

SIERRA

THE SIERRA CLUB BULLETIN

JANUARY/FEBRUARY 1979
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SPECIAL REPORT
1978: A BANNER YEAR FOR
THE ENVIRONMENT



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Sierra, published bimonthly, is the official magazine of the Sierra Club, 530 Bush St., San Francisco, California 94108, (415) 981-8634. Annual Dues are \$20 of which \$3.00 is for subscription to *Sierra* (Nonmember subscription: one year \$8.00; three years \$20; foreign \$12; single copy \$1.50). Second-class postage paid at San Francisco, California, and additional mailing offices. Copyright © 1979 by the Sierra Club. Publication number 495920. No part of the contents of this magazine may be reproduced without the written consent of *Sierra*. Reprints of selected articles are available from Sierra Club Information Services.

Change of address should be sent to Sierra Club Member Services, 530 Bush St., San Francisco, CA 94108. Along with your old and new addresses, please include an address label from a recent issue, if possible.

Editorial and business offices: 530 Bush Street, San Francisco, CA 94108. Unsolicited manuscripts must be accompanied by a stamped, self-addressed envelope.

Advertising: *General Advertising East and Midwest*: Erwin Baker and Associates, 20 Evergreen Place, East Orange, NJ 07018, (201) 673-3950.

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SIERRA

THE SIERRA CLUB BULLETIN

JANUARY/FEBRUARY 1979

VOLUME 64/NUMBER 1

Special Report

1978: THE ENVIRONMENT IN REVIEW

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Cover: A backpacker approaches Liberty Lake in Nevada's Ruby Mountains. Photo by Elliott Varner Smith.

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High-Voltage Transmission

It is sad and disappointing to see *Sierra*, which once contained interesting, informative and reliable articles, deteriorating to the point where it publishes such an irresponsible diatribe as the article in the July/August issue entitled "Health and High Voltage," by Kelly Davis. This article contains numerous errors of fact and unfounded allegations, and it is not possible in a short letter to cover all of them.

In the first place, the utility industry is carrying on a very extensive program of research relating to all aspects of high-voltage transmission. The Electric Power Research Institute, for example, has spent and committed over \$21 million in this area and the federal government, over \$3 million. This effort has resulted in better knowledge so that transmission lines designed today are better performers than those of the earlier years.

In California's Pacific Gas and Electric Company system, there are over 1000 miles of 500-kilovolt (kV) transmission lines, which have operated very successfully for more than ten years without any of the deleterious effects claimed in the article.

Among other things, the article refers to evidence of biological effects reported by Dr. Andrew Marino. His work, subject to peer review, is considered marginal or of poor quality by most nonutility experts in the field. The Administrative Law Judges in the recent New York State hearings on the 765kV lines concluded, "In this recommended decision, it has been demonstrated that Dr. Marino was reckless and inaccurate in his public statements, that he exaggerated in his letter to Governor Carey, that he was evasive and argumentative under cross-examination, and he was unable to cite any support by other scientists for his speculations as to biological effects from EHV (extra-high-voltage) transmission lines. With this background, the indications of careless procedures, faulty statistics, and unsupported extrapolations from his own experiments make it



impossible to place any substantial reliance on Dr. Marino's scientific research as set forth in this record."

A great deal of publicity has been given to work by Russian engineers and scientists, but on closer examination their data simply indicates that in a population of workers exposed to electric fields there are a number of disorders; whether this number is high or the same as what would be expected in a similar population not exposed to electric fields is not indicated. We note that, in general, the U.S.S.R. uses lower transmission line clearances than are the practice in the U.S. For example, the Soviet's minimum clearances to ground are from 23 to 26 feet over farmland; our practice is 35 to 37 feet for similar 500 kV lines. For 750kV lines, the Russians employ 29 to 39 feet compared with 50 to 55 feet prevalent in this country. Their lower ground clearances result in higher electric fields at ground level than are experienced in the U.S. There is absolutely no supportable evidence that I am aware of showing damage to crops or livestock from electric fields under high-voltage lines in the U.S.

The article's statement on audible noise clearly exaggerates the situation. The claimed 70-decibel (dB) noise at the edge of the right-of-way is totally unrealistic. Typical foul-weather values at the edge of the right-of-way for 500 to 765kV lines range from 48 to 53dB, with most lines below the 53dB level. This is at least 17dB less than the number quoted in the article. On an actual noise basis, this means one eighth of the noise claimed.

Finally, with reference to the lead picture in this article, it has been well known for decades that fluorescent tubes will

glow dimly in the presence of weak electrical fields. A very similar picture can be obtained by putting fluorescent tubes near automobile ignition systems, CB antennas, television sets and some other household appliances.

I hope these brief comments will help you realize that in the long run no useful purpose is served by publishing exaggerated and nonfactual articles and that doing so tends to impugn the credibility of the organization publishing such materials.

W. R. Johnson
Chief Electrical Engineer
Pacific Gas and Electric Company

While I appreciate the concerns reflected in Kelly Davis' article on high-voltage transmission lines ("Health and High Voltage," July/August), the article did not deal fairly with respect to the public utility industry and the state public utility regulatory agencies, and thus is misleading to the general public.

The author did not recognize that choosing the cheapest route (farmland) is generally desired by utilities and regulatory commissions because it results in the lowest cost of power to the consumer and, in addition, usually impacts the least number of people. These aspects should have been acknowledged, even if the author is in favor of paying higher utility rates in order to encourage reduced electrical use.

The author also notes that state regulators fix utility profit margins as a percentage of total investment. Does not that fact negate the contention that utilities always seek the cheapest route—i.e., a minimum-investment approach?

Moving power plants closer to cities would add to the cities' pollution and to consumers' costs. Compared to the environmental impact of power plants, the impact of transmission lines is relatively minor. Furthermore, even if a plant were located close to a city, transmission lines would be required to connect that plant with other facilities outside the city in order to provide adequate system reliability.

Davis also notes that 60dB(A) [decibels as perceived by human hearing] is a transmission line noise level that requires shouting to be heard; but 60dB(A) is in fact an ordinary conversation level, while shouting is at a level of 75dB(A). A 70dB(A) level is approximately twice as loud as a 60dB(A) level.

Reference should have been made to the extensive hearings (14,000 pages of testimony) conducted by the New York State Public Service Commission, which, while requiring further studies of public health as affected by high-voltage lines, did grant permission to operate a new 155-mile-long 765kV line in that state. Finally, in fairness, it should be noted that the testimony of Dr. Andrew Marino, quoted by Davis, was thrown out as evidence by the Administrative Law Judges hearing the case, based upon his lack of credibility.

D. H. Weiss
San Mateo, California

Kelly Davis replies:

The New York State Public Service Commission ordered a study of the health effects of 765kV lines because they felt the utilities' research in this area was hopelessly biased. The Electric Power Research Institute has two major projects under way; in each case the experimental protocol has been designed in such a way that no possible result of the experiments will be adverse to the utility industry. An initial research project sponsored by EPRI found biological effects due to extremely-low-frequency (ELF) electric fields. After five years the project was abruptly canceled at the recommendation of EPRI's scientific advisory committee precisely at the point where the investigators began to report serious biological effects due to ELF exposure.

There have been countless attempts to discredit the work of Dr. Marino. Lawyers for Rochester Gas and Electric cross-examined him for thirteen days; he was made the target of abusive legal maneuvers; his personal life was investigated. Why such tactics if he was not right on target? Dr. Marino cited more than 200 references to scientific sources in support of his testimony, which was not "thrown out." The final document of the PSC substantiated Marino's position that the lines could be hazardous and that involuntary exposure to them must be ended. It agreed with him that the right-of-way should be widened and that a standard of one volt per centimeter at the edge of the right-of-way should be applied.

W.R. Johnson repeats a vicious personal attack on Dr. Marino but does not

add that the Administrative Law Judges' statement was ruled out of order and excluded from the final Public Service Commission document.

Dr. Marino also testified before a committee of the California Energy Resources Conservation and Development Commission investigating the safety of transmission lines. The committee's report to the commission recommended compliance with Marino's proposals regarding exposure to the electric fields under the lines.

Rather than quibble over the clearance differences between American and Russian wires, the power industry should follow the example set by the Russians, who recognize that power lines present a health risk. The U.S.S.R. has a regulatory system governing length of exposure, type of clothes worn, distance of lines from houses, etc. There are not such safety precautions in this country because the utility companies insist, in the face of overwhelming evidence to the contrary, that the lines are not a threat to the environment. At least 65 groups of scientists around the world have reported biological effects due to ELF field exposure; the utilities have dismissed them all as incompetent.

A Rochester Gas and Electric report on their proposed 765kV line through New York state said flatly that the noise level at the edge of the right-of-way would be 53dB(A). The measurement was not made under operating conditions, nor was foul weather defined—and upstate New York weather can definitely be foul. Even if we believe only the utility company figures, it's still more noise than people should be subjected to involuntarily. RG&E assured people that the noise would not disturb their sleep because their windows would be closed in bad weather!

When upstate New York farmers were told they should be grateful for the 200-foot towers in their backyard because it would reduce their electric bills, they answered appropriately—and 40 were sent to jail. Building transmission lines on farm land is cheaper, if one takes the short view. It is cheaper to build shopping centers and housing developments on farmland, too, and we have been doing so at such a great rate that vast amounts of prime farmland are being gobbled up every day. Someday we'll have to pay *that* bill.

Saving the consumers money is not the overriding concern of the power companies, or why would we have such things as "phantom taxes" (tax costs anticipated by utilities and charged to customers but never collected from the utilities), which in 1977 amounted to \$2.1 billion? Or over-

charges for the generation of excess electricity? Pacific Power and Light Company's customers paid an additional \$35 million in 1976 for the production of unneeded power.

Moving power plants closer to cities would at least decrease the number of miles of lines necessary and reduce the amount of public exposure to the hazards of the lines. Transmission lines are usually buried underground in cities, because rights-of-way are unobtainable. A more important step would be to decentralize energy production using smaller local plants instead of building large units far from the points of use.

Fluorescent tubes will not glow near a household appliance, unless there is leakage because of a faulty mechanism. If that is the case, something should be done about it, and for the same reason that we should be doing something about high-voltage transmission lines: they're hazardous to our health.

The Editor comments:

Several people have written to point out that the photograph published with Kelly Davis' article was a time exposure. The picture showed demonstrators waving fluorescent bulbs under power lines at Binghamton, New York—the bulbs' glow powered only by the lines far above them. We have recently learned from photographer David Tinney that the photo was, indeed, a time exposure, the technique used to emphasize the light, which was visible to the naked eye. Although when we published the photo we didn't know that Tinney had done a time exposure, and so didn't mention it in the caption, our point illustrated by the shot is not affected—that the electrical field surrounding these power lines is sufficient to light fluorescent bulbs.

