberate deep breathing works for you by practicing on several flights of stairs.

Two more walking tips: Take your pack off, then sit down and rest for at least 10 minutes each hour. Be strict with yourself about this, even if you don't feel tired. And when you *are* tired, don't hesitate to stop for a rest. You'll feel the difference at the end of the day. Of course, you know these rules, but how often have you ignored them as you pushed on to reach the next stream or lake?

WHAT TO CARRY. Robert Wiswell, exercise physiologist and assistant professor of physical education at the University of Southern California, has researched the effect of exercise on older persons (up to the age of 80). He says that as people age "they have less muscle mass, so a given load on an older person is a greater proportion of their capacity—and the greater proportion of capacity they carry, obviously the greater the risk of muscle soreness, fatigue, and strain. The older individual may be more prone to injury, but, with caution, normal mountain hiking should not be a major risk."

In light of Wiswell's research, the truism that an ounce in the hand feels like a pound on the back has added importance for the older backpacker. If your ready-to-hike packweight is much more than 20 pounds (woman) or 35 pounds (man) for a week's trip, unpack and start over. It's always amazing to find that something once thought essential could well have been left behind. Just keep repeating,

more inches—and we decided to exit at Harris Wash. But before leaving the river we agreed to explore Silver Falls Canyon.

The canyon proved pleasant, with tall old cottonwood trees and easy walking. A half mile from the river, high on a sand bench, we found a neat, well-constructed, one-room cabin. Kent remarked that cattle are still brought here to graze in spring and early summer. We carried our drinking water, which we boiled or treated, having been warned that *Giardia lamblia*, a protozoan that causes severe intestinal distress, has been found in the Escalante. Boiling will kill it, more surely than chemicals. (See "Purifying Water in the Wild," page 57.)

We investigated a very large, deep alcove where the names of early travelers were scratched in the rear wall. Most prominent was that of G. B. Hobbs, who camped there for five days near his 24th birthday in 1883. He was packing food and supplies to a Mormon settlement across the river when he was caught in a snowstorm. He passed the time by chipping his name and the date in the sandstone wall of the cave.

The river dropped still another two inches overnight, so we prepared to pack out at Harris Wash. We carried the raft into a neat hiding place. We had already walked about 26 miles; it would be 11 miles to the exit road, a long, hard, hot walk away from the river. We arrived at the hikers' register at 4 p.m. and camped there.

In the morning Marian volunteered to walk to Hole-in-the Rock Road in hopes of flagging down someone to drive her the eight miles back to our camp and then haul us to Hurricane Wash, where our car was parked. Success! A young girl in a pickup brought Marian back to where we waited and loaded us and our gear aboard—she was going to Hurricane Wash anyway.

She was certainly surprised to see three senior-citizen backpackers come out of the bush, and she told us so. Wonderful, friendly people in Utah, and the end of another beautiful adventure with dear and treasured companions.

KENT AND I did not want to give up our project of backpacking the Escalante to Coyote Gulch. We linked up again with Marian in the town of Escalante the following June. Another of our "gang," Chet Knight, a youngster of 60 and a retired businessman from Phoenix, joined us. Again we did the car shuffle, except this time we parked one of the cars near the register box in Harris Wash.

The day was half gone after all the driving, but we readied our packs and began the 11-mile hike to the river. We remembered a very large alcove from our last trip. Well above the wash, with a dry, sandy floor, it was a perfect place to camp. We made it by about four o'clock. No evidence of former camping there. The reason? A high, steep bank to climb. Our own private window on the world.

We made an early start the next morning and were at the river by 10. We were somewhat shocked to see the river high and

"Nothing weighs nothing," and keep that packweight down.

For each new item my husband or I add to our packs, such as the woolen underwear that has become such a comfort, we subtract an equal weight. We carry only one extra wool sock apiece, no toothpaste, forks, or dishes, and no big jacket. After sunset, when it gets cold, we just nestle into our warm down sleeping bag and watch the stars appear.

WALKING AND EATING SCHEDULES. Our natural cooling system becomes somewhat less efficient as we get older. According to Wiswell, "Thermal regulation changes. You're increasing the fat, decreasing the percentage of fluid volume. . . . There's general drying and less sweating. It's harder to cool and to maintain warmth in the body with aging."

The prospect of trudging for miles along an unshaded granite trail has become so demoralizing that I try to avoid it at all costs. Instead, I'm willing to rise before dawn to be on the trail well before the sun is up. The hours gained in this lovely, quiet part of the day allow us to take a long rest near a stream later, when the sun is blazing.

If the afternoon becomes too hot for comfortable hiking, it's a good idea to stop in the shade at 3:30 or thereabouts to prepare and eat your evening meal. Even after cleanup and rest, there will still be time to hike for a couple of cooler hours. In the summer, it stays light until 8 p.m. or so, allowing plenty of time to find a campsite and get ready for the evening.

We discovered many years ago that we set out more vigorously in the morning if we skip breakfast. Apparently, strenuous walking and digestion lay claim to the same oxygen, which is less available to us at higher altitudes. Ruth Weg, associate professor of gerontology and biology at the USC–Ethel Percy Andrus Gerontology Center, adds that this problem is not limited to the elderly. People of all ages have less oxygenated blood flowing to the leg muscles after eating. She comments, however, that in older persons "the digestive system is less efficient. Peristalsis slows down, and digestive juices don't flow as copiously."

That's really all there is to it: Walk and breathe deliberately, pack very lightly, and be prepared to modify your hiking and eating schedules. These are such simple adaptations that you might ask how they can make any real difference, and yet there is scientific justification for each of them. But the most important thing, for those who want to wring as many years of enjoyment from backpacking as possible, is that these techniques really work. If you are not an oldster and have still read this far, try them out. They'll work for you too. □

Shirley Blumberg says she has been backpacking with her husband for "many, many years." They live in Long Beach, Calif.

flowing fast. Marian, a physically strong person, wanted to test the depth of the water —so in she plunged, almost to her waist, and it was cold.

I said that I would "chicken out." Chet also declined. He had pulled a tendon in one knee and did not want to aggravate the injury. Kent and Marian decided to give it a try. We watched them shoulder their packs and walk off downriver. I admit I was concerned for them, but from long experience with Kent, I trusted his judgment. Chet and I began the long walk to the car.

We covered half the distance and stopped for lunch along the trail. We were surprised to see a group of five young girls—in their teens perhaps—with no packs, just out for a walk, or so we thought. About 10 minutes later a long line of young fellows and five more girls marched single file down the trail; all appeared to be about the same age as the first five. No packs. We asked where they were going. Seemed they were on a survival trek. One carried a 50-pound sack of wheat; the others had packages that contained all-natural foods. No sleeping bags, no blankets, no canteens were visible.

A short time later four young fellows came by, loaded to the tops of their heads with equipment. We asked what they were doing. "Oh," they said, "we're going to tube downriver to Coyote Gulch." They had plenty of food and equipment and two very large dogs. One of the animals carried—what else?—saddlebags filled with food for two.

Down the trail walked a lone figure that turned out to be a young woman about 18. She carried nothing. Around her waist was tied a thin sweater. We: "Where are you going?" She: "Oh, I'm on a solo three-day survival hike." We were curious, and asked questions. She carried no knife, matches, food, or water. I asked if she had been told not to drink the river water because it had been found to contain *Giardia*. She replied that she had been told it was safe. She walked away, her shoulders squared.

We couldn't leave—this was better than TV sports. We didn't wait long. Down the trail came two more young men, each crowned with a kayak. Yes, we did ask about their outing. They were going to kayak down the Escalante, and were in a hurry. "Bye, have a nice day!"

What next? Two more girls came walking down the canyon. We greeted them; they smiled pleasantly and passed by, though they gave us some rather odd glances. It must have been the gray hair.

They returned shortly, and stopped for a visit. We offered them some chocolate, but they declined. They too were on a survival trek. Through questions, we learned that Brigham Young University sponsored this trek as a survival course, and these two young women were the instructors. They had misplaced five girls. Had we seen them? We reported the five we had seen leading the parade. We again offered them chocolate, and after some hesitation they accepted, then departed munching the forbidden goodies.

Later, through correspondence, I learned that Kent and Marian had had to leave the river—it was just too brutal. They hiked out Scorpion Canyon, then over the rims to the car at Willow Springs.

Other information from Kent—the kayakers had crashed on the rocks, wrecked their kayaks and had to walk. The four young men had had one tube fall apart and were taking turns riding the other one. The last Kent saw of the dogs, they were floating and swimming downriver.

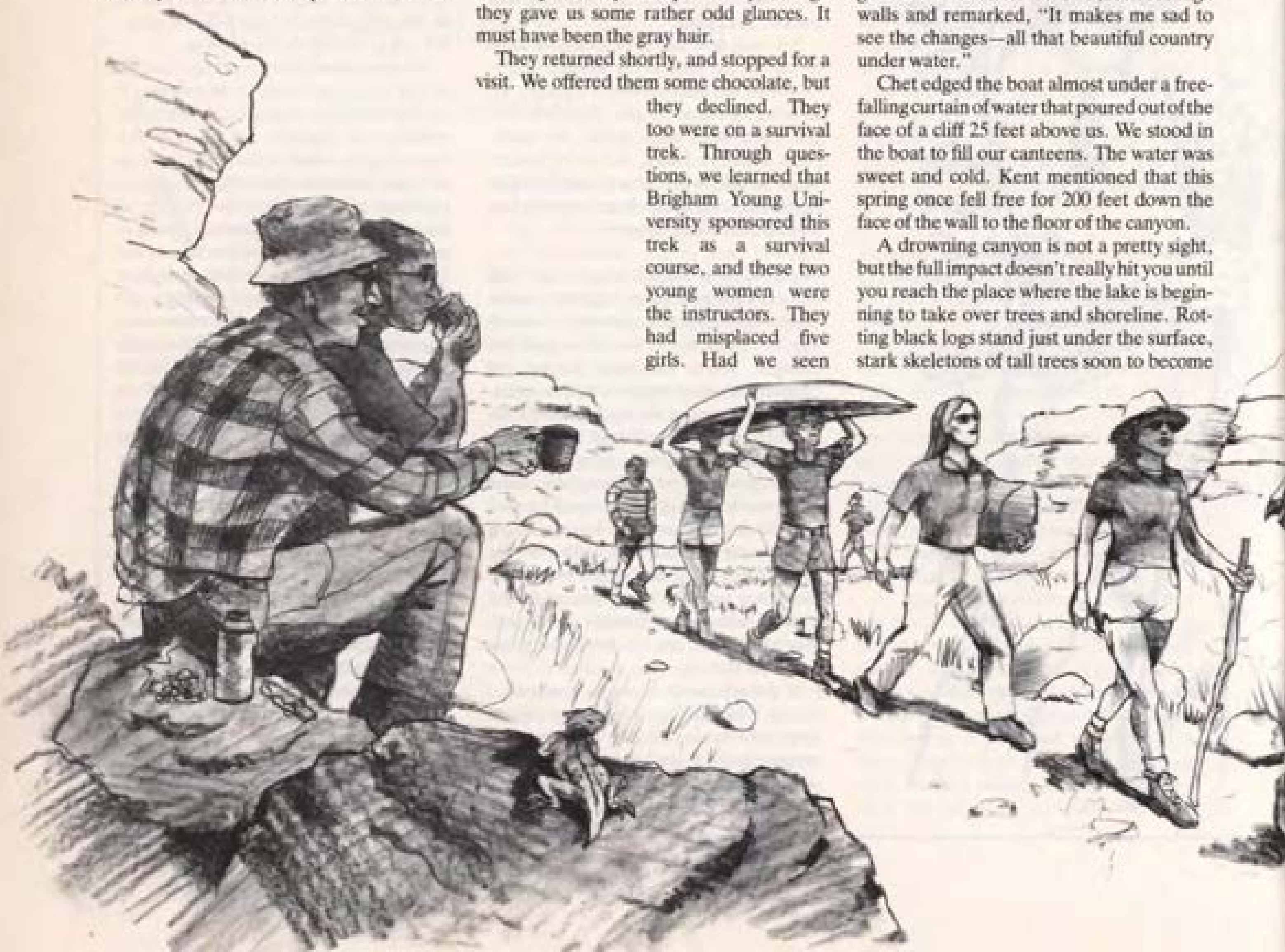
The survivalists? They probably did!

A CHANCE TO EXPLORE the lower canyon of the Escalante River by boat came in July, when Kent and Chet asked me if I would care to join them at Lake Powell. Chet would have his boat.

A fine, sunny day found us slowly cruising up Escalante Canyon. Kent had difficulty believing how high Lake Powell's waters had encroached into the canyon. He recalled the grandeur of Escalante's 2,000-foot-high walls and remarked, "It makes me sad to see the changes—all that beautiful country under water."

Chet edged the boat almost under a free-falling curtain of water that poured out of the face of a cliff 25 feet above us. We stood in the boat to fill our canteens. The water was sweet and cold. Kent mentioned that this spring once fell free for 200 feet down the face of the wall to the floor of the canyon.

A drowning canyon is not a pretty sight, but the full impact doesn't really hit you until you reach the place where the lake is beginning to take over trees and shoreline. Rotting black logs stand just under the surface, stark skeletons of tall trees soon to become



so waterlogged they can no longer remain upright. They'll collapse and join the other rotting muck on the bottom.

There was one more place Kent wanted us to see before we left, and that was Willow Creek, a small tributary. Chet eased the boat slowly between the narrow canyon walls. The water was very deep here until just near shore, where we could step out on a small beach and then walk about a hundred yards to a small, flowing stream—Willow Creek. Kent suggested we hike up the canyon.