Nuclear Waste Disposal

Ellen Winchester's article, "How Sweden Plans to Dispose of Nuclear Waste" (July/August), is an important step in informing the public that solutions already exist for disposal of high-level nuclear waste. We had similar demonstrations in this area more than six years ago. However, it is difficult to understand the statement that "As of this writing, no one has disproved the possibility that fissile materials in the anticipated 9000 canisters could migrate to form a critical mass." Using her own figures, and with only 0.5% to 0.8% plutonium in spent fuel and only approximately 0.5% of that in the high-

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level waste, there would be only 25 to 50 grams of plutonium in each container, vitrified, diluted in a solid contained 0.4 meters in diameter and 1.5 meters high.

We see vitrified materials in natural formations that are hundreds of millions of years old. Plutonium has a half-life of less than 25,000 years. What is there left to prove?

Mark H. Arndt
Pacific Northwest Chapter

Ellen Winchester replies:

Mark Arndt appears to misunderstand both my article and radioactive decay phenomena.

I did not say that solutions already exist for disposal of high-level nuclear waste. Instead, I discussed a plan by the Swedish nuclear industry prepared *in the hope* of satisfying the Swedish law that there must be a means for disposing of nuclear waste before any more nuclear power plants are licensed. Since the plan's release in December 1977, it has been extensively reviewed for the Swedish government by experts from several countries. Most of these reviewers have pointed to significant defects in the plan, and some of these I discussed at sufficient length to indicate that a permanent and safe disposal plan for high-level waste does not yet exist in Sweden.

In dismissing the danger of criticality in a repository at some future time, Arndt apparently fails to realize that intricate radioactive-decay relationships involve several actinide elements, not plutonium alone. Furthermore, geochemical changes in the initial repository configuration may, over hundreds of thousands of years, concentrate some of the fissionable material into a critical mass. More study of the criticality problem is urgently needed with respect to all currently proposed plans for disposal of nuclear waste.

The importance of criticality considerations in designing a satisfactory repository for Sweden has been briefly stated in the review of the KBS plan carried out in April 1978 for the Swedish Energy Commission (document Ds I 1978:17, "Disposal of High Active Nuclear Fuel Waste, A Critical Review of the Nuclear Fuel Safety [KBS] Project on Final Disposal of Vitrified High Active Nuclear Fuel Waste"). The following quotes pages IV:36-37:

"The KBS has not considered whether, through a sequence of geochemical events, the plutonium or uranium present at some future time could be assembled into a critical mass and cause a nuclear chain-reaction. The consequences, in terms of heat and radioactivity produced, could be

disastrous. According to KBS designs, the total of fissionable elements present, including americium, which decays to plutonium, is, in a full repository, 1000 times more than needed to form a critical mass under ideal laboratory conditions. Since plutonium decays to fissionable long-lived uranium-235, the time of concern is essentially infinite, and prevention of criticality must be based on geochemical barriers to critical-mass formation. The barriers to dispersion of radioactivity in groundwater may actually tend to increase the risk of accumulating fissionable isotopes into localized regions, through element retention by mineral surfaces, and thus lead to the formation of critical-mass regions. Therefore, additional geochemical features must be included in the repository design to counteract this tendency. The failure of KBS to consider criticality as a potential problem is a major oversight."

Praise for the Alaska Campaign

During the Alaska National Interest Lands debate on the floor of the House, I wished we had John Muir back to champion our cause. But what pleases me is that the Sierra Club not only survived his loss, it is still one of the most influential conservation organizations in existence.

I think that while all of us need to thank our senators and representatives who supported the Alaska legislation, credit also goes to the many citizens, members and nonmembers, who worked so hard. As long as this spirit of cooperation exists, and as long as such keen environmental awareness is felt, the Sierra Club will never die!

John H. Burkitt
Portland, Oregon

Apalachicola River

I found K. Cruickshank's article, "'Improving' the Apalachicola" (May 1978) quite interesting, particularly as I have been studying the hydrodynamics of Apalachicola Bay for a year now. Cruickshank hints at the problem upstream dams may create, but he does not state it clearly. While mean annual discharges of water may be slightly reduced by increased evaporation, in general the topography of the Apalachicola Valley requires dams to be essentially "run-of-river"—providing minimal storage. Large-scale changes in the frequency distribution of river flows that drive the estuary would therefore be

relatively minimal. The high-saline episode referred to in the article was probably due to the joint occurrence of a low-flow event, high evaporation and the new artificial boundary created by Sikes' Cut, which was completed in 1954. The cut allows saline water to enter the bay's center without the tidal and frictional mixing that it previously underwent.

Of more importance than alterations in the discharge and the salt-flux frequency, perhaps, is the possibility that the quality of incoming water will be reduced because of upstream industrialization based on water-borne commerce. In this case, the state would bear the environmental costs and receive few of the benefits. In addition, one of America's greatest estuaries could be lost.

Steven Graham
Gainesville, Florida

Jobs in IPM

Hal Rubin's article ("IPM: Getting Off the Pesticide Treadmill," June 1978) clearly illustrates the environmental dangers of the prodigious growth in pesticide use and gives much-needed attention to the IPM alternative.

The task before us is to bring IPM techniques into use by as many farmers as possible. We can succeed in this effort because the indiscriminate use of chemical pesticides is not only environmentally detrimental, it is also far more costly for farmers than pest control using IPM.

IPM is labor-intensive. If agricultural extension offices are to expand IPM programs, they will need a great number of trained "scouts" to walk the fields and monitor the number of pests present. This is essential if we are to limit pesticide use to those times when the number of pests reaches a critical level.

I have introduced legislation to include IPM jobs among employment programs under the CETA (Comprehensive Employment and Training Act) bill, which provides jobs for our nation's unemployed. Young people, who suffer disproportionately from unemployment, are particularly well-suited for jobs as scouts. And these would be real jobs, not make-work pastimes. In addition, training in IPM techniques will assist a young person in obtaining permanent employment in this expanding field. This proposal has gained support and will almost certainly be included in the pending CETA legislation.

Richard G. Lugar
United States Senator, Indiana

The Environment in Review

Introduction

BROCK EVANS

IT WAS INTENSE and powerful right to the end, a suitable climax to the most environmentally important Congress in history. Although much had been accomplished already, a considerable unfinished legislative agenda faced Congress as it went into its final week prior to adjournment on October 15. The result was an increasing tempo of early-morning and late-night meetings and increasing fervor and intensity in the debates, all climaxing in a marathon 48-hour, around-the-clock session last weekend.

The scene in the Capitol seemed straight out of an etching of some earlier time: weary representatives and senators in their chambers at 4:00 a.m., milling around the floor, listening to debates and making points of order, disposing of the most important legislation in minutes, and debating for hours over minutiae.

This is perhaps not the best way to conduct the nation's business, but this is how it is done at the end of every congressional session. It is a dangerous time for groups such as ours that have so much at stake. A knowledgeable representative will use this time to attach special riders or amendments to completely nongermane legislation being considered, hoping that opponents won't notice until it is too late. The enormous time pressure also means that Congress will accept amendments to a bill just to get it through, even though the amendments would never have had a chance in less harried times. This was the case with the Endangered Species Act, which came up on the House floor early Sunday morning. Several weakening amendments were tacked on, and the damage had to be repaired in a hasty House-Senate conference just before final passage. In the crush, another bill—one to give stronger protection to the Boundary Waters Canoe Area in Minnesota—actually got lost for an hour or so. The bill had just passed the House, and it was put in a pile to be sent to the President for his signature, instead of back to the Senate for final approval.

When the dust finally settled, there emerged a truly outstanding record, which is summarized in this special section. A strong stripmining bill and a Toxic Substances Control Act had passed earlier; now there is a strengthened Clean Air Act, and a still-strong Clean Water Act; there is a good Outer Continental Shelf bill and, finally, a National Energy Act that includes much of the Club's conservation policy.

Nearly 5.5 million acres were added to the National Wilderness Preservation System—the largest single set of additions since passage of the Wilderness Act in 1964. The national parks record is just as excellent. The Santa Monica Mountains in Los Angeles, the famous Mineral King Valley in the Sierra Nevada and the Pine Barrens of New Jersey were all protected by the "Omnibus Parks" legislation. In separate legislation, Redwood National Park was finally expanded. Eight rivers, from Pennsylvania to California, were added to the National Wild and Scenic Rivers System and seventeen designated for study.

The Alaska bill died in the last hours, but it proved to be only a

temporary setback. President Carter took action to preserve much of the Alaska Public Interest Lands. Other bills, such as the Endangered Species Act, were weakened somewhat from their previous form; but here, as in all cases, we must consider the nature of the opposition, which fought against any meaningful legislation. The fact that we were able to hammer out a bill that many believe more durable than the old one is again a tribute to the many thousands who wrote in to support a strong act.

We have much to be proud of in this Congress. We are grateful to the many representatives and senators who stood up for environmental bills, such as Representatives Udall (D-Arizona) and Seiberling (D-Ohio) and Senator Durkin (D-New Hampshire) on the Alaska issue; Representative Phillip Burton (D-California) for his outstanding work on redwoods, the Boundary Waters Canoe Area and the "Omnibus Parks" legislation; Representatives Jim Weaver (D-Oregon) and Teno Roncalio (D-Wyoming) for their work on the Endangered American Wilderness Act; Senator Gary Hart (D-Colorado) for his work on clean air and Senator Ed Muskie (D-Maine) for his on clean water.

But we can also be proud of ourselves. For while it is the members of Congress who must actually do the voting and propose the amendments, we are the foot soldiers. Environmental bills do not pass in any Congress without massive support from the people. No bill would see the light of day without thousands of letters and expressions of support; neither could it succeed without accurate and timely information supplied by environmental groups. The great successes of the 95th Congress are due as much as anything else to the unique interaction between conservation group staff and volunteers.

The future is more uncertain; it is not clear if the new Congress can equal the accomplishments of the old. The elections did result in a definite turn to the right, which generally means a more pro-industry and anti-environment tone. In addition, several environmental leaders on key committees lost their bids for reelection. Finally, the central fact of lobbying in Washington in the mid-1970s has been the enormous concentration of wealth and power of our opponents.

Nonetheless, we have a very large agenda, and we must press on in whatever form and with whatever means available to us, not resting until everything is safe that must be made safe. □

Brock Evans is director of the Club's Washington office.

Congress and the Environment— Sweet Tidings

GENE COAN AND MICHAEL MOSS

THE 95TH CONGRESS ended October 15 in a flurry of bill-passing. When the paperwork settled, it was clear that environmental protection had fared well. Despite its glaring failure to pass an Alaska lands bill, the 95th Congress did act on a wealth of important environmental legislation. Below is a summary of the key environmental legislation of the last two years.

Wilderness

- The Endangered American Wilderness Act designated 1.3 million acres of wilderness in ten western states. Four existing wilderness areas were expanded, and thirteen new areas were brought into the National Wilderness Preservation System. Highlights of the act include a 306,100-acre Golden Trout Wilderness in California and a 206,000-acre Gospel Hump Wilderness in Oregon.
- The "Omnibus" parks legislation (its real name is the National Parks and Recreation Act of 1978) was praised as "the most sweeping conservation measure ever passed" by Interior Secretary Cecil Andrus. Title IV of the act designated almost 2 million acres in 8 units of the National Park System as wilderness and an additional 120,000 acres as "potential wilderness additions." The new wilderness additions are in: Carlsbad Caverns National Park (New Mexico), Everglades National Park (Florida), Guadalupe Mountains National Park (Texas), the Buffalo National River (Arkansas), Gulf Islands National Seashore (Florida), Hawaii Volcanoes National Park (Hawaii), Organ Pipe Cactus Na-

tional Monument (Arizona) and Theodore Roosevelt National Park (North Dakota). These areas more than double the amount of designated park wilderness.

- Montana wilderness areas were the subject of two separate pieces of legislation. One act designated a 285,771-acre Great Bear Wilderness and added 60,000 acres to the adjacent Bob Marshall Wilderness. A second act designated a 904,500-acre Absaroka-Beartooth Wilderness and an additional 973,000 acres for wilderness study.
- The "Wisconsin Package" of legislation designated a 7312-acre Whisker Lake Wilderness and a 5886-acre Blackjack Springs Wilderness.
- Legislation not only established a 70,000-acre Indian Peaks Wilderness in Colorado but also designated 459 acres of the Oregon Islands National Wildlife Refuge as wilderness.
- A Boundary Waters Canoe Area bill added 43,029 acres to the BWCA Wilderness in Minnesota, prohibited "commodity" uses such as logging and limited the use of motorboats and snowmobiles within the area.

- The proposed Dunoir Basin additions to Wyoming's Washakie Wilderness were not passed by Congress.

Parks and Rivers

- The Omnibus parks legislation added 21 new units to the National Park System, including a large Santa Monica Mountains National Recreation Area in California and a New Jersey Pinelands National Reserve that will protect the Pine Barrens in that state. The act also transfers 16,000-acre Mineral King valley from the Forest Service to the Park Service for inclusion within Sequoia National Park, thus probably killing plans for a major ski resort there.

The Omnibus legislation provides additional funds for acquisition in 29 units of the National Park System and funds for development in 34 units.

- Redwood National Park was increased by 48,000 acres to a total of 106,000 acres. A 30,000-acre protection zone was also established.
- A Chattahoochee River National Recreation Area was established to protect a 48-mile section of the river near Atlanta, Georgia.

- The Omnibus legislation added 8 segments totaling 620 miles to the Wild and Scenic River System, the largest single addition since the inception of the 1968 act. The new Wild and Scenic Rivers are: the Pere Marquette (Michigan), Rio Grande (Texas), Skagit (Washington), American (California), Missouri (Nebraska and South Dakota), Saint Joe (Idaho), Upper Delaware (New York and Pennsylvania) and the Middle Delaware (New York, Pennsylvania and New Jersey). Protection of the Middle Delaware river will finally prevent construction of Tocks Island Dam, opposed by environmentalists for the last sixteen years. An additional seventeen rivers will be studied for possible later inclusion in the Wild and Scenic River System.

Energy

- A good stripmining bill was passed in the first session of the 95th Congress, providing reasonable regulation for surface mining.
- Offshore oil development will be affected by legislation that will greatly improve federal management of the oil and gas resources on the outer continental shelf. The act also improves development plans and will increase state and local participation in leasing decisions.
- The National Energy Act finally passed. This long-awaited legislation includes a gas-guzzler tax, incentives for the implementation of solar energy and for energy conservation, a federal push toward utility rate reform, provisions to encourage utilities to burn coal rather than oil and gas and a new pricing scheme for natural gas.
- Solar energy was the subject of a number of bills; one of the most important measures that passed will accelerate funding for the development of photovoltaic cells.
- Nuclear proliferation could be slowed by legislation that places greater control on nuclear exports.
- Oil tanker construction and operation will be better regulated by new legislation.
- Environmentalists lost some, too: Congress failed to pass legislation on oil-spill liability. The Solar Energy Development Act, which would have



provided funds for increased solar development, also did not pass. The most important environmental loss, however, was Congress's approval of the breeder reactor program.

Pollution

The Clean Air Act was amended in 1977 to improve the protection of clean air areas, while extending the timetable for cleaning up automobile emissions.

The Water Pollution Control Act was amended in several beneficial ways, keeping the momentum for clean water.

Public Works

Unnecessary dam construction was dealt a heavy blow when the House failed to override President Carter's courageous veto of the Public Works Appropriations bill. The bill included funding for some 30 dams and other water projects that would have been environmentally damaging, that did not meet good water-planning criteria and that would have benefited only a few individuals. A later compromise bill eliminated seventeen of the projects; environmentalists see this as a turning point in the battle against unnecessary projects.

A scaled-down Locks and Dam 26 on the Mississippi River at Alton, Illinois, was authorized for construction. One lock (instead of two) was approved, and only a weak "user" fee was incorporated

in the legislation. But provisions were included for thorough environmental studies of the upper Mississippi, including user fees and transportation. Authorization of further projects is forbidden until a master plan, based on those studies, has been adopted.

- The Highway Trust Fund Authorization again passed, but it did include less money for highways than was proposed in an earlier bill, and it also improved funding for mass transit.

Urban Issues

The Sierra Club sponsored five features of President Carter's urban policy. Congress passed three of them:

- A Neighborhood Self-Help program will provide \$15 million to community organizations over two years for such programs as housing rehabilitation and weatherization.
- A Livable Cities program will provide another \$15 million in grants to nonprofit groups over two years to encourage neighborhood revitalization through artistic, cultural and historic preservation projects.
- The Omnibus legislation contained an Urban Recreation Recovery program that will grant \$725 million over the next five years to renovate recreation facilities in urban areas.

The remaining two parts of the package did not pass. The first, the "State-Urban Strategies" program, was to give states grants to reallocate funding and make plans to aid cities. The second, the "Labor-Intensive Public Works" program was to provide grants to renovate public facilities while relieving hard-core unemployment.

Miscellaneous

- The Endangered Species Act was extended, but for only eighteen months. Two especially disturbing amendments were adopted; one calls for an economic review before critical habitat can be designated. The second establishes a cabinet-level board that can exempt certain projects from the act. □

Gene Coan is the Club's assistant conservation director and editor of the National News Report. Michael Moss is assistant editor of the NNR.

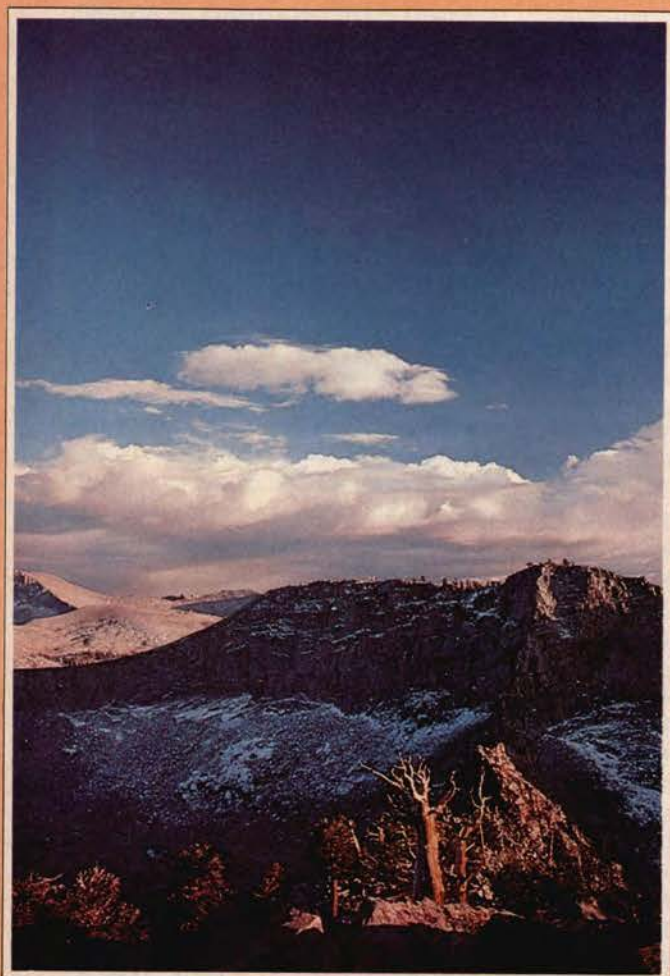
The Omnibus Parks Legislation

Varieties of Victories

THE OMNIBUS Parks legislation, which expands the wilderness, wild and scenic river and park systems by more than one million acres, culminates years of Sierra Club efforts in a number of campaigns. Often called the "Burton bill" (for its author, California Representative Phillip Burton), the Omnibus legislation was a political innovation. Using the tactics usually associated with the passage of public works legislation, Burton combined proposed parks, wilderness and rivers located all over the nation into one legislative package—thus assuring the widest possible support.

Below: John Muir's dream was finally fulfilled when Mineral King Valley was added to Sequoia National Park; as early as 1911, the Sierra Club urged expansion of the park to include the 16,200-acre valley. *Right:* Horn Island is now part of the Gulf Islands Wilderness, which includes much of the Gulf Islands National Seashore in Florida and Mississippi.

Below right: Much of New Jersey's Pine Barrens will become a national recreation area, preserving a unique and extensive wild area close to the great eastern cities.