The stream had cut a narrow crevasse where small, stepped falls and pools contained the flow. A canyon in miniature, except for the inner walls, scrolled in free-form, that stood at least 500 feet high. One section—so narrow I could touch both walls with outstretched arms—contained water, hip-deep and cold. But when exploring something new and exciting, a little water and some wet clothes are of no consequence.

We had walked two miles up the canyon when Kent suggested we stop for a lunch of apples and nuts.

Knowing Kent, we were alerted to something by his sly smile. He remarked casually, "Sure is a lot of great scenery around here." Spinning around, Chet and I saw the resplendent Broken Bow Arch. Its bent bow stands against the sky on a sturdy base—high enough so Lake Powell will never touch it. It's a beautiful formation of soft pink and crimson sandstone.

We returned to the boat and made our way down Willow Creek Canyon and Lake Powell. I was exhilarated and happy, for I had found a new, unspoiled treasure—and shared the experience with good friends of many years. □

Enid C. Howard, former Utah associate editor of Desert *magazine, now makes her home in Pearce, Ariz.*

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My Side of the River

DEBBIE LYNNE SIMMONS

A Participant Reflects on the Club's First National Outing for the Disabled

Author Debbie Lynne Simmons and her "aide de camp," Nancy Schlegel.

I SPENT THAT SPRING worrying about chemical toilets. About the possibility of no toilets at all. What would the Sierra Club do with eight physically disabled adults if there were no toilets?

My other nagging fear was that I'd fall out of the raft. My ablebodied friends glanced at the trip description with raised eyebrows. Eight handicapped people rafting down Oregon's Rogue River? It sounded a bit disconcerting to them, especially when they noticed the requirement that a participant must have the ability to "hang on." I argued that 13 ablebodied people would also be going. They countered that I have virtually no use of my hands.

My uncle told me not to go. My friend in Indiana prayed for my safety. And secretly, when nobody was around, my own confidence wavered. Maybe I'd fall off the chemical toilet and into the Rogue River. I'd be swept over the rapids. Out to sea. Well, I believe in Heaven anyway. Bring on those treacherous chemical toilets!

Mom kept reminding me that Frankie Strathairn, our trip leader (see box on page 69), knew what she was doing. If anyone could pull off a stunt like this, it was Frankie. Besides, this might well be my only chance to see the Ashland Shakespeare Festival (the factor that ultimately convinced me to sign up for the trip).

This would be my first vacation without parental guidance. No names sewn into my clothes or taped to the frames of my sunglasses. *I'd* written the check. *I'd* supervised as my attendant packed. This was *my* vacation . . . the blow I'd strike for independence!

Indian Mary, situated right on the banks of the Rogue, turned out to be a wonderful campground. Flat. Paved. Real toilets! Downright luxurious, especially after reading the Sierra Club's instructions for waste disposal. Frankie, as expected, had everything under control here.

We would be camping at Indian Mary from Sunday night until Thursday morning, first week of August. I tried to ease my qualms about rafting by remembering that we'd be in Ashland Thursday night, watching Shakespeare's *A Comedy of Errors*. Please, Lord, I thought, don't let that title be an omen of what the week will be like!

As I felt myself slide off my air mattress that first night, all my illusions of independence evaporated. My cerebral palsy, which had seemed so insignificant as I met the other participants before dinner, suddenly tumbled back into my body. Before I could so much as glimpse the river, I found myself flat on my back between the mattress and the side of the tent.

For a moment I didn't realize what had happened. Then my pillow flopped over the edge of the mattress to cover my face. Swell. I wasn't even going to die by drowning. I could see the teaser for the evening news: "Would-be rafter smothers in her tent. Film at 11."

My attempt to crawl back on the mattress was pretty ludicrous. I resembled a turtle that had rolled over on its back. Defeated, I relaxed as much as I could. Isaiah 40:31 quite appropriately popped into my head: "They who wait on the Lord shall gain new strength." So, fixing my gaze on the ceiling of my tent, I waited. After all, my tentmate would return from her walk eventually.

"How on earth am I going to stay on a raft?" I suddenly wondered. "I can't even keep myself on top of a stupid air mattress!"

And I was still meditating on my battle with the mattress as the boatmen lifted us into the vans the next morning. I wondered if anyone else had fought with air mattresses, small tents, or sleeping bags.

As we drove to the put-in point, and I saw for the first time the power and strength of the river's current, my chest tightened in apprehension. Seven wheelchairs and a blind woman. Why didn't anyone else seem nervous? What were they thinking?

If anyone drowned, I figured, it would be me. (Well, at least drowning has a little more class than suffocating under an air mattress!) But the rest of them had good upper-body strength; two of the women even played wheelchair basketball. *They* could hang on to the sides of the boat.

The boatmen gave the obligatory lecture on water safety, and my breakfast rolled around in my stomach. The stretch of water I looked at from the put-in point, steely gray under the fog, appeared calm, but I didn't trust it. What if my raft were to tip over? Simple answer: My muscles would contract, and I'd drown. Paraplegics can swim, but cerebral palsy quadriplegics sink.

The boatmen assured us that no one would fall overboard. Then they issued us life jackets.

They looked at the rafts. They looked at the wheelchairs. They pondered. They whispered and nodded, pointing in my direction. Were they conspirators? Smothering hadn't worked. . . .

"Would you like to have your wheelchair in the boat?"

Inwardly, I was answering passionately, "Yes, yes, a thousand times yes!" I grinned when Frankie decided to let me stay in the chair.

They loaded me first, presumably to see whether or not I'd sink. My breakfast once again did the samba in my digestive tract. That water looked awfully nippy.

But the raft managed to behave in a raftlike manner: It remained on top of the water. The stretch we took that morning was wonderfully calm. The riffles we encountered, though they made me feel unsteady at first, felt strangely similar to riding over a dirt road in a '67 VW bug without shock absorbers. I was amused.

The morning had started out clear; but by the time we put in, some fog had drifted in. I wasn't concerned . . . though the fog *was* lasting a little longer than it should.

We took out for lunch, and everyone critically examined my legs, remarking solicitously that I had goosebumps. They wondered why I'd worn shorts. I didn't defend myself. The articles I'd read all summer had promised that the Rogue is hot in August.

Debbie Simmons, trip organizer Frankie Strathairn, outfitter Vladimir Kovalik, and Nancy Schlegel enjoy the scenery in still waters.

That fog would burn off soon. Any self-respecting sky, after all, would have the courtesy to clear after lunch.

That's how weather generally works in California. But as we put in again after eating, the clouds thickened. I stubbornly waited for the "fog" to burn off. The goose-pimples spread.

It was clearly going to rain.

My companion, who before that Saturday had never taken care of a disabled person, deftly pulled her rubberized rainsuit over my legs. By this time the raindrops weren't quite so tentative.

We approached Hellsgate Canyon, a spectacular sight that atoned for the dampness. I'd never seen colors arrange themselves in bands like that. I was fascinated by the layers of blue, white, and salmon-pink that lined the canyon walls.

My oarsman reminded me, with a sinister chuckle, that it was called Hellsgate for a reason. My, what a comforting thought. He elaborated, sort of, by warning me that tomorrow I'd see *why* it was called that.

At last it was time to take out. I was anxious to huddle in my tent, dilapidated air mattress and all, where I'd be protected from the showers, torrents, sleet, or whatever. Show me your worst, Oregon! But, almost with perverse delight, the sky turned blue as the men hoisted me from the boat.

I was beginning to appreciate Wilderness World, the outfit that provided our rafts, boatmen, food and transportation. As we disembarked, I sensed that they had already become comfortable with our disabilities.

Before dinner, a reporter from the local paper, her voice just brimming with awe and admiration for the eight handicapped people who had so "courageously conquered" the Rogue River, asked one of the men, "Did being out of your wheelchair give you a sense of freedom?" (I daresay it gave him more of a sense of freedom than her loaded question did!)

I wished I'd been sharp enough to tell her that we'd expected to walk on water.

And yet I must admit that I did feel a little awed by what we had done. I'd always thought I was much too disabled for rafting. It's more my style to sit prettily on the deck of a swimming pool with a tall glass of iced tea, smiling at the ablebodied others. But I didn't dare let the reporter know that. No way! That's exactly what she'd want to hear.

As I remembered that I'd have to face the air mattress again, I considered sleeping in my wheelchair. No, I argued with myself, tonight I'll manage to stay on top of it. If they position me just right. . . .

Five minutes after my sleeping bag was zipped up, the familiar backward slide began. In exasperation I called out, "It happened again!"

I spent most of that night clutching the edge of my mattress in an effort to stay on it. Why don't these things come with back supports? I thought about home, yearning for the large, heavy pillow that I normally use to brace my back.

My first words Tuesday morning were: "Let's roll up my bulky jacket in my stuff-sack tonight, to make a back support."

We put in soon after breakfast, and I suddenly remembered that I was soon to learn why Hellsgate Canyon wasn't named arbitrarily. And wouldn't you know that Madame Reporter, probably still enraptured by our "accomplishment," would send a photographer out to zero in on my wheelchair? I smiled for the first shot, wondering if Cheryl Tiegs started out this way. Then my mind wandered back to Hellsgate. Varying degrees of panic transformed my expression. I'll bet that photographer has one entertaining portfolio.

We started drifting downstream. I waited cautiously. Those vicious rapids would certainly be around the next bend, eager to flip my raft. How safe were these life jackets anyway? I wasn't in the mood to test mine.

Fortunately, those hellish tongues of whitewater never materialized. A few riffles. One or two small rapids. Neither Frankie nor Wilderness World wanted to take chances, so they selected easy runs for this initial disabled-people's trip. Smart folks!

We skimmed easily along, sighting os-

PHOTOS © EVAN JOHNSON

A raftful of participants—Mo Sansing, Debbie Saunders, John Markey, Abbie Freedman, and Sharon Bard—drop off a shelf into whitewater on the Rogue. Right, visually handicapped Debbie Saunders takes the oars while John Markey acts as her seeing-eye boatman; left, Tom Roud takes a turn.

preys, ducks, and turtles. Someone in another raft spotted a few minks, but we missed them. Frankie pointed out an osprey's nest to me, sitting high in a leafless tree. I wondered if the birds surveyed the river from that lookout tower.

Something, I felt, was noticeably different. I glanced around in an attempt to discern what it could be. No, my chair was still in the same position as it was yesterday. The sky was still beastly. But there was something, and something pleasurable at that. I concentrated.

It was me! Was I somehow different because I found myself enjoying wildlife? No. I know I'm pretty metropolitan, but I'd also done my time as a Girl Scout.

It was something about my body. I stared at my arms. Why, they weren't contracted! I marveled at how fluid they felt, draped gracefully on the armrests of my chair. They *never* relax that much! They even seemed almost . . . attractive, of all things. Had the drifting motion of the river relaxed them, or was it simply being away from typewriters, telephones, deadlines, and meetings?

Whatever it was, I was thankful.

The rapids were getting a little more rapid now, but still nothing nearly as fearsome as I'd imagined Hellsgate would produce.

And then we saw The Hole.

I wasn't too sure I was ready for this, until I consulted my arms. Still relaxed! If I'd honestly been nervous about going through The Hole, those arms would be contracted.

But, for some reason, our boatman skirted The Hole. Oh, we felt a bump, and I thrilled to that. "Can we do it again?" I asked, amusing them.

I felt smug Tuesday night. My jacket made the stuff-sack firm and heavy. My friends propped it against my back and zipped the sleeping bag around it. Confident in my talent for invention, I purposely lunged backward, trying to fall off the air mattress. The makeshift brace caught me. I paused to see if there would be any delayed reaction. Nothing. I sighed with relief, exceptionally proud of my cleverness. Then I fell asleep.

Wednesday came awfully soon. I was surprised at the sense of disappointment I felt in realizing that this would be our last day on the river. I even caught myself wondering if we could cancel out of Thursday's Shakespeare Festival so that we could raft an extra day. (It's amazing what one good night on an air mattress will do!)

The weather was absolutely flawless. Now Oregon was conforming to my expectations. Nevertheless, I eyed that brilliant sky a little suspiciously, remembering how unpredictable it had been Monday. And I took my jeans in my day bag, just in case.

A man, evidently of retirement age, was quietly flycasting at the base of our put-in point. Wheelchairs were parked up and down the ramp. What was he thinking about

Another First for Sierra Club Outings

STEVE GRIFFITHS

THE SIERRA CLUB'S first national outing for the physically handicapped was a raft trip on the Rogue River in Oregon, August 2 through 4, 1982. Eight of the 23 participants were physically handicapped. One was blind, and the others were paraplegics or quadriplegics. Frankie Strathairn, a handicap specialist and consultant, planned and organized the outing. A veteran Sierra Club leader, Frankie is currently cochair of the River Raft and Sailing Trips subcommittee.

While raising her own children, Frankie also spent 18 years as a volunteer worker in classes for disabled persons. Later, her children grown, she returned to school to earn a master's degree in special education. For the past 12 years she has worked professionally with the physically handicapped.

Wilderness World of Pacific Grove, Calif., is the outfitter Frankie contracted with when planning this special outing. The trip took place on relatively placid stretches of the Rogue above Grave Creek, the put-in point for the wild-and-scenic portion of the river. During the trip, many of the paraplegic participants had an opportunity to row the boats. They make ideal oarsmen because their upper bodies are in excellent shape from the muscular development required to power their wheelchairs. In fact, Vladimir Kovalik of Wilderness World was so impressed with the physically handicapped rafters that he expressed his willingness to take paraplegics with well-developed upper-body strength down some of the rougher sections of the river.