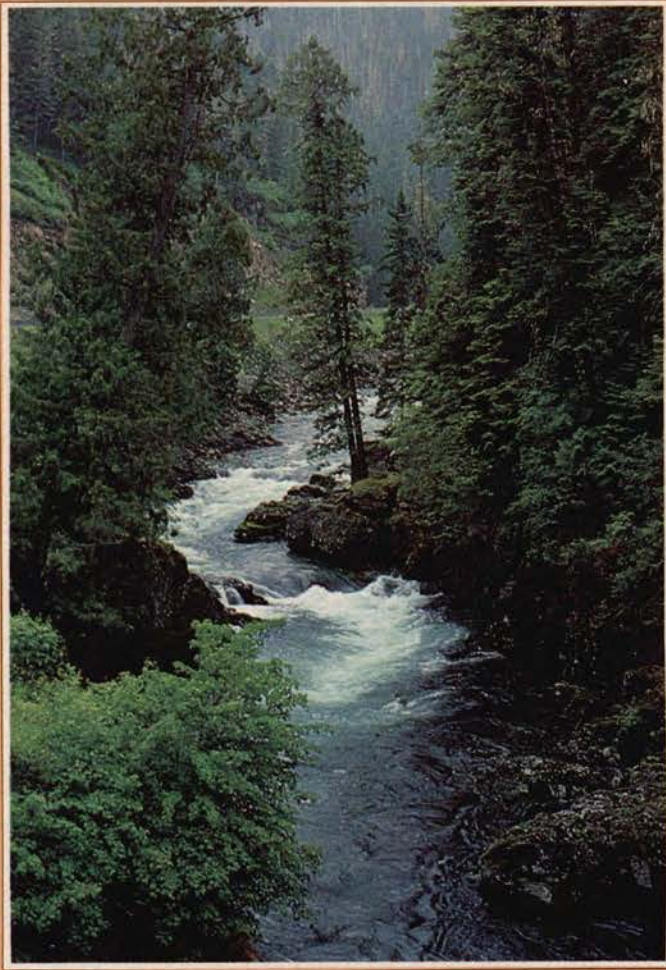
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Left and below: Idaho's Saint Joe River and Washington's Skagit River both became parts of the national Wild and Scenic River System.

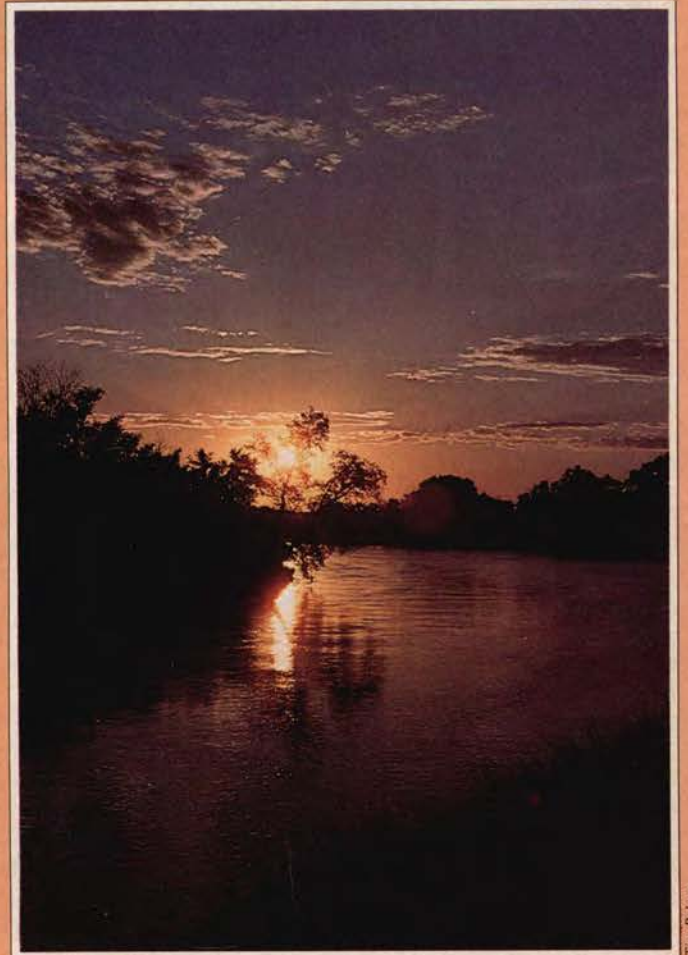


Tim Palmer



W. A. Richardson III

Right: Pennsylvania's Upper Allegheny River will be studied for possible designation as a wild and scenic river. Above: Los Angeles now has much more parkland; a Santa Monica Mountains National Recreation Area was established.



Tim Palmer

*Eighty Years of Grass-roots Action
Has Saved California's Coastal Redwoods*

The New Redwood National Park

LARRY E. MOSS

EIGHTY YEARS of effort to preserve a significant living heritage of *sequoia sempervirens*, the coast redwood, culminated in the spring of 1978 when President Carter signed H.R. 3813 into law. Congressman Phillip Burton's legislation enlarged Redwood National Park by 48,000 acres and, for the first time, established a national park big enough to preserve an adequate portion of the landscape and towering trees of the striking northern California coast.

The forests of coast redwoods that now grow only in the coastal area from Big Sur in central California to the southwestern tip of Oregon are all that remain of the vast redwood forests of prehistoric times. Twenty-five million years ago the "Redwood Empire" extended across the northern hemisphere from western Canada to

the Atlantic Ocean and from France to Japan. However, when the climate became colder and drier and the great glaciers began to move across the earth at the close of the Miocene epoch, the redwoods began their retreat. Many species of these giant trees disappeared forever, and the remaining forests are mere samples of what once existed. The California coast, which approximates the temperate humidity of former times, is the last stronghold of the redwood.

Some specimens of the dawn redwood remain in China and giant sequoia groves are found in the Sierra, but only the coast redwood gives a sense of the redwood forests that once existed. It was once the most common conifer on 1.5 million acres of forest land; but today most of the magnificent old-growth trees, some of them more than 2000 years old, are gone. Only 6% of the old-growth acreage remains intact, and most of that is in parks. In many places second-growth forests sprouted when the old-growth giants

were felled, but elsewhere redwoods no longer grow where they flourished prior to 1850. The vineyards of the Russian River valley, the sheep meadows and housing tracts of the Sonoma and Mendocino coast, the cow pastures of the lower Eel River valley—all these once supported luxuriant redwood forests.

Redwood country is sharply etched and luminous—innumerable ridges and canyons, translucent mists, brilliant sunshine, shifting trails of fog, great rivers pulsing to the sea. Throughout its range, but particularly in the southern half, the redwood is part of the coastal mosaic and mixes with other trees. *Sequoia sempervirens* occupies a well-defined climatic niche—the fog belt of maritime central and northern California. The summers are too dry to support extensive stands of the types of conifers that thrive in the moister climate of coastal Oregon and Washington, but the fog's dampness lingers in the summer to keep the dry-climate conifers at bay.

The coast redwood is most magnificent in the northern California counties of Humboldt and Del Norte. It is concentrated there in almost pure stands in the canyon bottoms, on the nutrient-rich alluvial flats and on north-facing slopes. Douglas fir is found throughout the redwood zone, and tan oak and madrone mix with the large conifers on the drier slopes. Redwood shares the coastal cliffs with sitka spruce and grand fir. Big-leaf maple, alder, laurel, azalea, rhododendron, mosses, ferns, berry vines and many flowering plants are also significant components of a redwood forest.

Unfortunately, the awe evoked by groves of redwoods has not always been matched by a commitment to their preservation. Approximately 75 years ago, President Theodore Roosevelt, speaking of both the coast redwood and the giant sequoia, said, "I appeal to you . . . to protect these mighty trees, these wonderful monuments of beauty . . . There is



The long campaign to preserve California's remaining redwoods did not slacken when Redwood National Park was established in 1968. In 1969, as Lady Bird Johnson spoke at the dedication of a redwood grove named in her honor, activists demonstrated for park expansion.

nothing more practical in the end than the preservation of anything that appeals to the higher emotions in mankind." However, fine sentiments are often easy to express but difficult to implement. Roosevelt's sole achievement on behalf of the coast redwood was to accept for the federal government the gift of a few hundred acres of redwoods in Marin County, north of San Francisco, which he proclaimed as Muir Woods National Monument. Congressman William Kent had purchased the area and donated it to the federal government, which then took no action to preserve more of the trees until Redwood National Park was established in 1968.

The coast redwoods, mostly owned by the federal government at one time, were practically given away under the terms of the Pre-Emption Law of 1841, the

Homestead Act of 1862 and the Timber and Stone Act of 1878. By the time preservation of the coast redwoods became a concern, the trees were in private ownership.

Fortunately the state of California and groups of private citizens have done better. The Sempervirens Club of California was formed in 1900 and, in 1902, it persuaded the California Legislature and the governor to establish Big Basin Redwood State Park in the coastal mountains south of San Francisco. But the most magnificent redwood groves rise from the river canyons of northwestern California, and the increasing harvest of timber in that region spurred the formation of the Save-the-Redwoods League in 1918. The league, in conjunction with the state, has done yeoman's work since then, establishing a string of small but

ecologically significant state parks.

However, the state parks did not encompass enough land upslope from the preserved groves, and destruction of old-growth trees within the parks has resulted. A combination of destructive logging and attempted conversion of the land to grassland denuded many slopes, and relentless winter rains sent countless tons of exposed soil and rock down the streams. In 1964, hundreds of magnificent redwoods were destroyed in Humboldt Redwoods State Park when a gully-washer sent a tremendous load of silt from logged-over lands rushing down Bull Creek. The raging, overloaded stream cut away its banks on the alluvial flats and undermined many giant trees in the Rockefeller Forest. Even today the signs of recovery are barely discernible.

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accelerated the harvest of old-growth redwoods, increasing pressure to save the redwoods. Public concern expressed from all parts of the country forced establishment of a Redwood National Park in 1968. Unfortunately, Congress took a good proposal for a national park and weakened it so much that the Redwood Creek portion of the park was another Bull Creek disaster waiting to happen.

The national park established in 1968 consisted of 58,000 acres and took in three state parks—Jedediah Smith, Del Norte Coast and Prairie Creek. The principal federal acquisition was in the area of Lost Man Creek and Redwood Creek. Redwood Creek is a major coastal stream south of the Klamath River; the world's tallest measured trees grow there, in the "worm," the narrow, southern-most extension of the park. However, all land more than one-quarter mile upslope of the creek in the worm remained in timber company ownership. As clearcutting went on and the lands became a swath of timber slash, erosion and scenic degradation, the promise of a national park in Redwood Creek was fast receding. Timber operations had substantially damaged these upslope lands during the decade after the park was established, but increasing evidence of that damage, the growing threat to the tall trees along Redwood Creek, and the continuing interest of organizations such as the Sierra Club finally won over the state of California, the Carter Administration and Congress. Congressman Burton's legislative skill, the support of key senators, and grass-roots activity in all parts of the nation finally made a reality of the hope for a larger park.

The 1978 Redwood Park legislation—H.R. 3813—consists of three principal parts.