Frankie Strathairn is convinced that physically handicapped people can participate in a variety of Sierra Club outings. "We just have to convince the leaders and outfitters that it's possible," she says. Besides river trips, Frankie believes burro and base-camp trips could also be planned for the physically handicapped.

To recruit participants for the Rogue trip, Frankie sent announcements to community colleges in the San Francisco Bay Area and contacted many of her friends and acquaintances, Debbie Lynne Simmons among them. The trip was also announced in the 1982 Club Outing schedule. Each disabled trip member was accompanied by a "TAB" (temporarily ablebodied person). Some of these people had no previous experience working with the handicapped, but each one was enthusiastic about sharing the river experience with them.

While this was the first national outing specially designed for the physically handicapped, Sierra Club members have been working for the past few years with the hearing- and visually impaired through the Inner City Outings (ICO) program. (See "Going It Together," May/June, 1980.) For example, the San Francisco Bay ICO group, through its Trail Signs program, has helped train several with impaired hearing to lead paddle raft trips, while leaders in the Sacramento ICO group have taken people with impaired eyesight on hiking and cross-country skiing outings. □

Steve Griffiths, who coordinates the Club's Inner City Outings program, was a participant in the Rogue River trip.

all this? I half expected some sort of remark . . . at least a gawk. His line tensed, quivering with frantic jerks. He reeled in his catch, examined its size, and threw it back with disgust. "Can't catch 'em big enough," he muttered offhandedly.

Maybe river people accept anything.

We rowed downstream for about 20 minutes. The river was entirely different without those clouds brooding over it. It was a welcoming green color, and actually pretty in the sunlight. Maybe my first impressions had been too hasty.

Then came the infamous, long-threatened dunking party. Boatmen and able-bodied participants began almost indiscriminately tossing passengers overboard. Passengers hurled themselves voluntarily from their rafts. I tensed, fearing they'd throw me in if they heard me laughing. As far as I was concerned, swimming (particularly in such a cold river as the Rogue) should definitely be a spectator sport!

By this time it was delightfully hot. A couple of impotent clouds broke up the monotony of the sky. Though most of our group boarded their rafts after being dunked, a few gutsy diehards swam along as we continued downstream.

The Hole was coming up again. "Shall we take it?" our boatman asked. Absolutely! We were ready for this baby! He nodded toward me, ordering, "Brace her neck!"

We plowed directly into The Hole, my end of the raft first. A wide wall of water rose in front of me, folding over me like a huge blanket. As it broke across my head, cooling me instantly under that merciless sun, the exhilaration was tremendous. I grinned.

After lunch we pulled our raft far ahead of the others, forfeiting participation in the upcoming waterfight. All week, boatmen and participants had been threatening to even scores through that waterfight, so I was a little sorry to miss it. But we spent our afternoon floating peacefully through the canyons, enjoying our conversation. As I looked at more colored bands on the canyon walls and watched for waterfalls, I discovered a shocking change in my attitude. I was falling in love with river rafting!

The take-out point appeared before I was ready for it. I wanted to ask if we could go a bit farther, but someone commented that beyond this point rafters were committed to the river for three days. I imagine the real whitewater starts somewhere near that bend in the Rogue. But by this time I was romantic enough to brave some real rapids, to suggest that we go ahead and take it. (I could always read *A Comedy of Errors* when I returned to California.)

Now I was cooking! I wanted to see a little more action. But we obediently took out. And, true to form, I was the first out of the boat. It figured.

As they set my wheelchair on dry land, the responsibilities waiting for me at home began, for the first time all week, to pester me. The river skipped joyously past, perhaps not knowing that I could no longer travel with it. □

Diana Coats and Paul Plakely carry Cathy Cain down to the rafts after lunch.

Debbie Lynne Simmons lives in San Rafael, Calif., where she edits the monthly newspaper of the Church of the Open Door. She is a free-lance writer specializing in disability-related topics.

AROUND THE WORLD WITH 19

IN 1984, SEE IT OUR WAY!!!

Sierra Club outings offer a unique program of foreign trips, including trekking, hiking, bicycling, camping, sailing and more. In 1984 our members will visit countries all over the world in our own cooperative, conservation oriented, *special* Sierra Club style. All our trips are planned and led by Club-trained members who want to share their experience and insights with you. Read these pages for a preview of our 1984 program. See upcoming issues of *Sierra* for specific trip details.

[AFRICA]

(765) Mountains to the Sea Safari, Kenya—February 5-24. *Leader, Emily Benner, 155 Tamalpais Rd., Berkeley, CA 94708.* Drive, walk and camp in the wildlife parks and scenic areas of Samburu, Masai Mara, Lake Baringo, the Aberdares and the moorlands of Mt. Kenya. By train, journey to the beaches of Mambasa and the ancient town of Lemu on the Indian Ocean. With our naturalist-guide, observe and photograph game, exotic birds and waterfowl, visit Masai villages, sail on Dhow boats and explore tropical islands. Optional yacht trip is planned.

(815) Kenya Expedition—By Horseback, On Foot, By Landrover—July 9-31. *Leader, Ross Miles, P.O. Box 866, Ashland, OR 97520.* Ride into the Loldaiga Hills, through the Anandanguru Forest and down the Mukogoda Escarpment. Go down the Uaso Nyiro River to the boundary of the Samburu Game Reserve with its tropical birds and game. At Lake Baringo, see thousands of flamingos. Spend two days exploring in the Cherangani Hills, home of the Pokot tribes, and visiting the villages. We will be in the Masai Mara at the time of the migration before our return to Nairobi.

(835) Kenya Adventure—By River, On Foot, By Landrover—August 9-31. *Leader, Ross Miles, P.O. Box 866, Ashland, OR 97520.* Beginning with a drive through the lower slopes of Mt. Kenya to the Tana River, we will camp at Grand Falls and take a three-day float trip to the Meru National Park. We will circle Mt. Kenya and take spectacular hikes. We'll visit Samburu Game Reserve, Lake Turkana, camp on El Molo Bay, and visit the Njemps and Pokot tribes. We end in the Masai Mara for the incredible migration.

[HIMALAYAN COUNTRIES]

(785) Sherpa Country Trek, Nepal—April 30-May 26. *Leader, Patrick Colgan, P.O. Box 325, La Honda, CA 94020.* The Mani Rimdu Festival of the May full moon and the dramatic views of the Everest peaks will be highlights on this 23-day moderately paced trek into the heart of the Khumbu Himal. From Lamidanda we will follow the Dudh Kosi, and trek to the high, glaciated Gokyo Lakes. Leader approval required.

(850) Zanskar—The Hidden Kingdom, India—August 25-September 25. *Leader, Phil Gowing, 2730 Mabury Square, San Jose, CA 95133.* High in the Indian Himalaya on the Tibetan Plateau lie Zanskar and Ladakh—remote, mysterious, and fascinating. This trip starts in the Hindu Kulu-Manali area, features a moderate 22-day trek in Buddhist Zanskar/Ladakh, and finishes in Moslem Kashmir. We will spend two days visiting the monasteries in Leh, and two days in Srinigar on the houseboats at picturesque Dal Lake. Leader approval required.

(905) Jugal Himal Trek, Nepal—October 8-November 1. *Leader, Serge Puchert, 1020 Koontz Ln., Carson City, NV 89701.* This moderate trip features a 22-day trek through the part of the great Himalayan Range closest to Kathmandu. We will visit the holy lakes of Gosaikunda and the Sherpa settlements in Helembu. We will explore the Jugal Himal, nestled on the Tibet border and dominated by magnificent Dorje Lahkpa (23,000). We will not go higher than 15,000 feet. Leader approval required.

'84 Sierra Club Foreign Trips

(907) Kangchenjunga Trek, Nepal—November 9-December 8. *Leader, Peter Overmire, 293 Union St., San Francisco, CA 94133.* Explore an area of eastern Nepal just opened for trekking. Our moderate trek starts with a short flight from Kathmandu, and ends in Darjeeling, India. We will travel up the Tamur Khola Valley to the remote Yalung Glacier on the flanks of Kangchenjunga, the crown of the Nepal-Sikkim border. Leader approval required.

(910) Sherpa Christmas Trek, Nepal—December 22, 1984-January 12, 1985. *Leader, Peter Owens, 117 E. Santa Inez, San Mateo, CA 94401.* Spend the holiday season on a moderate 19-day trek into the Rowaling Valley. This is a Buddhist area on the Tibetan border dominated by Gaurishankar Peak (23,440). This trip stresses interaction with our Sherpa and Tamag staff and a visit to Bigu Gompa, the largest Sherpa Buddhist nunnery in Nepal. Maximum elevation will be about 13,000 feet. Leader approval required.

[PACIFIC BASIN]

(770) Tramping and Camping in New Zealand—March 12-April 2. *Leader, Vicki Hoover, P.O. Box 723, Livermore, CA 94550.* Sampling mountains and fjord-like lakes of the south islands, and the volcanoes and semi-tropical forests of the north island, we will hike between huts on two of the south islands' famed tracks. While car camping, we will take day hikes and scenic drives from Stewart Islands Bird Refuge far south to northern thermal areas. Leader approval required.

[JAPAN]

(780) Exploring Mountains and Islands in Northern Japan—April 22-May 12. *Leaders, Mildred and Tony Look, 411 Los Ninos Way, Los Altos, CA 94022.* Visit the Hirosaki Castle site where 3,000 cherry trees will be in bloom; view the old temple on the island of Kinkazan and the Japanese Alps. There will be day walks in the rural areas, walking trips to the shrine and temple compounds and day hikes in the mountains. Travel by train and bus to Japanese inns, hot spring lodgings and a monastery.

Kyoto Extension—May 12-18. Imposing shrines, temples and palaces, with elaborately designed gardens, attest to the glory and splendor of Kyoto, the ancient capital of Japan. We will visit places where the outstanding traditional crafts are displayed and manufactured. Two days are spent in the foothills at the village of Ohara, nestled in the forests.

[EUROPE]

(768) Ski Touring in Norway—March 11-24. *Leaders, Madeleine and Jim Watters, 50 El Gavilan, Orinda, CA 94563.* Through the forested hills of Nordmarka, we will be light touring on set trails, while staying in remote full service huts. We travel north touring hut-to-hut in the Jotunheimen mountains, carrying only light packs. Our local guide will show us clever Norwegian ways of mountain travel. Skiers should be of at least intermediate ability.

(790) England's West Country and South Wales—June 1-13. *Leaders, Terry Seligman and Lori Loosley, 1212 W. California Ave., Mill Valley, CA 94941.* Hiking in Exmoor and Dartmoor National Parks, sampling inland moors and scenic coastal paths, we will pause at prehistoric stone circles, medieval Dunster Castle, and Tintagel, legendary birthplace of King Arthur. In South Wales the bleak tops of the Brecon Beacons National Park tower over green, peaceful valleys. We will stay in small inns and farmhouses.

(805) West Wales and Southern Ireland—June 15-27. *Leaders, Lori and Chris Loosley, 15000 Venetian Way, Morgan Hill, CA 95037.* Hiking in the quiet hills of West Wales, we will explore ruined castles and abbeys, visit a working farm, and stop for tea at a restored flour mill. We will visit many places in Pembrokeshire Coast National Park. A ferry passage to Ireland will take us to County Kerry with its green and misty mountains. Evenings will be for relaxing at country inns or farmhouses.

(810) The French Alpine Spine—July 1-15. *Leader, Lynne Simpson, 1300 Carter Rd., Sacramento, CA 95825.* From the coastal town of Nice, we travel north visiting three mountainous regions of France. Staying in hostels and small hotels, we will hike regions of high usage and locations where only hikers gather. The French treatment of conservation of their mountain resources will be observed. Dinners will be provided by the hostels (delicious!) and we will purchase regional foods for our daily "pique-nique".

(820) Basque-land Trek, Spain/France—July 10-23. *Leader, John Doering, 6435 Freedom Blvd., Aptos, CA 95003.* We explore the intriguing valleys on the Spanish side of the Pyrenees, the beautiful beech forest of Irati, and follow an historic Basque trail in France. On this moderately strenuous hike we will see the canyons of Kakonetta, cascades of water, and 12th-century Romanesque churches, and perhaps join in local festivals. Primitive accommodations in mountain *refugios* and *gites* or remote country inns.

(825) Hiking in the Pyrenees—July 29-August 11. *Leader, Rosemary Stevens, 3700 Fairfax Way, South San Francisco, CA 94080.* We will day hike through lush green valleys, along roaring mountain streams, and across sparkling snowfields of the Pyrenees Mountains, while staying in mountain *refugios* or in simple country inns. We will step back in history as we come upon Roman bridges and medieval churches, and meet people living in the mountain villages.

(830) Sunnyside of the Alps, Switzerland—August 5-18. *Leader, John Doering, 6435 Freedom Blvd., Aptos, CA 95003.* A moderately strenuous hike through isolated valleys where the local traditions and colorful costumes are still preserved. Quaint villages, exquisite meadows, charming houses and manicured forests alternate with grey scree and spectacular views. We walk from the French Valais through Verbier, Les Haudieres, Grimentz to the German Grachen and Saas-Fee.

(840) Mountain Hiking in Norway—August 12-25. *Leader, Bob Paul, 13017 Caminito Mar Villa, Del Mar, CA 92014.* We will hike the mountain trails of Norway's Jotunheim Mountains, experiencing the grandeur of lofty peaks, vast glaciers, mountain valleys and lakes, winding rivers, exuberant waterfalls, and majestic fjords. By bus and boat we will visit small villages and mountain huts, and savor hearty Norwegian cooking. Leader approval required.

(845) From Lake Constance to the Rhine—August 20-27. *Leader, Lynne McClellan-Loots, 88 Ridge Rd., Fairfax, CA 94930.*

(847) From Lake Constance to the Rhine—August 29-September 4. *Leader, Lynne McClellan-Loots, 88 Ridge Rd., Fairfax, CA 94930.*

Walk through the beautiful Black Forest countryside, photogenic at every turn, arriving at comfortable lodgings for a delicious meal, shower and soft bed. This trip offers the premier way to see southwestern Germany's villages and forests and to enjoy its vistas and gemutlichkeit.

(855) Glories of Ancient Greece—August 30-September 16. *Leader, Kern Hildebrand, 550 Coventry Rd., Berkeley, CA 94707.* After a short cruise to some of the Greek islands, we will explore the Peloponnesus and parts of northern Greece. From Epidaurus and Olympia to Delphi, to Meteora and Mount Olympus, we will travel by bus to classical and Byzantine sites. Taking moderate day hikes, we will stay at small village hotels or in the homes of villagers.

(860) Bike Southern France—September 10-30. *Leader, Bob Stout, 10 Barker Ave., Fairfax, CA 94930.* Follow autumn colors as we ride from Paris to Nice. Through the heart of the French vineyards, we pedal to Dijon and to Geneva. Visit the old towns of Annecy and Chambéry as we wander the foothills of the Alps to the Côte d'Azur. There will be time to relax and enjoy art, history and the countryside.

(900) Mediterranean Sailing Adventure—September 20-October 2. *Leader, Kern Hildebrand, 550 Coventry Rd., Berkeley, CA 94707.* Discover the unspoiled "Turquoise Coast" of Turkey. Sail from Rhodes along its shores with wooded inlets and islands, making daily excursions to explore villages and archeological sites—ancient Lycaean, Graeco-Roman, Crusader and Byzantine are all represented. Nights and meals will be aboard a comfortable 65-foot motor-sailing ketch.

[LATIN AMERICA]

(767) Barranca and Jungle: Mexican Birds—February 25-March 9. *Leader, Richard Taylor, Box 122, Portal, AZ 85632.* Explore the natural history of the Sierra Madres and the jungle surrounding historic San Blas. While the accent will be on birds—some 400 species—we will also see a myriad of flowers and habitats, and take a riverboat ride where four-foot iguanas are common. Accommodations will be in picturesque hotels.

(795) Peru and Boliva—June/July. *Leader, Charles Schultz, 1024-C Los Gamos Rd., San Rafael, CA 94903.* Peru & Bolivia, with their high Andes, valleys and altiplanos, are the heart of the Inca Empire. In Peru we will raft the sacred Urubamba, explore Machu Picchu, and experience the lowland jungle before going on to Lake Titicaca. In Bolivia, we'll visit Isla del Sol, the ruins of Tiahuanaco and spend a few days trekking the Bolivian highlands.

See your March/April issue of *Sierra*, or write the Outing Department, for information about:

(710) Tanzania Safari—September 25-October 10, 1983. *Leader, Bill Bricca.*

(715) Bike and Hike in China—October 2-22, 1983. *Leaders, Frances and Patrick Colgan.*

(720) Siguniang Trek, China—September 6-October 8, 1983. *Leader, Kern Hildebrand.*

(730) Trek to Everest, Tibet—October 10-November 13, 1983. *Leader, Cal French.*

(740) Zambezi River Run—December 19-30, 1983. *Leader, Blaine LeCheminant.*

(760) Sierra Nevada del Cocuy, Colombia, South America—January 2-15, 1984. *Leaders, Frances and Patrick Colgan.*

(800) Annapurna Circle Trek, Nepal—June 11-July 7, 1984. *Leader, Peter Owens.*

If there is enough interest, second sections will be added to these trips:

(735) Annapurna Sanctuary, Nepal—October 16-November 5, 1983. *Leader, Mike Brandt.*

(745) Lamjung Christmas Trek, Nepal—December 17, 1983-January 2, 1984. *Leader, Peter Owens.*

[1984 WINTER TRIPS]

(291) Adirondack Ski Touring, New York—January 15-20. *Leader, c/o Walter Blank, Omi Rd., West Ghent, NY 12075.* On this trip we ski to different inns or wilderness log cabins each day. Your baggage is carried for you by vehicle. The trip includes lodging, meals, and assistance in transferring your luggage. It features continuous wilderness skiing in the southern Adirondacks.

(45) The Grey Whales of Magdalena Bay, Baja—January 29-February 4, 1984. *Leader, Mary O'Connor, 2504 Webster St., Palo Alto, CA 94301.* Magdalena Bay is one of the largest grey whale mating grounds in Baja, covering 80 square miles of quiet, deep water, small canals, inlets and islands. We will observe the breaching, fluking and skyhopping of these magnificent animals from our home, the *Don Jose*, a comfortable 80-foot boat. Also of interest are mangrove swamps that support a variety of sea and shore birds, rolling dunes and shell-filled stretches of beach. Cost includes roundtrip transportation from La Paz, Mexico.

(46) River of Ruins Raft Trip, Mexico—February 8-19, 1984. *Leader, John Garcia, 124 Romero Circle, Alamo, CA 94507.* The River of Ruins, Rio Usamacinta, forms the boundary between northern Guatemala and Mexico. We will visit ruins of great Mayan city-states. The river is quick and deep with some rapids and the surrounding area is tropical jungle. We will see many varieties of animals and birds, among them monkeys, iguanas, and caymans, as well as parakeets, parrots, macaws, toucans, and more. Cost includes roundtrip transportation from Villahermosa, Mexico.

(47) Blue Whale Expedition, Sea of Cortez, Mexico—March 18-24, 1984. *Leader, Jeanne Watkins, 26 Miramonte Dr., Moraga, CA 94556.* The special goal of this expedition will be to observe the magnificent blue whale, the largest living creature on earth. We will drift along with the whales listening to their sounds and observing their behavior. We will also have the opportunity to observe finbacks, Bryde's, minke, sperm, grey, killer whales and several species of dolphin. We will cruise north from La Paz aboard the 80-foot *Don Jose*, visiting islands and fishing villages. Cost includes roundtrip transportation from La Paz, Mexico.

(200) High Desert Special, Mojave Desert, California—January 29-February 4, 1984. *Leader, Dolph Amster, P.O. Box 1106, Ridgecrest, CA 93555.* The Mojave Desert is best visited in late winter when temperatures are moderate, lighting low and soft, and shadows transparent. We will car camp in sites in or near Death Valley, with ample time for leisurely exploration of sand dunes, canyons, and unique formations. All ages are welcome—especially the artist or photographer around whose deliberate ways this trip will be planned.

Toward a Wilderness Ethic

HOLWAY R. JONES

Wilderness and the American Mind, by Roderick Nash. Yale University Press, New Haven and London, 1982. $25 cloth, $8.95 paper.

In this third edition of what has already been called a modern classic, Roderick Nash again presents a purely objective account of the intellectual history of the concept of wilderness. Nash takes what he would call an anthropocentric point of view almost exclusively—that is, he tells us why *people* think wilderness is harmful or inspirational, fearful or friendly. He barely touches on the biocentric view of wilderness, which from a preservationist position regards the protection of wild places as a good unto itself, irrespective of our species' interest or disinterest in visiting those places or turning them into reservoirs.

Admittedly, I approached Nash's new edition from the latter point of view because my personal conception of wilderness had undergone a complete turnabout since my reading of the second edition (1977). I was as anthropocentric as anyone when I engaged in the fight to preserve French Pete, one of only three or four valleys in the western Cascades of Oregon that remain free of roads and clearcuts. I was not then thinking of wilderness in terms of its *own* justification for preservation; I was concerned only with the political battle to save it for use by me and my fellow hikers.

Later, when I spent five solitary days in the proposed Diamond-Thielsen wilderness north of Crater Lake National Park and saw no other human being the entire time, I reveled in the freedom to roam at will, as John Muir did more than 100 years ago in the Sierra. Later still, during a long Labor Day weekend in Yosemite, I was told I could not backpack into the particular destination I had mapped out because zoning quotas had been filled. I was upset, because my freedom to move about in the wilderness I had selected had been compromised.

At home that winter I read Edward Abbey's novel, *The Monkey Wrench Gang*, and worried about the fantasy Abbey had created. Is ecological sabotage without an underlying set of principles a way to restore wilderness or to stop those who would defile it? Would I be at ease with myself if I lent my support to the Earth First! activists who were hoping to save the Kalmiopsis Wilder-

ANSEL ADAMS

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ness by massing in front of bulldozers, thereby preventing construction of the Bald Mountain road? Where in fact *are* the ethics of environmentalism?

The real jolt, however, came for me in reading a manuscript by a young college professor whose perception of John Muir's wilderness philosophy so turned me on that I found myself probing deeply into my inner self, asking: "Is this piece of land over which I trod something that should be saved for itself?" Not for me. Not for others. *But for itself!*

And then it dawned on me why Nash's book seemed so empty. My own perspective had been changed radically by my recognition that a biocentric ethic must counterbalance the anthropocentric habit that had underpinned my own thinking for many years. With Nash's emphasis on the human values of wilderness, the relegation of nonhuman values to a very small number of pages in this long book struck me as unbalanced. I think what is lacking in this third edition is a Nash who dares to discard his historical objectivism and come to grips with his personal philosophy of wilderness.

* * *

Wilderness and the American Mind has its roots in Nash's University of Wisconsin dissertation under one of the giants of intellectual history, Merle Curti. Though often critical, reviewers were uniformly impressed by the first (1967) edition. "Lucidly written, thoughtfully conceived, sensitively interdisciplinary," wrote John Diggins in the *Journal of American History*. Yet Diggins wasn't satisfied with Nash either. He desired more analysis of American values, particularly an adequate accounting of America's antipathy toward nature. "Did Americans," he asked, ". . . experience a *guilt complex* about wilderness not because they carelessly wasted it but because for the first time they began to sense an estrangement from nature itself?"

Donald Swain, writing in the *Wisconsin Magazine of History*, felt that Nash was at his best in dealing with the ideas of Henry David Thoreau, John Muir, and Aldo Leopold—and there are indeed superb chapters on these seminal leaders. But Swain felt Nash overemphasized the importance of the Echo Park Dam controversy in propelling preservationism into the arena of public debate while underemphasizing the significant preservationist work of the National Park Service.

These criticisms notwithstanding, the third edition is still a book that all environmentalists should read. No other single source sweeps the wilderness river so thoroughly—presenting the whys and wherefores of how the preservationist idea began;

showing how passions for and against were transformed, who the leaders of the movement were, and what techniques were successful in gaining acceptance of the idea; and offering suggestions for saving wild land from those who would love it to death. Coupled with a deep understanding of ecological consciousness—as expressed in the writings of Muir and Leopold—advocates for wilderness will find the ammunition they need to spar with such opponents as James Watt, Joe Vogler, and Bill Hagenstein.

With minor revisions and corrections, the first 12 chapters are much the same in all three editions, except that Nash here cites more recent work by David Brower, Sigurd Olson, Edward Abbey, Gary Snyder, John McPhee, and others.

The truly new part of this edition is Nash's story of the Alaska campaign. It is the best overview I have read, and unusual because it contrasts the human response to two frontiers. As any schoolboy knows, in the lower 48 the frontier disappeared about 1890; yet it was several decades before public feeling was sufficiently aroused to result in formal legislative recognition of wilderness. For Alaska such recognition has come while the frontier is still a major part of the 49th state —albeit a more modern frontier than the one we romanticize about.

An 11-page epilogue to the second edition —almost an afterthought—is here turned into a 26-page instruction on "The Irony of Victory." Nash tells us that four revolutions in our modern culture have created a situation in which unregulated wilderness recreation constitutes as great a threat to wilderness qualities as economic development does. An intellectual revolution resulted in the first major change in our attitude toward wilderness. The evolution of lightweight, relatively inexpensive backpacking gear and the proliferation of outdoor stores and catalogue outlets led to the second revolution. A third revolution took place with the building of roads over or through all but the most difficult passes and canyons. The fourth revolution was one of information, finding its expression in a great outpouring of books, guides, films, and maps extolling the wonders of pristine nature. As Nash succinctly confirms Muir's prediction: "'. . . [T]housands of tired, nerve-shaken, over-civilized people' *had* come to the wilderness and discovered that 'wildness is a necessity.'"

Then the prophetic announcement: "Some also discovered that in the process the wilderness had vanished." Indeed!

This leads me back to my original dissatisfaction with Nash's third delineation of the wilderness idea. In a final chapter, a new "Epilogue," Nash tries to outline some pretty far-out ideas for coping with "the irony of

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victory." A key sentence is buried in the first part of this chapter: "Wild land will remain wild only as the result of deliberate human choice."

Nash sees two ways that wilderness on earth may be eliminated. The *wasteland scenario* envisions a paved-over and poisoned planet, ravaged to the point of death. The *garden scenario* invokes humanity's manipulation of the land to serve its own desires, thus ending wilderness as we think of it today.