- The park was expanded by 48,000 acres in order to provide ecologically sound park boundaries in Redwood Creek and to add some important lands that separated Prairie Creek Redwood State Park from the federal land in Lost Man and Redwood creeks. The bill also established a park protection zone of 30,000 acres upstream from the expanded park in Redwood Creek. The

Secretary of the Interior is authorized to acquire land in the park protection zone in order to prevent damage to park resources.

- Less than 10,000 acres of the 48,000-acre park expansion consist of undisturbed old-growth redwoods. The rest is cutover; much of it was logged recently. This cutover land is a welter of stumps, buried small streams and ongoing erosion. H.R. 3813 authorizes the expenditure of \$33 million to rehabilitate these lands. This program will boost the depressed and undiversified north coast economy while minimizing further erosion of logged lands.

- Timber operations of two companies—Arcata and Louisiana-Pacific—were partially dependent upon logging the old-growth redwood trees that were taken for the park expansion. These companies, as well as Simpson Timber, will be fairly paid for the land taken, but employees of Louisiana-Pacific have been laid off because of federal acquisition of land that was scheduled to be logged during the next few years. Arcata and some other employers will also be affected. Title II of H.R. 3813 provides that employees who lose their jobs or whose earnings are reduced because of the park expansion will receive compensation, retraining and relocation payment. This provision is unique to the Redwood National Park expansion legislation and should minimize any economic losses by individuals.

The new park is long and slender, appropriate for the preservation of trees that grow only near the sea. The park reaches 50 miles from Redwood Creek south of Orick to the magnificent forests of Jedediah Smith Redwoods State Park east of Crescent City. Although Redwood National Park was established to preserve the coast redwood, it also includes a spectacular wilderness beach from Orick to Crescent City. Soaring headlands, steep cliffs, the surging sea, long open beaches, the Klamath River estuary, offshore rocks, quiet lagoons and the ever-present trees are the elements of this unique landscape.

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There are three main areas of preserved old-growth redwoods in the park—Redwood and Lost Man creeks, Prairie Creek and Jedediah Smith State Park. The trees in the Stout Grove, at the conjunction of Mill Creek and the Smith River, the lush forest and understory along Prairie Creek, the unbroken ranks of redwoods on the slopes of Redwood Creek, and the world's tallest trees are the highlights of the redwood forest, but there is a naturalist's catalogue of other places to see.

Three large lagoons, which are not part of Redwood National Park, extend south eight miles from the mouth of Redwood Creek, and there is a breathtaking slope of redwoods to the east of the town of Orick. An old logging road, mostly reclaimed by alders, serves as an eight-mile trail along Redwood Creek to the world's tallest tree, and another closed road provides a trail up Lost Man Creek. The upper watershed of this small stream supports particularly impressive stands of rhododendrons.

A dirt road leads to wild Gold Bluffs Beach, so called because of an attempt in the 1850s to mine gold from the colorful cliffs. Fern Canyon, a jewel draped in robes of ferns, opens onto the beach. There are numerous trails through the redwoods and along the streams in Prairie Creek Redwoods State Park, and the open meadows and beaches are often frequented by Roosevelt elk.

Spectacular headlands rise south of the Klamath River and, north of the river, a trail opens onto views of a sea that seems to extend to infinity. Sea lions often are seen feeding at the mouth of the river.

Trails lead through the forest and down steep cliffs to the ocean in Del Norte Coast State Park. To the east of Crescent City, Mill Creek and the Smith River flow through what many consider to be the most beautiful of the redwood forests.

There are some questions about the future of the park. Redwood Creek is burdened with a tremendous load of sediment from the destructive logging of past years and from natural erosion. If a rainfall as intense as the 1964 deluge occurs before the unnatural sediment load is

gradually flushed out to sea, the disaster of Bull Creek could be repeated along Redwood Creek. The cessation of logging on the land that was recently acquired, together with the rehabilitation program, will decrease the unnatural sediment load entering the stream. The Interior Department is committed to systematic monitoring of activities in the park protection zone. The Interior Secretary has the authority to acquire any or all lands in that zone to prevent damage to the park, but it is not clear at this time if acquisition of any or all of this land will be necessary. The beautiful lagoons south of the park are partially in private hands and should be preserved. The state of California is presently working on an acquisition program in the area.

But, all things considered, the future of Redwood National Park is more assured than it has ever been. An agreement is nearly concluded between the state of California and the National Park Service for the federal agency to lease and manage the three state parks for 25 years. This will be the first step toward consolidating the federal and state lands into one national park, and it should facilitate the development of a master plan for the park.

The expansion of Redwood National Park could be used as a textbook example of the importance of grass-roots support for such an undertaking. Many Sierra Club people were deeply involved, among them Edgar Wayburn, the former Club president who worked for many years to establish a Redwood National Park, and Linda Billings, who worked for many years as a Sierra Club lobbyist. John Amodio, a north-coast resident who spent months in Washington, D.C., lobbying for the redwoods, said, "When the legislation to expand the park was hung up in the House Rules Committee, the flow of letters from people all over the country to their representatives in Congress provided the leverage to push the bill out of committee. Without those letters we wouldn't have made it."

Larry E. Moss is a free-lance writer on environmental issues and a former executive director of the Planning and Conservation League.

How Environmental Candidates Fared

The 1978 Elections

Results by Region

EXCERPTED FROM THE SIERRA CLUB
NATIONAL NEWS REPORT

CANDIDATES with strong conservation positions did reasonably well at the polls in November. In fact, in areas where environmental issues were the deciding factors in local elections, conservationist candidates enjoyed their greatest successes. Following are some of the most important election results.

Alaska, Hawaii and the Pacific Northwest

In Alaska, the narrow reelection victory of Governor Jay Hammond (R) was welcomed by environmentalists; he has emphasized planned rather than unrestrained development of Alaska's natural resources. A major setback for environmentalists was the passage of the "homestead" initiative, which will make up to 30 million acres of state land available for private ownership; this poses a threat to proposed National Interest Lands and to Alaskan wildlife. The initiative's constitutionality is being challenged in court.

In Hawaii, Jean King was elected lieutenant governor; King was a very effective conservation advocate in the state legislature. Voters also passed two environmental constitutional revisions: one gives citizens the right to sue on behalf of the environment; the other requires a two-thirds vote of the state legislature to approve a site for any nuclear facility.

The quality of congressional representation from the state of Washington should improve following the election of two conservationist-supported Democratic candidates to the House, Mike Lowry and Al Swift. Local conser-

vationists expect Lowry to take the lead among the Washington delegation on conservation issues.

The reelection of Representative James Weaver (D) in Oregon is one of the most important election results for conservationists. Weaver heads the House Agriculture Subcommittee on Forests and has been a strong advocate of sound forest management and wilderness preservation. Representative Les AuCoin's (D) reelection was also applauded by Oregon conservationists. Oregon voters strongly endorsed state land-use planning by soundly defeating, for the third time since 1971, an initiative that would have seriously weakened Oregon's Land Conservation and Development Commission.

California

Governor Jerry Brown (D) easily won reelection, with significant support from environmentalists. A key campaign issue was nuclear power; Brown opposes new plant construction until waste-management problems are solved. He also made strong commitments in his campaign to improve air quality in urban areas and to protect farmland.

The results in the congressional races were mixed. There will be three new pro-environment faces in the House: Norman Shumway (R) defeated incumbent Representative John McFall (D); Vic Fazio (D) will replace retiring Robert Leggett; and Tony Coelho (D) will occupy the seat of retiring B. F. Sisk. These gains were offset by one major loss—John Krebs (D) was narrowly defeated by Charles Pashayan (R). Two traditional opponents of environmental legislation, Don Clausen (R) and Robert Dornan (R), barely survived close contests with environmentalist-backed candidates.

The Northeast

The most significant gain for New England conservationists was the defeat of Governor Meldrim Thomson (R) in New Hampshire. Known for his pro-nuclear power, pro-utility industry stands, Thomson lost mainly on the issue of levying a controversial proposed surcharge to pay for construction work in progress on the Seabrook nuclear power plant. His successor, Hugh Gallen (D), is opposed to the surcharge, which would increase electric bills prior to completion of the plant.

Environmentalists in Massachusetts were disappointed when Ed King (D), was elected governor. He supports nuclear power and offshore oil drilling and denies that the disposal of nuclear waste poses any problem.

Conservationists are pleased with the election of Representative Paul Tsongas (D) to the Senate.

In Maine, the proposed Dickey-Lincoln dam was a determining factor in the election of Representative William Cohen (R) to the Senate. He defeated incumbent Senator William Hathaway (D), who was generally good on environmental issues, but favored the dam. Cohen's House seat was won by Olympia Snowe (R), who also opposes construction of the dam.

In Vermont, Representative James Jeffords (R), a solar-energy backer, was reelected. However, Governor Richard Snelling (R), a pro-development businessman with no apparent environmental sympathies, was also reelected.

Senator Claiborne Pell (D), Representative Fernand St. Germain (D), and Representative Edward Beard (D), all strong conservationists, were reelected in Rhode Island.

In Connecticut, the reelection of Representative Toby Moffett (D) was a major environmental victory.

A major loss in New Jersey was the defeat of Representative Helen Meyner (D) by James Courter (R). Also disappointing was the reelection of Representative Edwin Forsythe (R), a powerful anti-environmentalist. On the brighter side, both Representative James Florio (D) and Representative William Hughes (D) retained their seats. Florio was especially helpful on the legislation to protect the Pine Barrens. Representative Robert Roe (D) was reelected by an overwhelming margin. Roe is the chairman of the Economic Development Subcommittee of the Public Works Committee, where he has been a leader on urban environmental issues.

In New York, Geraldine Ferraro (D) scored an unexpected victory for environmentalists, but Representative Edward Pattison, a strong environmental backer, was defeated.

The Midwest

In Michigan, Detroit City Council chairman Carl Levin (D) defeated two-term Senator Robert Griffin in the state's most important Senate race. Griffin was at best lukewarm on environmental issues, although he did play an important role in defeating the SST in the early 1970s, and more recently was a supporter of strong Alaska lands legislation. However, Levin is well-liked by environmentalists. The most exciting change in the House was the defeat of Republican Garry Brown; he was replaced by former state legislator Howard Wolpe, who will, we hope, be an excellent environmental advocate.

On election day Wisconsin voters picked Republican Lee Dreyfus to be the state's next governor. A colorful maverick, Dreyfus was chancellor of the University of Wisconsin before deciding to take on the favored Representative Robert Kasten for the GOP nomination, along with then-incumbent Martin Schreiber (D). While environmentalists generally supported Schreiber, Dreyfus is believed to be receptive. His announced energy policies are terrible—accelerated powerplant development, more nuclear power—but his general environmental sympathies are still unknown. The defeat of Representative Robert Cornell (D) is regarded as a setback; he had a good environmental record and was responsible for the recent passage of a bill designating two national forest areas in his district as wilderness.

Minnesota's Democratic-Farmer-Labor party suffered a major defeat. Senator Wendell Anderson, the incumbent Democrat, was narrowly defeated by Republican Rudy Boschwitz. Anderson's national posture was strongly in favor of environmental measures, but state environmentalists were angry at his positions on state issues. Boschwitz seems receptive and has been a strong advocate of the BWCA wilderness.

For the Senate seat held by Hubert and then by Muriel Humphrey, Representative Don Fraser, a superb environmental leader, was beaten in the primary by a millionaire entrepreneur, Bob Short. Environmentalists were thus delighted to see Republican David Durenberger thoroughly trounce Short in the general elec-

tion. Durenberger in the past has been active in the environmental movement in Minnesota, although his campaign pronouncements did not reflect that fact.

The worst news from the Midwest was the defeat of Iowa's Senator Dick Clark, a most respected environment-minded member of the Senate. Clark was upset by Roger Jepson (R), who apparently benefited from well-organized anti-Clark campaigns. The defeat of two-term Representative Mike Blouis, a strong environmentalist from Dubuque, was also regrettable.

Illinois had a few surprises or significant events for environmentalists. Senator Charles Percy came from behind to win a third term. Percy has had a generally good environmental record. In the most interesting congressional race, the perennially beleaguered Abner Mikva, a strong environmentalist, was reelected.

Ohio environmentalists will have to hunker down for another four years of anti-environmental Governor James Rhodes, who barely squeaked past the challenge offered by Lt. Governor Richard Celeste.

In Kentucky, environmentalists had hoped to elect a candidate from their ranks, Tom Easterly, to the House to replace John Breckenridge. Lexington area voters foiled that by filling the seat with a Republican for only the second time since the Civil War. Little is known about the environmental leanings of the victor, Larry Hopkins.

In Kansas, incumbent Governor Robert Bennett (R) was narrowly defeated by environmentalist-backed John Carlin (D), former speaker of the state House. Representative Dan Glickman (D), considered to have the best environmental voting record in the state, was easily reelected. Losses included the election of Bob Whittaker (R) to the House (Whittaker opposes the proposed Tallgrass Prairie National Park) and the defeat of Martha Keys (D), who also has a good conservation record, by Jim Jeffries (R).

The Southwest and the Rockies

In Arizona, Representative Morris

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Udall (D) easily won another term in the House despite the concerted opposition of the mining industry, which had launched a recall campaign earlier in the year. Udall is chairman of the Interior Committee and has a good record on environmental issues. Environmentalists were also pleased by the reelection of incumbent Governor Bruce Babbitt (D), who has a good record and is an avid backpacker.

In Colorado, conservationist-backed Senator Floyd Haskell (D) lost his reelection bid to Representative William Armstrong (R). Armstrong has a very poor voting record on conservation issues in the House. Representatives Patricia Schroeder (D) and Tim Wirth (D), two incumbents with good environmental voting records, won reelection handily. Governor Richard Lamm (D), a one-time environmentalist whose reelection campaign stressed opposition to Carter Administration environmental policies, also won easily.

In Montana, Representative Max Baucus (D), a strong conservationist, will be replacing retiring Senator Paul Hatfield (D). Baucus' House seat will be filled by Patrick Williams (D), who ran on a pro-conservation platform.

Two nuclear power initiatives passed in Montana. One, a statewide initiative, requires that all nuclear facilities proposed for Montana must be approved by the voters and must be covered by a bond of 30% of the capital cost to cover decommissioning. Missoula County voters approved a ban on the siting of any nuclear facility within their county.

Wyoming's incumbent Governor Ed Herschler (D) ran a close but successful reelection campaign that stressed environmental protection and strict controls over energy development.

In Idaho, Senator James McClure (R) and Representatives Steve Symms (R) and George Hansen (R) all won easy reelection; all three have very poor voting records on environmental issues.

The South

In Florida, Robert Graham (D), who had an excellent environmental record in the state senate, defeated Jack Eckerd for the governorship. Florida also voted

down constitutional revisions that would have crippled environmental agencies.

In North Carolina, Representative Steve Neal (D) was reelected; he plays a key role in energy issues on the Banking Committee, heads the subcommittee that oversees the Export-Import Bank and is the author of a bill to create a solar energy development bank. Senator Jesse Helms (R), who has one of Congress's worst conservation records, was reelected.

In Virginia, Representative Herbert Harris (D) retained his seat. Harris sponsored legislation for the Manassas Battlefield Park and the Potomac National River Park.

Southern environmentalists received a double blow in South Carolina; Senator Strom Thurmond and Representative Floyd Spence, who both have terrible environmental records, will return to Congress.

Arkansas and Alabama each had moderate environmental gains. Howell Heflin (D), an opponent of unrestrained growth and a critic of nuclear power, claimed a senate seat unopposed in Alabama. Arkansas' new governor is Bill Clinton (D), formerly the state's attorney general and a strong backer of solar power.

Oklahoma Representative Ted Risenhoover (D) lost his seat in the primary election. He will be replaced by Mike Synar (D), who looks good on environmental issues.

The new Texas congressional delegation appears slightly improved to conservationists. Eight of the state's 24 seats were available because of retirement. Retiring Texans held many key committee positions. Four representatives are likely to be strong supporters of environmental positions: incumbents Bob Eckhardt (D) and Jim Mattox (D) and newly elected Mickey Leland (D) and Martin Frost (D). Environmentalists regret the defeat of John Hill, a pro-environment Democrat, for the governorship. Farmland preservationists were pleased to see the passage of a constitutional amendment that bases property taxes on the present use of the land rather than on its development potential. □

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Alaska: President Carter to the Rescue

EDGAR WAYBURN

THANKS to the vision and courage of an environmentally aware President of the United States, the National Interest Lands of Alaska now have a great degree of protection. Congress adjourned in October without passing National Interest Lands legislation. On December 1, 1978, using his authority under the 1906 Antiquities Act, President Jimmy Carter signed proclamations designating 17 national monuments

covering approximately 56 million acres of Alaska. The President also directed Interior Secretary Cecil Andrus to use the 1976 Federal Land Policy and Management Act (the BLM Organic Act) to designate approximately 40 million acres in 12 areas as national wildlife refuges.

Secretary of Agriculture Bob Bergland has also taken action under the BLM Organic Act to protect 11 million acres of the Chugach and Tongass National Forests from mineral entry and preemptory state selection.

Earlier, on November 16, Secretary Andrus had protected all the areas in proposed conservation units by issuing emergency withdrawals of 110 million acres—including the acreage that President Carter later moved to protect. These

three-year withdrawals will remain in force with the President's actions under the Antiquities Act.

Thus, firm executive action has accomplished the objectives that the Sierra Club and other conservation organizations have been fighting for since the Alaska Native Settlement Act passed in 1971.

Thirteen of the national monuments will be managed as national parks by the National Park Service. Two monuments are national wildlife refuges, managed by the U.S. Fish and Wildlife Service, and two areas will be managed as wilderness by the U.S. Forest Service. Subsistence hunting will be allowed in all areas except the Kenai Fjords National Monument.

President Carter's deeds reflect not only his environmental understanding and wisdom but also the overwhelming support of the American people for protection of Alaska's National Interest Lands. This support was evidenced repeatedly in congressional hearings held over the past two years. But Congress's failure to act—largely because of the delaying tactics of Alaskan Senator Ted Stevens (R) and the intransigence of Alaska's other senator, Mike Gravel (D)—put the National Interest Lands in jeopardy. The President's quick and decisive actions place him in history as the greatest conservation president of our time. Only Theodore Roosevelt, who withdrew a total of 234 million acres of public land, established the national forest system and designated national monuments in the Grand Canyon and in the Olympic Mountains, can be compared to President Carter.

Grateful as we are for the actions of the President, we must remember that the battle for the National Interest Lands is not over. Congress can modify or nullify what President Carter has done. It is not likely that those who would exploit the last great natural areas will be content to let the President's actions go unchallenged. For our part, we must see that the measures he has taken are reinforced—strongly and immediately. In his proclamation the President stated, "The actions I have taken today provide for urgently needed permanent protections. However, they are taken in the hope that the 96th Congress will act promptly to pass Alaska lands legislation." It is up to us to follow his lead. □

National Monuments Proclaimed by President Carter

<i>Under Park Service</i>	<i>acres</i>		
Aniakchak	350,000	Noatak	5,800,000
Bering Land Bridge	2,600,000	Wrangells-St. Elias	10,950,000
Cape Krusenstern	560,000	Yukon-Charley	1,720,000
Denali	3,890,000	<i>Under Fish & Wildlife</i>	
Gates of the Arctic	8,220,000	Yukon Flats	10,600,000
Glacier Bay	550,000	Becharof	1,200,000
Katmai	1,370,000	<i>Under Forest Service</i>	
Kenai Fjords	570,000	Admiralty Island	1,100,000
Kobuk Valley	1,710,000	Misty Fjords	2,285,000
Lake Clark	2,500,000	Total acreage:	55,975,000

Proposed National Wildlife Refuges

	<i>acres</i>		
Arctic Range	9,900,000	Nowitna	1,560,000
Copper River	690,000	Selawik	3,220,000
Innoko	3,720,000	Tetline	770,000
Kanuti	1,480,000	Togiak	1,180,000
Kenai Range	160,000	Yukon Delta	13,710,000
Koyukuk	2,080,000	Alaska Marine	460,000
		Total acreage:	38,930,000

Opposite: Unnamed twin glaciers in the proposed Lake Clark National Park.



*"You must take the consequences
of your mistakes or misfortunes without
excuses or explanations. Excuses and
explanations are for the world below."*

Avalanche!

LAWRENCE LADIN

Behind the drama and adventure of Lawrence Ladin's story is an important lesson, one always heeded on Sierra Club outings. Any mountain trip may be dangerous, yet with common sense and experience, the risks of ski-touring can be minimized. Sierra Club ski tours stay out of trouble by staying out of avalanche country and by having the appropriate equipment and enough well-trained leaders on each trip. And, of course, our main tool for avoiding danger is utilizing the common sense, the knowledge and the precautions that have evolved during the 76 years the Club has been leading outings. For a description of Sierra Club ski tours, write the Outings Department, 530 Bush Street, San Francisco, CA 94108.