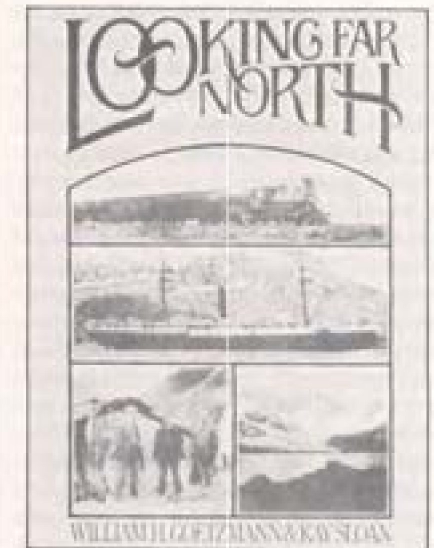
The basic problem, of course, is that we have met the enemy . . . and he *is* us! If we want wilderness to be a part of our earthly existence in the 30th century, we *must* control our population growth and, as Nash suggests, "develop beneficent forms of centralization." I am disappointed that he did not take the next step and conclude this edition with a lengthy discussion of the ethics of wilderness. If we practice the biocentric lifestyle, population control and innovative forms of centralization are more likely to occur. Perhaps then and only then can we assure future generations the chance to experience real wilderness—an argument preservationists have frequently used to justify their battles on wilderness' behalf.

Holway R. Jones, a former Club Director, is head reference librarian at the University of Oregon, Eugene. He is the author of John Muir and the Sierra Club: The Battle for Yosemite.

HIGH TIMES AND BRIGHT MOMENTS

PETER WILD

Looking Far North: The Harriman Expedition to Alaska, 1899, by William H. Goetzmann and Kay Sloan. Princeton University Press, Princeton, 1982. $8.95, paper.



IN THE SPRING OF 1899 a private train bearing a remarkable collection of bright minds chugged westward from New York City. As the luxury cars clickety-clacked across the prairies, biologist C. Hart Merriam entertained the gentlemen (and a scattering of ladies) with humorous adventure tales. Artist Frederick Dellenbaugh washed the dust of the Great Plains from his throat with bottles of Pabst Blue Ribbon quaffed in a lavishly appointed club car dubbed the "Utopia." In the Rockies an aging John Burroughs shook off his homesickness for the East's soft greenery by riding up front on the engine's cowcatcher, his jacket tails and white beard flying.

California poet Charles Keeler and a quipping John Muir joined the merry tribe in Portland. From there the group proceeded to Seattle, where the scientists, photographers, and writers of the Harriman Alaska Expedition boarded the steamship *George W. Elder* for an all-expenses-paid excursion to the nation's northernmost coasts. For two months the avid adventurers scurried on and off the ship at various ports, relieving their fieldwork with evenings of concerts, poetry readings, and dancing by the light of the moon on the deck of their floating Camelot.

Yet the grand tour had nearly died aborning when, on a morning of the previous March, railroad magnate Edward H. Harriman descended upon the offices of the U.S. Biological Survey in Washington, D.C. Would agency chief Merriam please draw up a list of noted scientists and litterateurs? Harriman explained that his doctor had told him to take an extended rest from his busy moneymaking. Though he knew little enough about science and art, he thought he would combine a family vacation with philanthropy by sponsoring an expedition.

Thinking he had an eccentric on his hands, Merriam humored his visitor along. But a later check with friends revealed that he had shown one of the country's wealthiest men out the door. Harriman got his list in a trice. So began one of the most delightful yet strangely telling chapters in conservation history.

Many people know of the Harriman Expedition in passing, as an event granted a few pages in several biographies of John Muir. It is perhaps too easy to discount the affair as the whimsy of a captain of industry who liked

to be surrounded by famous people. Yet in recreating the journey, authors Goetzmann and Sloan show that the voyage marked an occasion worthy of a full volume. After all, could we have such luminaries as ornithologist George Bird Grinnell, feisty forester Bernhard Fernow, and Louis Agassiz Fuertes, the 20th century's answer to John James Audubon—not to mention Muir and Burroughs—thrown together on a boat for two months and not have bright sparks fly?

Sometimes the events mingled embarrassment with revelation. When the *Elder* reached Skagway:

> *As soon as the ship touched the long pier, more than a hundred men and boys scrambled recklessly aboard and raced wildly across the decks of Harriman's ship while the scientists watched, amazed at the sudden chaos. . . . [T]he lusty, unruly crowd spilled across the decorous decks of the* Elder *until the ship's crew sternly ordered the intruders off. John Burroughs' eyes bulged, possibly not with innocence, at the sight of women in billowy "bicycle suits," who "gazed intently at the strangers." The frontier, it seemed to the naturalist, had spawned a bold new breed of woman.*

Much of the material, then, is anecdotal and often pleasantly revealing. For instance, too often we think of Muir only as the lonely explorer of Sierra peaks. Here we see his other side, the gregarious "John o' the Mountains" entertaining the festive company with his stories. As for the amiable rivalry between Muir and Burroughs, we glimpse a seasick Burroughs trying to sneak off the ship at Unalaska Island to avoid the last leg of the trip across the "tempestuous water" to Siberia. "Where are you going with that grip, Johnny?" sang out Muir, a twinkle in his eye. A crestfallen "John o' Birds" shuffled back on board. And Muir wasn't beyond joshing Harriman himself, at one point sending the tycoon, eager for the hunt, off on a wild-goose chase toward an inland valley where Muir promised hundreds of howling wolves for targets.

High times and bright moments continued. Dr. Fernow, dean of Cornell's school of forestry, picked out tunes on the piano while artist Robert Gifford played violin accompaniments. Photographers busied themselves snapping pictures to record the gala trip for Harriman's official album. The *fin-de-siècle* ship threaded its way through Alaska's fiords, trailing bittersweet music and the invaders' war cry: "Who are we? Who are we? We are, we are, the H.A.E.!"

Much passed unseen in the midst of the gaiety. In Skagway the troupe clambered aboard the cars of a new railroad for a tour up the Dead Horse Trail. The holidayers

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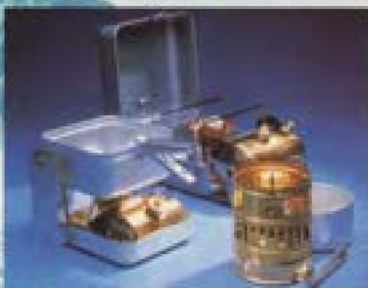

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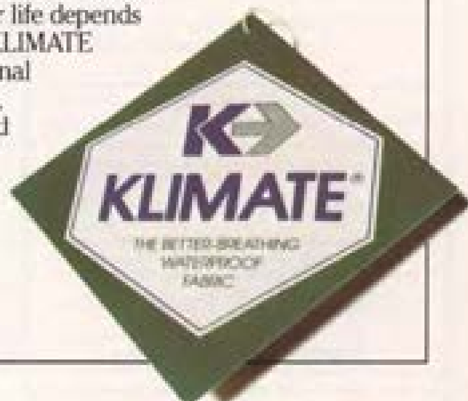

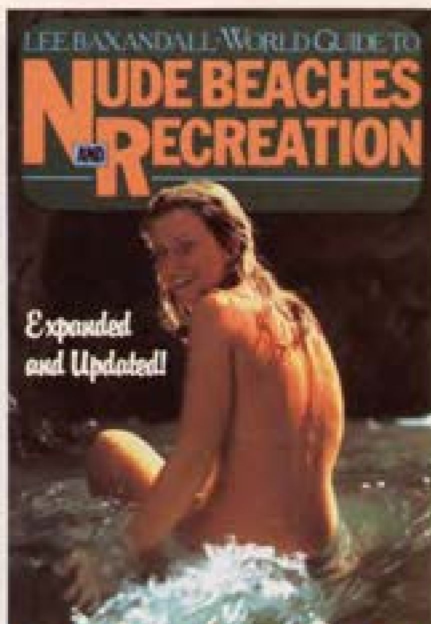

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gaped at the scenery, in their comfort all but oblivious to other adventurers making the backbreaking trip on foot along the steep, 21-mile trail indeed littered with dead horses. Back aboard the *Elder*, some passengers relieved their boredom by shooting eagles.

Skirting Cape Fox, the ship spotted a deserted Indian village, and in a few moments an army of tourists was frolicking ashore, ransacking homes for souvenirs and uprooting totem poles. As one passenger too-gently satirized the thefts:

"Who'll go ashore today with me,
And gather some totems—
say two or three?"
Cheerily, my friends, yo ho!
Cheerily, my friends, yo ho!
With a long, long pull and a
strong, strong pull
At the bottle to help us through
And we cheered without stint
for the "science gent"
Who showed us the thing to do.

"This [is] sacrilege," Muir wrote of a group that, for all its collective intelligence, had not yet learned stewardship. Only he and George Bird Grinnell foresaw the growing dangers in air pollution near Juneau, in the already depleted salmon fisheries at Orca, and in a forest on Douglas Island reduced to stumps by miners. Like Grinnell, Muir saw Alaska in terms of "something better than gold."

Despite the general lack of foresight, the Harriman Expedition of 1899 made lasting contributions. It discovered hundreds of new species, studied glaciers, and charted unknown waters. The 13 volumes of its *Reports*, subsidized by Harriman, became shining mileposts of research, standard reference works on Alaska. Harriman's much-publicized largesse gave invaluable boosts to the careers of young scientists and future conservationists, and Muir's friendship with the railroad man meant a powerful behind-the-scenes influence in Congress. The contact with Grinnell changed the life of photographer Edward S. Curtis, who thereafter devoted his energies to recording the dying cultures of American Indians, and whose haunting landscapes foreshadow the work of Ansel Adams. Taken together, all this helped strengthen the more sensitive appreciation for our natural heritage that was dawning with the 20th century.

Peter Wild is professor of English at the University of Arizona, Tucson. He is the author of Pioneer Conservationists of Western America, *and has reviewed books for many publications.*

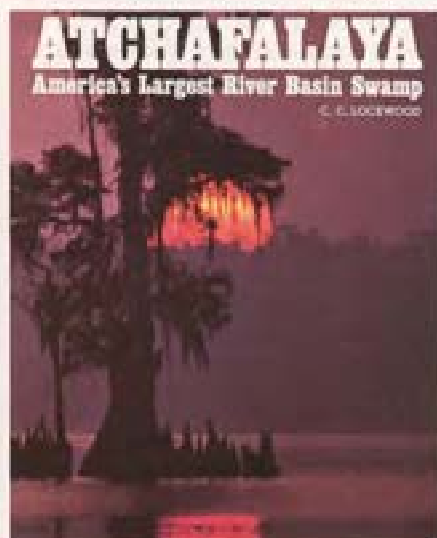
PHOTOGRAPHING ATCHAFALAYA

HARRY MIDDLETON

Atchafalaya, America's Largest River Basin Swamp, by C. C. Lockwood. Beauregard Press, Baton Rouge, 1982. $35, cloth.

THE ATCHAFALAYA RIVER runs through and feeds one of the world's largest remaining river-basin swamps, 1.4 million acres of primitive, delicate, and endangered wetlands in southern Louisiana. Wilderness has never fared well in contact with humankind, and the Atchafalaya Swamp is no exception. Years of dredging and draining have scarred it deeply; flood control, channelization, and unnatural silting have already turned many of its lush backwater lakes into brackish willow bogs. Farmers have tamed much of the northern basin, converting its rich soil to pastureland and soybean fields. It is therefore principally the large middle section of the swamp, more than half a million acres, that environmentalists are fighting to save.

Efforts to preserve the remainder of the swamp began nearly a decade ago. After years of discussion, argument, and study, Governor David Treen announced a compromise proposal for the Atchafalaya basin in 1980 that would transfer ownership of most of the basin's lands from industry and private ownership to state control. Under the plan, industries such as Dow Chemical agreed to surrender their holdings in the basin to the state, while the state promised to purchase development easements on privately held lands, as well as access easements on more than 100,000 acres. Where private



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landowners will sell, the land will be purchased outright. This compromise permits the basin to operate both as a major Mississippi River floodway and as wilderness wetlands. But the plan's ultimate success depends on whether Louisiana and the federal government appropriate the money needed to buy land; until then the basin's future is uncertain and gloomy. At this writing no federal money has been forthcoming, although Governor Treen and Louisiana's representatives and senators are eager to begin the program and may appropriate state funds.

C. C. Lockwood first journeyed into the Atchafalaya in 1973, and soon decided to make southern Louisiana his home. He began his career as a wildlife photographer in 1971 with one camera and one lens. At first he worked in the West with fellow wildlife photographer Marty Stauffer. But in the Atchafalaya basin Lockwood finally found his subject, a place that captivated his mind and imagination, even obsessed him. Living aboard his houseboat, the *Bayou Wanderer*, he moved into the swamp, determined to track its life season by season. His pictures of the swamp have appeared in magazines such as *National Geographic*; eventually he made a film of the Atchafalaya.

Lockwood, who won the Sierra Club's Ansel Adams Award for outstanding conservation photography in 1978, is a photographer of rare talent. There is nothing static or complacent about his work; his pictures refuse to have boundaries or limits. The photographs that make up this splendid, moving book, a chronicle of his life within the swamp, are more than studies of light and form: they are glimpses of life—ongoing, indefatigable, unyielding.

Accompanied by a chatty and unsentimental narrative, the photographs present a clear, uncluttered view of the landscape of the swamp and of the nature of life there for humans and animals alike—charting the swamp's tragedies as well as its triumphs. Finally, though, it is the basin's glory that these finely crafted images celebrate, not what the Atchafalaya was or might be, but what it undeniably is today.

Lockwood is a patient man, willing to wait for that single winter sundown that soaks the sky in purple shadows. He gives us everything from the yellow of the egret's eye to mist-shrouded cypress knees gnarled like an old man's hands. But the greatest service of this excellent book is that it reminds us now, while there is still time for action, of what is at stake in the Atchafalaya basin, what we stand to gain or lose forever. □

Harry Middleton, a columnist for Louisiana Life *magazine, was nominated for a Pulitzer Prize in 1981. He lives in Baton Rouge.*

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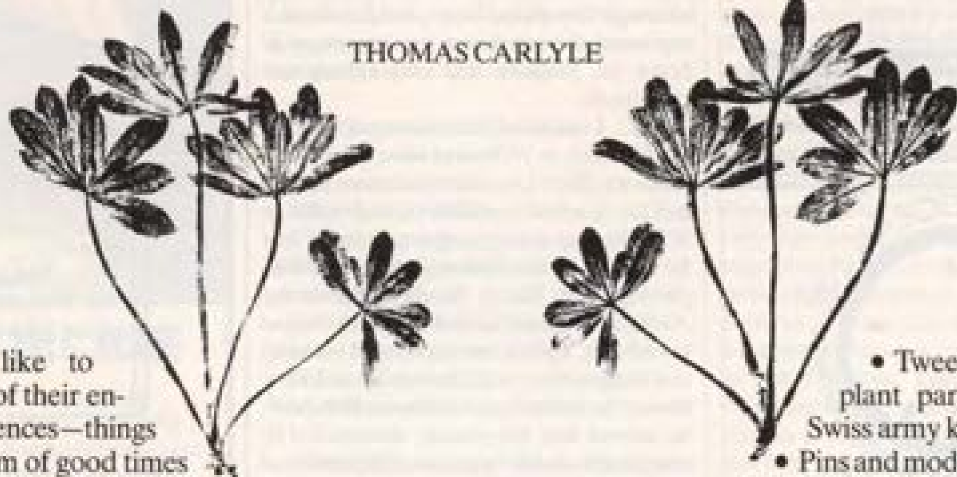
Make Your Own Pictures from Flowers, Leaves, & Fish

THOMAS CARLYLE

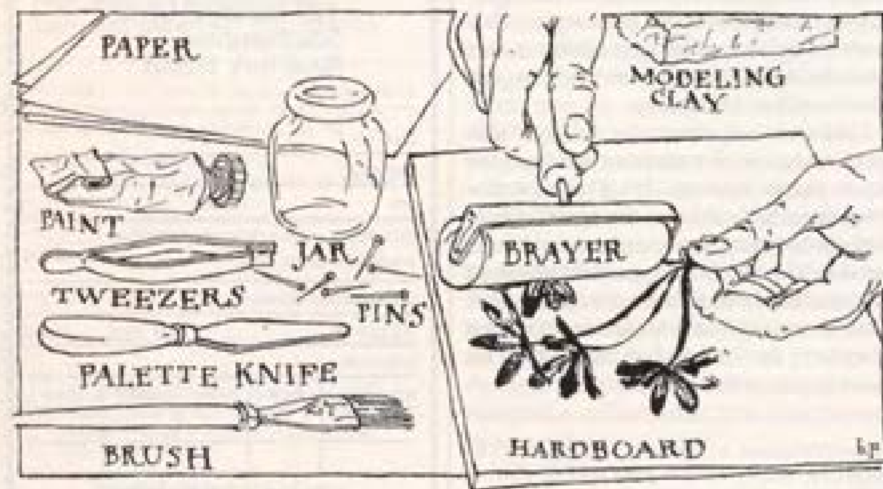


Most people like to have souvenirs of their enjoyable experiences—things that remind them of good times they've had.

Fortunately, it's easy to capture a little bit of the outdoors in an artistic way—and you don't have to be a practiced artist or photographer to do it. You also don't have to spend a lot of money on equipment and tools; all you need is some ink, some paper, and a few other easy-to-find items, and you can soon be making prints of the most beautiful plants you see . . . even of fish you catch from a mountain stream or lake!

Here are the supplies you will need to get started making nature prints in the field, and what you might expect to pay for some of them:

- A tube of Speedball-brand thick water-based printing ink ($1.65);
- A 9"x12" pad of smooth-finish newsprint drawing paper ($1.50);
- A moderately stiff-bristled ½- or 1-inch oil-painting brush ($3);
- A 2-inch plastic brayer (ink roller) for plant prints ($5.75);
- Two 9"x12" sheets of hardboard, one to serve as an inking surface, the other as a backing board for printmaking ($3 each);
- A small, flexible palette knife to spread ink before rolling ($3);
- Tweezers to hold plant parts (or use your Swiss army knife);
- Pins and modeling clay to raise delicate fins and other fish body parts to a printable level;
- Empty baby-food jars for storing unused ink.



TECHNICAL ILLUSTRATIONS BY BILL PROCHNOW

Making Your First Print

Be sure to read these instructions through at least once before you begin your first nature print.

Step 1. Take a walk around your camp and pick several leaves from plants typical to the area. Pick only as many leaves as you think you will need, and be careful not to pick any rare plants at all. Pine-needle clusters, ferns, wild-currant leaves, and large, coarse grasses print well for beginners. Also, make sure you know how to identify any poisonous plants in the area, and avoid them!

Step 2. After returning to camp, lay out your supplies in the shade—so your ink won't dry out so quickly—or under a rain-fly if bad weather threatens. Gather some clean stones to use as paperweights.

Step 3. Squeeze a small amount of ink onto one of your hardboard sheets and roll it thin and evenly with the brayer. Cover an area a little wider than the object you will be printing. Try to work fairly quickly,

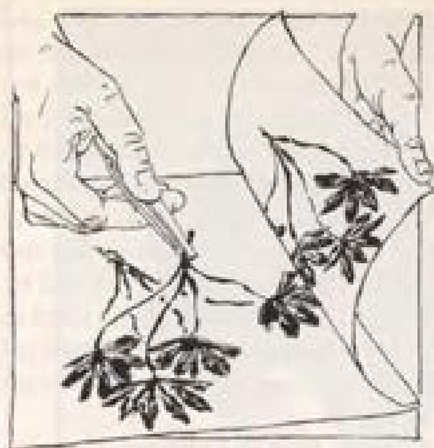
as water-based ink dries in a very short time. (You might consider using oil-based ink until you can successfully print most plant parts, such as leaves, buds, pods, and stems, but you will then need to bring along some kerosene for thinning-out and cleanup purposes.)

Step 4. Place the first leaf you've chosen on the inked surface, holding the stem or a similarly sturdy part with tweezers or the fingers of one hand. The leaf should lie as flat as possible. Smooth out any creases and straighten folds with a small penknife or with your fingers. Roll ink onto the top of the leaf, moving the brayer away from you. (The leaf may roll up on the brayer if you pull it toward you.) Carefully coat the entire leaf. Use a small brush to ink any area you may have missed. Now turn the leaf over gently and ink the reverse side in the same way; avoid using too much ink, however.

Step 5. Carefully place the leaf on a piece of scrap paper, or have a friend hold it by the stem for a moment while you fold a sheet of newsprint paper down the middle so it's 6"x9". Unfold the paper and lay it open on the other sheet of hardboard. Weight the paper with stones, if necessary, to keep it from moving.

Step 6. Using the tweezers, carefully transfer the inked leaf onto one side of the fold in the paper. Be careful not to move the leaf once it's on the paper, as this will create scuff marks and a blurred image.

Step 7. With clean hands, fold the other side of the paper onto the leaf. By running your fingers over the paper, find the base of the leaf, or the thickest part of its stem. Press down firmly with the fingers of one hand while you start to follow the shape of the leaf with the thumb and fingers of your other hand. The dark shape of the leaf will appear faintly through the paper to help you "see" the entire leaf.



Open the paper slowly to reveal your print.

Step 8. After pressing down firmly to make a print of the entire leaf and its stem, slowly open up the paper as you would a book. Remove the leaf with tweezers or fingers, lifting it straight up off the paper to avoid blurs and multiple images.

Congratulations! You have just created your first nature print—or, rather, your first two prints, one a mirror-image of the other. You may now consider inking and placing another plant part or two on the same page with your first printed leaf, or you may decide to start with another plant on a fresh sheet of newsprint.

When you've finished each print, place it in the warm, dry shade—direct sunlight quickly yellows newsprint paper—and allow several minutes for the ink to dry. (If you're using oil-based ink, you'll find your print will take the rest of the day to dry.) A next step would be to experiment with color, using dark inks such as brown, red, green, or blue, and then perhaps moving on to handmade Japanese papers, such as "hosho" or "kozo," as you become more skillful. These don't cost much—around 75 cents to $1.50 per sheet—and they are much more durable than newsprint.

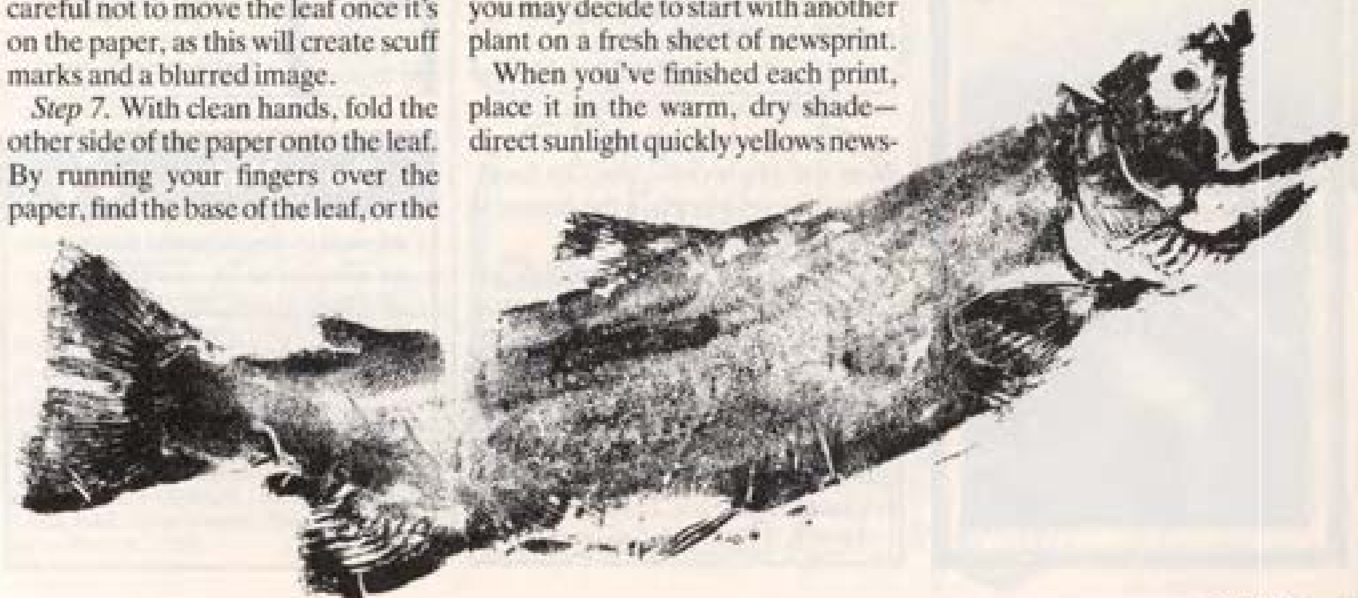
Plant prints have been popular with artists for more than 500 years. By comparison, fish-printing is less than 200 years old. It was developed in Japan in the early 1800s, possibly as a way for fishermen to prove the size of their prized catches. Called *gyotaku* in Japanese, the technique has now caught on in the United States as well, becoming especially popular in the last decade.

Making a Fish Print

Again, be sure to read these instructions through carefully at least once before you begin your first print.

Step 1. Gently clean the mucus from your fish with water. (Fish secrete mucus to help them slip through the water and to protect against disease.) Do not scrub so hard that you damage the fish's scales. Dry the fish carefully.

Step 2. Cover one sheet of hard-



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board with a clean sheet of paper and place the ungutted fish on its side on the covered board. (If the fish has been cleaned already, you can stuff its body cavity with paper towels to restore it more or less to its original shape.) Using straight pins and modeling clay, prop up the fish's fins and tail so that every body part will be well-inked and on the same level as every other part. This way, you'll get a clear image of every important detail.

Step 3. With the paintbrush, cover the upper side of the fish with an even, thin film of ink, brushing in a

Brush a thin film of ink onto the fish.

head-to-tail direction. Just before printing, and without putting more ink on the brush, apply a coat of ink from the tail toward the head so that the ends of the scales are coated too. *Apply ink on only one side of the fish.* Inking the underside will cause you to make a distorted print, showing a fish much fatter than the one you're actually using. (Although some unlucky fishermen might think that is a very good idea!) Keep ink away from the eye socket; you can hand-paint the eye in later, in the Japanese tradition of *gyotaku*.

Step 4. If you've done a messy job of applying ink, slip clean paper underneath the fish just before printing, to cover any ink that may have transferred from the edges of the fish onto the bottom paper. Now move quickly, before the water-based ink begins to dry.

Step 5. Lightly drape a sheet of

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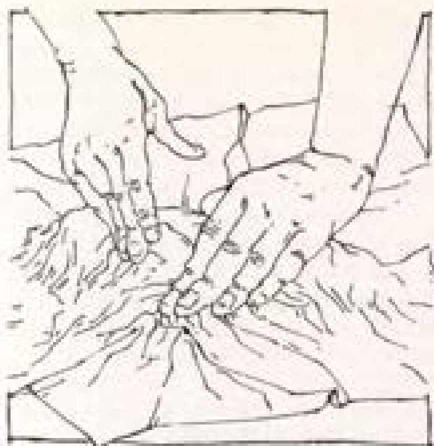

Press the paper over the inked fish.

newsprint over the inked fish. Use the fingers and thumbs of both hands to locate the fish beneath the paper, starting at the head, and then press down firmly, rubbing the fish over the entire length and breadth of its body. The experience you gained in leaf printing will be valuable at this stage to help avoid double images and wrinkled paper. If you're using water-based inks, the fish won't be easy to see through the paper—it doesn't have the raised structures a leaf does—but when you feel that you have pressed and printed all of the fish's anatomy, firmly and smoothly lift off the paper in a head-to-tail direction.