WE HAVE halted to rest at the top of Allenby Pass. I drop my pack on my skis, panting from the climb. The cold, still air quickens the blood with each breath. Around us range shining, untouched snowfields, the ramparts of the Canadian Rockies. Pale blue glaciers hang on the cliffs. Above us, near the peaks, the rocks have been blown bare of snow. No one speaks.

The sun is intense, dazzling. There is no wind.

Snow, rocks, sun, silence.

Then, on a farther peak, snow begins to waterfall off a rock ledge, first slowly, then in a heavy stream. The snow plume lands far below, and the lower snowfield ab-

ruptly disappears in billowing clouds, with the boom of thunder. Then silence again.

We scrape the ice from our skis, shoulder our packs, tighten the straps and move on.

That, in 1976, was my first winter trip in the Canadian Rockies. We had the mountains—we were 40 miles northwest of Banff, Alberta—completely to ourselves. The snow had buried our log cabin to above the windows. We skied up and down a few peaks, built an igloo, held a dance by kerosene lamps and with a wind-up Victrola. The Canadian guide knew his wilderness skiing and was practiced in mountain rescue. Our second guide was a Frenchman from Chamonix, an ex-mathematician, who had climbed on Everest. At the end we skied out over Allenby Pass, making the 28 miles in two days. The mountains and glaciers were awesome. I can see them yet.

IRATHER like the Canadian Rockies. Their history is pleasing and romantic—the *voyageurs*, the Hudson's Bay Company, the Mounties, the Edwardian spas. I like the Canadians, too. I've made many summer backpack trips in their mountains, sometimes with friends, sometimes solo.

Backpackers now sweep into the Rockies each summer. Yet those who love the sheer silence of the wilderness prefer the winter.

Consider, however, the problems of the winter wilderness. You climb a mountain

on your cross-country skis. You descend that mountain on those light wooden slats with their loose bindings, carrying a 40-pound pack.

The snow pours down. You cannot see ten feet ahead. You must find your camp in the white-out. Your fingers are starting to freeze. What now?

You must cross a steep snowfield. Can you tell whether the snow will avalanche as you cross? If you are swept away, can you save yourself? If your companions are buried, can you find them? Can you revive them after they have been buried half an hour, ten feet down?

Here skill is rewarded, ignorance and clumsiness are punished. You must take the consequences of your mistakes or misfortunes without excuses or explanations. Excuses and explanations are for the world below.

In 1977 two Canadian friends asked me to join in another winter trip, to be led by the same Canadian guiding firm as the year before. My mountain cross-country skiing was till shaky, my winter survival skill still rudimentary. My training might well continue with this outfitter. I wrote to say I'd join the group.

We would ski in about eight miles, then rendezvous with a helicopter for a lift to the cabin. A week later we would ski all the way out, going over Allenby Pass again. I noticed that this year the guide firm offered more than a dozen trips, far more than in 1976.

SEVEN O'CLOCK in the morning, a bus station in the mountains. I edge through a crowd of skiers, hunting for our guide. Most of the skiers are expensively dressed, carry downhill skis and are obviously not with my party. I spot some of my group in well-worn hiking clothes and carrying packs. We gradually sort ourselves out from the high-fashion crowd. No guide yet, so we pass the time in the station coffee shop. I don't see my friends from last year; they must have canceled.

The group is large—too large—about 20 persons. Some of our skiers are wearing bulky, heavy jackets. All wrong for cross-country work. Others have shiny new skis and new packs, another sign of beginners. We'll manage, if the trip is run as well as last year.

Our guide turns up at 8 a.m. A close-cropped brown beard, a green Tyrolean hat and gray ski knickers. Very little to say. A Swiss, it would appear. He is not quite sure when we leave. Eventually our bus pulls in, and we leave for the jump-off point. Somewhere in the mountains the bus lets us off.

Most skiers leave their backpacks on the bus for the copter to carry in to the cabin, but I'm going to carry my pack; I need the workout. Besides, my sleeping bag and extra clothes make good emergency gear for winter travel in the backcountry.

THERE'S some milling and confusion while the experienced people help the beginners wax their skis. Cross-country wax should grip the snow going uphill but slide smoothly going down. I carry six waxes, examine today's snow, hesitate between blue and green wax, and decide on blue. Blue had better be right. I wax up, push my boots into the toe irons, clamp them tight and ski over to the guide.

The guide's name is Kobi. He doesn't volunteer much information; hardly the take-charge type.

"Kobi, where is the other guide?"

"I will lead you in myself. The other guide is at the cabin."

"Only one guide to lead 20 people?"

"The Citadel Pass is a simple route. Never problems going through."

"How about avalanche cords for us, or

at least some avalanche beepers?"

"Have them at the cabin. Don't need them in Citadel."

Clouds have been piling up as we ready ourselves. Clothes and packs are adjusted. Snow begins to fall. The ascent begins.

We ski single file. Kobi, far ahead,

Illustration by Bill Yenne



breaks the trail in the soft, deep snow. Skiers chatter, introduce themselves, talk about gear. The islands of pointed spruces look black against the snowfields.

In a few minutes I have a good cross-country rhythm. Slide, slide, breathe in; slide, slide, breathe out. "Dah, dah, dah,

dah, dum. Somewhere I'll find you/ moonlight behind you/dah, dah,dah,dah, dum." I'm moving smoothly and easily, and my pack is riding nicely.

Kobi leads us across an alpine meadow, his trail dipping occasionally but steadily climbing. I skim over the rises and swoop down across the dips. A good feeling. The snow blows stronger and heavier, driving with a pattern against my cotton wind parka. I tighten the parka about my face and wrists, hitch up my snow gaiters to my knees, and don my snow goggles. That's better.

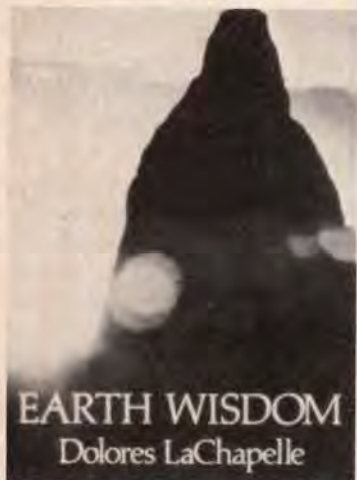
THE TRAIL grows steeper. A girl trips and pitches into the soft snow. She flounders, shoulder deep. Two of us pulling and hauling on either side get her on her feet again and brushed off. A novice, and not in good condition either.

The ascent continues. The pace slows as the slope steepens again. Slide, breathe in; slide, breathe out; slide, breathe in; slide, breathe out. Even in this cold wind I'm sweating. When skiing uphill the danger is not the cold; the problem is overheating and sweating, so I loosen my wind parka to let in air. Under the parka I only wear a light wool shirt and Norwegian fishnet underwear that lets air circulate against the skin. Sweat is dangerous. Sweat-damp clothes will freeze when you stop to rest. Keeping dry is the first rule in winter wilderness.

Here we go again. At this altitude the trees have shrunk to the size of bushes; they hug the ground tightly. Presently they disappear; we are above tree line. Our track is the only mark on the smooth, undulating snowfield. The slope steepens again; we must be nearing Citadel Pass. Slower pace, but I'm moving well. Slide, shift balance, breathe in; slide, shift balance, breathe out. There is no talking now.

We mount a small rise and at once the mountain opens up into a saddle between two dimly seen peaks—Citadel Pass ahead. The snow pours out of a white sky through white swirling air. To climb mountains with an exhilarating effort, to ski smoothly and tirelessly, to be warm and dry in the storm—this is truly living.

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It is tempting to push on to the head of the group but the novices are floundering and panting hard. There should be an assistant leader at the rear to keep the novices out of trouble.

ARED parka lags behind with me to keep an eye on the beginners. A German, apparently, named Ulli; a good skier, but a tireless talker. He knows a good deal about wilderness skiing, and he tells me all without pause.

Ulli doesn't like the snow conditions. Too much fresh snow, too deep and coming down too fast.

Now for the top of the pass. Today's snowfall is already knee deep, but still it comes down. The gates of the pass are hardly visible, though Kobi's trail is clear enough. A steep descent in the open, then brush and timber dimly seen below.

A pause to collect the slow-movers, and now the descent. The first skiers, the best ones, ski a straight descent, which looks dangerous. But there they are, whooping and yelling, plowing knee deep through the powder, making jump turns before they hit the brush.

I draw my parka close and tight for the descent, compose myself, and push off. First try an easy descent, a slow, shallow-angle traverse across the hill. My skis disappear in the soft powder, which billows around my knees. All under control, so I turn into a steep descent—floating down on air, whooping and yelling as the snow parts like a bow wave.

By the time the laggards flounder or fall to a stop, Kobi has disappeared into the trees, and the voices of the first skiers become distant. The trail is a traverse along the steep side of a hill, dodging between the spruces but easy to follow. Berni, a small and spritely lady, jogs in front of me, skiing her own casual, freeform style. She describes the one and only authentic way to organize a British Columbia salmon barbecue. Rod, her husband, begins some anecdotes of lumberjack bars he has known. We are the last ones on the trail. At least I think so, but I can't see far in this heavy timber.

Ulli has skied forward to talk with Kobi. Ulli doesn't like the snow conditions at all.

We hear them counting off from the front. About time. We count off three times before the guide, somewhere far forward, seems satisfied. Twenty-four people, including the guide. Too many.

The snow has suddenly stopped, leaving the spruces bowed heavily. We are still traversing a slope, inside the timber, but the going is easy. I'm gliding along nicely while Berni describes an annual gala her brother gives on Vancouver Island.

Someone ahead is shouting. Something about an avalanche. Well, we can't see any avalanche here in the trees, and we can't hear it, so what's the point? We'll see it, I suppose, when we get out of the timber.

"Hey, avalanche!"

"Where?"

"Avalanche, up forward. Hurry! Please hurry!"

"Can't hurry in these trees."

"For God's sake, hurry!"

We move forward. Still in big trees but now the snow is rumpled and torn. This can't be an avalanche. No trees broken off, no roar.

"Where is it?"

"Right ahead. For God's sake start digging! People are buried."

"Buried?"

"Dig!"

"What?"

"Dig! Right ahead. We don't know how many."

Kobi is probing into the snow with his ski pole held upside down. I drop my pack and start probing with a ski pole, handle down.

"Where's Anne? Where's Jo?"

THEY can't be buried. There wasn't even a roar. The trees aren't broken. They must be in the woods somewhere.

Kobi shouts: "Here's someone! You dig here. Take off your ski and dig with it." Kobi digs furiously with a short shovel.

"Watch out! I've reached her face. Dig the sides of the hole so I can get down to her. Her legs lie that way. Dig there."

The snow, packed heavy by the slide, is hard going. A girl's face appears about five feet under.