Step 6. Study the successes and mistakes of your first print and move into action to re-ink and print again. A freshly caught fish should yield at least 10 good prints before you—or the fish—start to wear out. And with water-based ink, you can wash the fish clean when you've finished . . . and eat it!

The leaf prints and fish prints you see on these pages are like the ones you can create with only a little bit of practice. It's a great way to learn something about nature while making a beautiful souvenir you can enjoy long after you return from the wilderness. □

Thomas Carlyle is a member of the Club's Wilderness Threshold subcommittee. He and his wife will lead a Highlight Outing to Canyon de Chelly (Ariz.) this August. The Carlyles live in Santa Barbara, Calif.

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DICK LEONARD: 45 YEARS OF CLUB LEADERSHIP

BOB IRWIN

FEW MEMBERS OF THE SIERRA CLUB have volunteered more hours of work in more capacities over the past half century than Richard M. Leonard, the Club's honorary president since 1976. Consider these varied roles, some of the many he has played:

- Pioneer of mountaineering and rock-climbing techniques;
- Reformer of the Club's National Outing Program;
- Patient, persistent, informed, lifelong conservationist;
- Master of low-key negotiation of environmental issues;
- Expert on the Club's early environmental litigation (when negotiation failed);
- Innovator of organizational and legal mechanisms for dealing with new conditions and challenges;
- Astute goodwill ambassador to and communicator with environmental agencies and conservation organizations;
- Husband of an able and dedicated conservationist/negotiator/fund raiser;
- Key leader at turning points in the Club's history.

Dick Leonard's abundant energies and talents have provided steam and direction for a host of other conservation organizations as well. Only in the past couple of years has he started to slow his pace, he confided to me recently. A heart attack late in 1980 induced him to cut his work week "from eight days to two," he said with a smile.

Leonard discovered the Sierra Club in the summer of 1930 while backpacking with two friends into the Kings Canyon high country. He noticed that the Club had placed climbers' registers on many of the southern Sierra summits, had built a substantial stone shelter at Muir Pass, and was working on the John Muir Trail. He decided that such an organization deserved his support, and joined later that year.

DICK LEONARD

MARK FARQUHAR PHOTO

Dick and Doris Leonard in 1934 on their honeymoon to the High Sierra. Dick in 1935 (inset) snapped en route to 13,200-foot-high Mount Waddington in British Columbia. A gathering of Club leaders (below) during a 1939 High Trip to Hutchinson Meadow. From left to right: Oliver Kehrlein, charter member Will Colby, Dick, and David Brower.

Leonard was no newcomer to the Sierra, however. Ever since he, his two sisters, and their widowed mother had arrived in Berkeley, Calif., in 1922 (when Dick was 14), he had made many trips into the range's northern and central mountains. In 1926 he led a group of Boy Scouts on a 60-hour, 85-mile hike over dusty roads into Yosemite.

He thanks his mother now for choosing to live in Berkeley after his father died of tetanus in the Philippines. It was because of that city's schools and its university that she decided not to return to Elyria, Ohio, where Dick had been born on October 22, 1908. Until settling in Berkeley, the family had constantly been on the move because of the senior Leonard's ever-shifting civil-engineering work.

In school and out Dick developed and pursued a keen interest in the sciences—especially botany, entomology, chemistry, and electronics. Late in his undergraduate years at Berkeley, however, he switched his major to economics. He earned his doctorate in financial law from the university's Boalt School of Law in 1932. Leonard's disciplined, inquisitive mind—plus his fund of scientific, legal, and financial knowledge and skills—would serve him well in all his dedicated endeavors for the Sierra Club.

Dick Leonard first became active in the Club in 1932. Then in his final year of law school, he found himself studying 16 hours a day, seven days a week . . . and in dire need of exercise. He tried rock-climbing on the steep cliffs of nearby Cragmont Park to save travel time. He read all the mountaineering books he could find in the Club library. Soon inspiring others to join him, he formed the Cragmont Climbing Club. By year's end Leonard became chairman of the San Francisco Chapter's rock-climbing section, the first ever in the Sierra Club, and disbanded the Cragmont club. (A young climber by the name of Dave Brower began practicing in the park, and in September 1933, with Leonard as his sponsor, Brower joined the Sierra Club.)

Leonard and his fellow climbers were both energetic and innovative; they perfected the dynamic belay (a rope technique for gradually checking a leader's fall) and pioneered the use of pitons in North America. The belay and the pitons made possible safer and more-challenging climbs: In the early 1930s Leonard, Brower, and others climbed a number of "unclimbable" peaks, including the Sierra's Three Teeth and the Cathedral Spires. Leonard chaired the Club's Mountaineering Committee from 1934 to 1936, and then took on a new duty.

When Will Colby resigned after 36 years on the job, Dick Leonard was appointed the new chairman of the Club's Outing Committee—mostly, he told me, because of his experience four years earlier in running a Park Service-sponsored 10-week trip for 16 Eagle Scouts in Yosemite's High Sierra. After assuming the chair, he set about to make some necessary changes. Then as now, all Club outings were self-supporting; participants themselves had to cover any deficits. Leonard reorganized food and supply purchasing with an eye to efficiency and economy, and saw to it that fees were sufficient to build up an adequate reserve fund. He also initiated liability-insurance coverage for the Club.

In the meantime his leadership abilities had not gone unnoticed. He was appointed to the Board of Directors in 1938 to fill a vacancy. He continued in both posts—as Outing chair until 1951 and as a director until 1973—with time out for military service between 1942 and 1945. He entered World War II as a lieutenant in the Quartermasters Corps—developing mountain and desert gear and clothing—and came out as a major after serving with an intelligence unit in Burma to obtain information on fabrics and equipment used by the Japanese in jungle warfare.

The war over, Leonard rejoined the Club's board. He served on its executive committee continuously until 1959 (and for most of the following years until 1973), becoming deeply and broadly involved in the Club's operations, legal matters, and finances.

From the days of his early rambles in the Sierra, Leonard had enjoyed a close rapport with Forest Service and Park Service personnel. In 1939, for example, he and his wife, Doris (of whom more anon), were two of only three "outsiders" at the five-day conference of all national-park superintendents in Santa Fe, N.M. In 1950 the Leonards attended the second such superintendents' conference, thus becoming acquainted with top park officials from all parts of the country. Perhaps as a result of those experiences—and the fact that both the Park and Forest services were in a sense creations of the Sierra Club—Leonard has held to the view that consultation obtains better results than confrontation. Yet he admits there are occasions when time for talk runs out, and litigation or political pressure becomes necessary.

Talk did the job in 1947, a turning point in Sierra Club history. The Park Service wanted to extend a road into the wild upper reaches of Kings Canyon, a plan not then perceived to be in conflict with one of the purposes of the Club ("to render the mountains accessible") as drafted by John Muir in 1892. Will Colby, a director since 1900, and other old-timers favored the plan. But Dick Leonard and Dave Brower (who had joined the board in 1941) opposed it and brought several other Young Turks over to their side. They argued that if Muir were alive at that time, he too would oppose the road, because both it and the crowds it would let in would destroy the very wilderness the Club should be protecting. The board voted against the road, and the Park Service dropped the plan. Five years later Leonard was instrumental in having the "accessible" clause removed from the statement of purpose contained in the Club's bylaws.

It took more than talk, however, to keep a dam out of Dinosaur National Monument. The year was 1953. Leonard had just begun the first of his two years as Club president when the U.S. Bureau of Reclamation introduced legislation for an Echo Park dam at Dinosaur. The dam was to be one part of the huge $5-billion Upper Colorado Project. That summer the Club's first river trip took 120 people—including the Leonards and five former Club presidents—for six days down the Yampa to see the area and the dam site.

HARVEY BROOME

Leonard meets with National Parks Association President Sigurd Olson (right) and Wilderness Society President Olaus Murie in 1953.

The battle was on. In the process the Sierra Club, which had a membership of about 7,000 at that time, became a truly national—not just a West Coast—organization. Leonard gives major credit for this broadening of the Club's political base to Dave Brower, whom he had recruited as the Club's first executive director late in 1952.

Finally, in 1956, Congress approved a compromise amendment to the Upper Colorado Project Act that prohibited any part of the project from ever affecting any national park or monument. That, of course, ruled out a dam at Echo Park. But more important, says Leonard, it ensured the integrity of all other national parks. And since Dinosaur, he adds, the Club has become more aggressive, as it hadn't been since the "magnificent battles" that were fought by Muir and Colby early in the century.

Leonard usually found himself on the side of aggressive conservationists because of his strong purist view that wilderness and all

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living things "are absolutely sacred of themselves and do not need to be useful to humans to justify their existence." He would, however, stop short of impugning the "competence or integrity of any public agency or official," in the words of a board resolution he seconded in 1957. During the years spent in pursuit of his goals, he has always preferred quiet, behind-the-scenes negotiation to any strategy of confrontation. With his legal training, he also is enough of a realist to recognize that there are times when only compromise works.

Over the course of their nearly 50-year marriage, the Leonards have addressed many of the great conservation issues of the century. Dick persuaded Doris Russell to join the Club in July 1933, and married her a year later—"for her money," he likes to say. (She was making $125 a month as his legal secretary; his pay was $75.) She soon became a conservation activist, attending conferences and hearings, mostly on park matters. She was in charge of three consecutive Sierra Club Wilderness Conferences (1955 to 1959) and of the first World Conference on National Parks, which took place in 1962 with 63 nations participating.

She, George Collins (a retired Park Service land-use specialist), and Dorothy Varian formed Conservation Associates in 1960. The group had no other members, but it worked quietly and effectively behind the scenes to accomplish things that larger and more-visible organizations couldn't. It was a close-knit group with strong ties to conservation and financial leaders. They were particularly successful in locating funds—sometimes as outright gifts, but more often as loans—to buy lands, or to hold them until a public agency could purchase them for park or other conservation purposes. CA got a loan of $100,000, for instance, to hold 2,400 coastal acres until they could be taken in as part of Point Reyes National Seashore.

Conservation Associates' first task was working to save Nipomo Dunes—conferring with park officials, searching records, making aerial surveys, contacting landowners, arranging meetings, and generally acting as a catalyst to get things moving. Through CA's efforts, some 800 acres of the Nipomo Dunes were added to Pismo Beach State Park in 1974. Similar services were performed for about a dozen other parks in California. In all of her work with Conservation Associates, Sierra Club Life Member Doris Leonard has worked closely with such organizations as the Save-the-Redwoods League and The Nature Conservancy.

In addition to providing leadership at three major turning points in Sierra Club history, through all his years as a conservationist Dick Leonard has thrown himself fully into other crucial campaigns to protect and improve existing parks, establish new ones, and protect wilderness. His energies have contributed to the efforts of a number of other conservation organizations, two in particular: the Wilderness Society (on its board since 1948) and the Save-the-Redwoods League (on its council since 1954, its president from 1975 to 1980, and chairman since 1980). The Sierra Club bestowed upon him its highest honor, the John Muir Award, in 1973.

Honorary President Leonard today.

As great as his other contributions to the Club have been, Leonard's fund-raising ability and his legal services and savvy have been of incalculable value. Throughout all his years on the board's executive committee he was always on hand to unsnarl legal tangles, draft documents, or cite points of law at hearings.

One example: At a 1948 hearing on dams proposed for Kings Canyon National Park, Leonard demonstrated the Sierra Club's legal standing in the case by dipping up a cup of water from the Kings River, which, he pointed out, ran right through some Club-owned property, Zumwalt Meadow.

Even more important has been his legal foresight. In 1954, after the U.S. Supreme Court upheld the law requiring lobbyists to register, Leonard incorporated Trustees for Conservation under the terms of a congressional provision allowing limited lobbying. Its tax-deductible funds were made available for use by the Sierra Club and the Wilderness Society. The Club's conservation campaigns, however, suffered from that arrangement. Lobbyists were permitted to talk only in generalities, and could not argue for or against specific bills.

Then, in 1960, the board gave the go-ahead for all-out, open lobbying. Foreseeing that sooner or later the Club would lose its tax-deductible status, Dick participated in the organization of the Sierra Club Foun-

dation. Funds given to it could not be used for lobbying. Six years later, in the heat of the Grand Canyon campaign, the Club did lose its charitable tax status. Until 1968, when the Club dropped all efforts to regain its former tax status, the Foundation Board did not solicit funds from Club members. When it finally began to do so, it raised $107,000 the first year and more than $1 million three years later, in 1971. Its role in recent years has changed. It now allocates the funds that are raised by the Club's Department of Development (and the Foundation itself) for administration by the Foundation. Leonard served 11 years as the first president of the Foundation, and nine more on its board of trustees. He now is one of the 20 members of its advisory council.

Today, after all the dust of old battles has settled, Leonard has some good words for the Sierra Club. Because Club members elect their directors by secret ballot, he calls it the most democratic of all environmental organizations, most of which appoint their board members. Once elected, Club directors have had to heed the members' wishes, either as expressed in ballot referenda or by general outcry and protest, which latter method succeeded in reversing a 1970 board decision to hire a Club president.

In the early 1970s a bylaw change was voted, limiting directors' terms to six years. If they wanted to run again, they'd have to wait at least a year. Leonard chose not to run again after his term expired in 1973, "to give the young folks a chance." He had voted for the change, calling it a healthy one. Leonard also thinks the members did the right thing last year in approving another bylaw that makes the executive director, not the president, the Club's chief executive officer. He regards the current holder of that office, Mike McCloskey, as one of the most effective of all environmental leaders—hard-hitting, thorough, fair, and highly respected by industrial adversaries.

Leonard would like to see one more improvement: more responsibility given to the council. He believes it should routinely be able to take care of *all* internal matters of the Club. The board's executive committee, he says, shouldn't have to decide whether a chapter can sell a T-shirt or belt buckle.

With more than 50 years as a conservationist behind him, Leonard remains an optimist. "Everything is *not* going to hell," he says. He has seen great improvements both in the environment and in people's attitudes toward it. When he first saw Yosemite Valley with the Boy Scouts, it was a dusty mess. Now it is beautiful, he says, with native plants in the meadows once planted to grain, and car traffic cut back. Having served on the Yosemite Master Plan Team for four years, he is even more optimistic about the park's future.

William Siri, one of Leonard's longtime fellow board members, said in an oral-history interview that Dick Leonard "probably had as much to do as anybody with the development and evolution of the Sierra Club," and observed that the many things

SIGHTINGS

JAIME BENAVIDES

Mardy Murie (right) receives a warm reception from Director Phil Hocker at the Club's annual dinner. Murie received the John Muir Award for her years of conservation work.

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j. *TOTAL INCOME (h + i)*	*$1,173*
k. *Increased income from gift (j − c)*	*$673*

The Planned Giving Program assists Sierra Club members and friends in creating charitable bequests and life income trusts. These gift techniques offer special income and tax advantages to donors and their beneficiaries, while helping ensure the future strength of the Sierra Club "family" of organizations. For more information, please contact Sarah Beebe Stafford, Director of Planned Giving, 530 Bush Street, San Francisco, CA 94108 (415/981-8634 ext. 452).

PLANNED GIVING PROGRAM

Sierra Club Legal Defense Fund, Inc.
The Sierra Club Foundation

PHOTOS BY JAIME BENAVIDES

Sala Burton, recently elected to fill the House seat of her late husband, Phillip, talks with Edgar Wayburn, Judy Kunofsky, and Neal Peirce at the Club's annual dinner. Below right: Guest speaker Peirce talks about environmental politics and regional issues.

Leonard had brought about are now taken for granted. Siri's most telling tribute to the man: "Leonard has always been a vigorous champion of conservation. He will be until he dies; it's built into him."

CLUB'S ANNUAL DINNER

This year's Sierra Club annual dinner was held on Saturday, May 7, at the Orient Express restaurant at the foot of San Francisco's Market Street. The restaurant's spacious landscaped environment made a striking impression on many people, providing an appropriate arena for the Club's good-natured celebration of itself—in the course of which both the best of our past and our prospects for the future were noted.

A feeling of high camaraderie was widespread that evening, perhaps fueled by the presence of Sala Burton, the widow of Rep. Phillip Burton (D-Calif.)—who had passed on just a few weeks earlier—and a leading candidate for his House seat. Other dignitaries in attendance included California State Sen. Milton Marks, Golden Gate National Recreation Area Director Jack Davis, and Karen Wyland, an aide to Rep. Barbara Boxer of Marin County.

Keynote speaker at the dinner was Neal Peirce, syndicated columnist and founder/contributing editor of *National Journal*. In his remarks Peirce drew on his recently published *The Book of America* to discuss the political and economic evolution of different parts of the country and to speculate on the implications these evolutions hold for environmental activism.

Since 1974, the History Committee has taken time at the annual dinner to present transcribed oral-history interviews to distinguished people in the environmental and conservation movements. This year three such interviews were cited by Ann Lage, History Committee chair, who introduced the two subjects present that evening: Norman B. "Ike" Livermore, Jr., former Club director and California state resources secretary in Gov. Ronald Reagan's administration, and Grant McConnell, a leader in the Club's battle to establish North Cascades National Park in the 1950s and '60s. The third honoree, writer Wallace Stegner, could not be present.

In addition, interviews conducted by students from the University of California were noted by Lage under the heading "Labor and the Environment in the Bay Area." The subjects of these interviews were Club figures Amy Meyer and Dwight Steele and labor leaders David Jenkins and Tony Ramos.

And, of course, a good number of awards and presentations were made to outstanding conservationists. This year the Club's highest honor, the John Muir Award, was presented to Mardy Murie, longtime activist in the struggle to preserve Alaskan wilderness. Other awards included: the William O. Douglas Award to Fredric Sutherland, director of the Sierra Club Legal Defense

Fund; the Ansel Adams Conservation Photography Award to Dewitt Jones; the Oliver Kehrlein Award to Jim Watters, for his work on the Outing Committee; the Francis Farquhar Mountaineering Award to Steve Roper, author of *A Climber's Guide to Yosemite*; Susan Miller Council Service awards to Edward L. Bennett, Walter G. Wells, and Mary Jane Brock; the Denny and Ida Wilcher Award to the Northeastern Ohio Group; and Special Achievement awards to Mary Hallesy, Earl Moser, and Olive Mayer.—*JFK*

Ann Lage, History Committee Chair, presents a transcribed oral history to Ike Livermore, former Club leader and member of Ronald Reagan's state government and presidential-transition team.

NOMINATING COMMITTEE FOR THE BOARD OF DIRECTORS

The committee that will nominate candidates for election to the Board of Directors for the 1984-1987 term invites Club members to recommend prospective candidates. Members of the Nominating Committee are Susan Merrow, chair, Colchester, Conn.; Carolyn Carr, Auburn, Ala.; Jim Dockery, Winston-Salem, N.C.; Jim Dodson, Lancaster, Calif.; Pat Frock, Cincinnati, Ohio; Dr. Robert Howard, Albuquerque, N.M.; and Gloria Shone, Dallas, Texas.

The Board of Directors is the top policy-making and managing unit of the Sierra Club, which now has more than 345,000 members, a staff of more than 195, and an annual budget of $14 million. Candidates must be Club members, must have demonstrated exceptional commitment to the Club's objectives, and must have experience managing a volunteer organization.

"Club leadership at the board level is one of the most serious commitments a volunteer can make," says Merrow. "The members of the Nominating Committee were chosen for their knowledge of the Club and the people who run it. We take seriously the need for a sound evaluation process."

Members are encouraged to send their suggestions before September 1 to Susan Merrow, Nominating Committee Chair, Haywardville Road, RFD 5, Colchester, CT 06415. —*JFK*

NINE YEARS AND COUNTING TO CLUB'S CENTENNIAL

The Sierra Club will celebrate its 100th anniversary in 1992. The Club's Centennial Planning Task Force, which has been charged with identifying approaches the Club might take to celebrate this milestone, held its initial brainstorming session in January during the Washington, D.C., Board of Directors meeting. Another session is scheduled for the first week of October, at which time a report will be prepared for presentation to the board at its November meeting.

The task force welcomes suggestions from the membership for activities and promotions that will highlight the Club's history when '92 rolls around. According to task-force chair Carroll Tichenor, ideas already under discussion include a commemorative stamp to be issued by the Post Office, a specially commissioned symphony or other musical work, an official history of the Club, a special centennial issue of *Sierra*, and a nationwide celebration by every Club chapter, perhaps linked by a satellite network. "There's no end to what we might do, but we need the input of all our members," Tichenor says.

Projects such as commemorative stamps or deluxe-edition books require substantial lead time for planning and scheduling, which is why preparations are under way nine years in advance of the Club's anniversary year. Members who have ideas of how the centennial might best be observed are encouraged to submit them to Carroll Tichenor, 3555 Keene Road, Nicholasville, KY 40356. —*JFK*

BOARD ELECTIONS

At its May meeting the Board of Directors elected officers for 1983. Denny Shaffer was reelected president for a second term. Other officers: Michele Perrault, Vice-President; Sanford Tepfer, Secretary; Phil Hocker, Treasurer; Marty Fluharty, Fifth Officer.

Two new board members, Larry Downing and David Brower, were seated at that meeting. Both were elected in the balloting by Club members that ended April 9. Downing is an attorney and former chemist from Oronoco, Minn. Brower, of Berkeley, Calif., is a former executive director of the Club and the founder of Friends of the Earth.

Incumbent directors Phil Hocker, Edgar Wayburn, and Betsy Barnett were reelected. —*JFK* □

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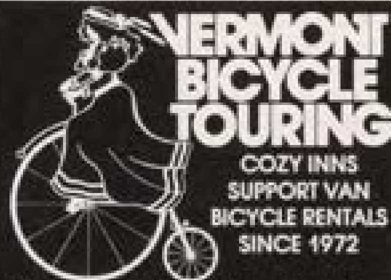

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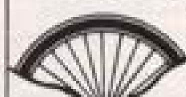

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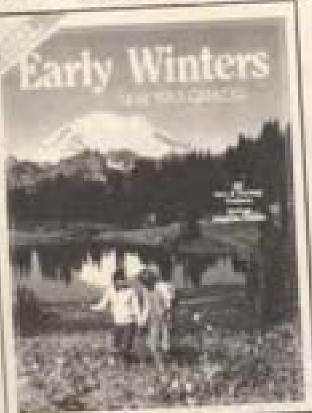

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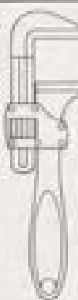

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QUESTIONS ? ANSWERS

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

Q I'm an avid skier who considers herself an environmentalist also. What's the Sierra Club's policy on downhill skiing—for or against? (*Cindy Blodgett, Palo Alto, Calif.*)

A Many Club members share your enthusiasm for alpine skiing, and the Club has no official policy about the sport one way or the other. The Club does object strongly, however, to the development of new ski facilities in areas that have been given wilderness, park, monument, or wildlife-refuge status. This would, of course, include wilderness-study areas.

The Club fought for many years to protect Mineral King from one proposed resort. That area has since been added to Sequoia National Park. Similarly, the Club is opposing attempts to develop a new facility on the slopes of Mt. Shasta. The Club does not object to the expansion or further development of existing facilities.

ILLUSTRATION BY KIRK CALDWELL

Q: Ever since I put up a hummingbird feeder I've been wondering how fast these amazing little birds beat their wings. (Mrs. John Bennel, Menlo Park, Calif.)

A: According to the book *Hummingbirds* by Walter Scheithauer (translated by Gwynne Vevers, Thomas Crowell Company, 1967), hummers of the 320 known species beat their wings anywhere from 23 to 80 times per second while hovering over a flower. The rufous hummingbird, the species you're most likely to see, and the ruby-throated hummingbird, familiar to those in the eastern part of the United States, beat their wings an incredible 200 times per second during their courtship flights. For comparison's sake, a bee beats its wings 190 times per second and a sparrow 13.

Q: With Congress now debating an immigration bill, and given the Sierra Club's history of support for zero population growth, what are the Club's positions on the issues of limiting immigration to the U.S. in general and on these bills in particular? (David Blake, Great Neck, N.Y.)

A: The Club has long supported the achievement of population stabilization (also called zero population growth) as an essential means toward environmental protection in this and every country. Unfortunately, U.S. population continues to increase by more than 2.3 million people a year. Approximately 30 percent of this increase is due to immigration. To this increase (and the percentage) must be added the unknown (but significant) contribution of illegal immigration.

The Board of Directors has not dealt with numbers, but has supported: 1) development of a national population policy for the United States that would ensure population stabilization; 2) analysis of immigration's impact on population trends in the U.S.; and 3) continuing review of U.S. foreign policy and foreign-assistance programs to make sure their efforts encourage a reduction in population-growth rates while improving environmental protection and furthering environmentally sound development.

The Club has taken no position on the pending legislation to which you refer (the Simpson-Mazzoli bills), but it has supported successful amendments to the bills that would require analysis of the impact of immigration on U.S. population growth, environmental quality, and resources. In this Congress, the Club is supporting H.R. 2491 and S. 1025, introduced by Rep. Richard Ottinger (D–N.Y.) and Sen. Mark Hatfield (R–Ore.) respectively. These measures would establish population stabilization as an official goal of the nation, improve the government's ability to do the kind of "foresight analysis" begun with the *Global 2000 Report*, and require an interagency council to recommend a level at which U.S. population should stop increasing.

If you have thoughts on specific policies the Club should adopt on immigration, please write to Dennis Willigan, Chair, Sierra Club Population Committee, Dept. of Sociology, University of Utah, Salt Lake City, UT 84112.

Q: I've hiked throughout the High Sierra for years, and I've witnessed with growing alarm the number of rutted, overused trails. I'm especially disturbed by the damage done by pack animals. How can the Club continue to justify such trips? (Don Sterner, El Cajon, Calif.)

A: Over the years, the Club has witnessed some controversy over the use of pack animals. This was especially true while the Club still conducted the old High Trips, on each of which anywhere from 100 to 150 pack animals were used. Now that pack trips are limited to 25 people, the Club feels the impact is acceptable. The Club uses one animal for three or four people, whereas private groups use as many as two animals per person. The Club also picks conscientious packers when subcontracting the trips. Finally, Club trip leaders make sure their hikers stick to the trail.

Rutted trails cannot be blamed on pack animals alone. Heavy human traffic bears some responsibility as well, and water-caused erosion (especially on compacted trail surfaces) inflicts more damage. It's a problem of trail maintenance, one the Club is aware of and is trying to do something about through the many service trips scheduled each summer.

The Outing Department has published *A Report on the Wilderness Impact Study*, a book that examines the effects of human-recreation activities, including the use of pack animals. Copies are available for $5.95 from the Sierra Club Bookstore, 530 Bush St., San Francisco, CA 94108.

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