"Can someone give mouth-to-mouth resuscitation? You can? Get in there, and keep going until she's out."

"Who's in this hole?"

"It's Barbara."

"Barbara, Barbara, can you hear me? Slap her face."

A murmur from Barbara.

"Barbara, who was ahead of you?"

Weakly—"Anne."

"How far ahead?"

"About three yards. She was caught. In front of me. The snow came down."

"Who was ahead of Anne?"

"Shirley."

"Who was behind you?"

"Dan."

To the group, "Is Dan, Anne or Shirley here?"

"I'm Dan. I dug myself out."

"Start probing about here for Anne. You three keep working on Barbara."

Ulli comes up to the guide. "Let me ski back with Ken. We're the fastest. I think

we'll make it to the park warden's station before dark. We'll look for help."

"Go ahead. The rest of you count off again."

Two are still missing.

"Make a line three feet apart. Probe ahead and below Barbara."

Kobi shouts again. "Here's one. Get over here and dig! Dig!"

Three of us dig with our skis. This one is deeper.

We find her about six feet down.

"It's Anne."

Anne doesn't answer when her face is cleared. Her skin is colorless, her lips blue. Barbara is out now, shaking violently. One of the women goes into the hole with Anne for mouth-to-mouth resuscitation.

From another woman: "Get some sleeping bags here. Get Barbara's clothes off. I'll get in the sleeping bag with her. Get some padding under us. Strip her to the underwear, that's enough."

KOBI slaps Anne's face. "Anne, Anne! Listen to me!" Anne's eyes open. "Was anyone ahead of you?" Anne murmurs something. "She says Shirley was caught ahead of her."

We start probing ahead and below Anne's position.

Kobi pulls some aluminum tubes from his pack, screws them together into a long pole and begins probing again.

The snow's deeper here. My ski pole could be passing over her head without touching her. I take a ski and push it all the way down and still no bottom. Worse and worse.

By this time we have organized into a methodical search party. Eight people are probing in line, each about three feet apart. Nothing.

Anne is out now and into a sleeping bag with another girl. She is crying and shaking convulsively. Someone else is inside a sleeping bag, too. Others sit dazed, with sleeping bags over them. Six or eight must have been caught.

We probe back and forth covering a dozen yards ahead of Anne and below her. Nothing.

A long time has passed—half an hour? Forty minutes perhaps? Someone is still buried in the heavy packed snow, perhaps sprawled upside down, freezing and smothering in the dark.

"Over here. Dig!"

Kobi found her with his probe. Right against a tree. She is down deep. We reach her nearly ten feet down, twisted against the tree trunk. Her face is dead white. We lift her out of the hole, but Kobi shakes his head and walks away.

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A man in a blue shirt lays a plastic sheet on the snow and stretches her out, face up. He opens her eyes and feels for a pulse. "No pulse, no breathing. You [to a woman in a green jacket], thump on her heart five times, pause and repeat. Don't stop. I'll give her mouth-to-mouth resuscitation." No expression on Blue Shirt's face as he begins. Berni and I wedge some foam pads under Shirley and lay my sleeping bag over her.

Blue Shirt (his name turns out to be Roger) and Green Jacket work steadily. Thump, thump, thump, thump, thump, pause. Shirley's chest rises and falls as Roger blows into her mouth. A little color returns to her face. Roger tells Green Jacket, "Amy, get ready to switch. Don't miss the timing. We'll switch again in ten minutes." The snow begins to fall once more.

From Kobi, "We'll move down to the bottom of the hill now, away from the avalanche area. Bring everything down." Apparently there is still avalanche danger here. A struggling shuttle begins—people with skis and packs moving down the slope.

Berni and I stay with Shirley. The resuscitation continues steadily. A woman joins the two working on Shirley, and they start relieving each other in rotation.

"Berni, how long has it been?"

"I think about two hours since the avalanche. I think about an hour since we found Shirley."

"Who is this guy Roger working on Shirley? Is that her husband?"

"Yes."

"Berni, do you think there's any hope?"

"No."

The revival team knows its business. Berni and I stand by, not able to help. Everyone else is gone, but it doesn't seem right to leave them. It's still snowing.

Finally, "Roger, it's been two hours. There still is no pulse, her pupils are still dilated. We'll work as long as you wish. But do you want us to continue?"

Roger mumbles, "It won't do any good now." The sleeping bag is pulled over Shirley's face. Two women lead Roger and start down. I take my sleeping bag off Shirley. It will be needed tonight. I pull a plastic tarp over her and leave a ski pole in the snow as a marker.

THE CHUG, chug of a helicopter rotor becomes audible suddenly. It must be looking for us through the snowstorm. The helicopter takes form briefly, then disappears into the snow again.

Camp is in a grove of trees some distance down the valley. A big trench has

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been dug in the snow. Five people wrapped in sleeping bags sit with legs in the trench. Several women do what they can to comfort the rescued. One woman is trying to get a fire going.

"Does anyone have an ax or saw?"

"No—get all the firewood you can by hand."

We scatter for firewood. The snow is very deep; it is getting darker; we flounder into the trees. Plenty of big dead timber, but without an ax or saw it is unusable. Rod and I return with a few armloads of small branches and twigs. Others straggle in. Now we *are* in a fix. Five or six avalanche victims, plus Shirley's husband, are in shock. No one has dug a snow shelter—a cave or igloo—and it's too dark to start. Twenty-three people and only eight sleeping bags. Our firewood can't possibly last the night.

The group is calm. People are doing what they can, but the avalanche victims aren't going to make it through a night in the open. If Ulli and Ken get caught in another slide and don't make it to the park warden's headquarters, there could be a wipeout tonight. We've given up on the firewood, so we start cutting spruce boughs for insulation from the snow. I suppose we can dig snow trenches, line them with spruce boughs and if we lie down huddled together I suppose we'll manage. God help the injured.

Rod and I make one last try for firewood, hunting in the twilight. We hear shouts in the woods. The rescue team!

A MOUNTIE and I are seated at a wooden table. Hot food is cooking in the kitchen. I am cold, wet, tired and glad to be alive. Those who could ski were led out, skiing in the dark. The rescue team is still out there in the woods with the injured. The Mountie opens his notebook.

"Was everyone rescued? How do you know? How many were there in your party? How do you know how many? When did the guide count them? Was everyone dug out? How do you know? Did you see any avalanche signs before the slide happened?"

"Now sir, we'd appreciate your name, address and phone number. Don't leave the area without checking with us. Thank you for your information."

Bowls of hot, thick bean soup are put before us. I have never tasted anything so good in my life. Then they bring roast beef, baked potatoes and I don't know what else. I muddle my plate. I can't eat now. □

Lawrence Ladin ski-tours and backpacks, and has chaired the Club's Iowa Chapter.

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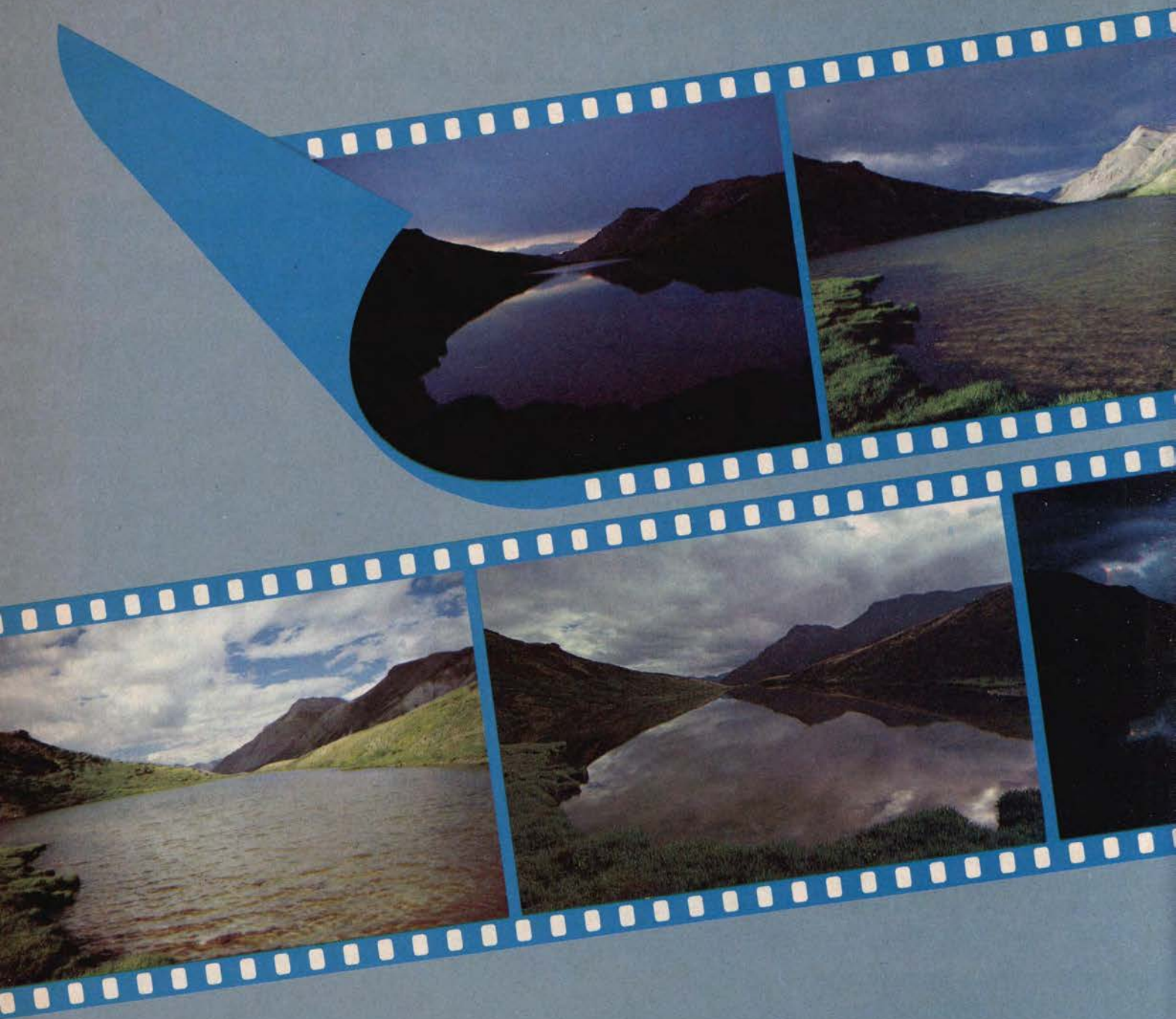
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Capturing a Mountain Lake

Shifting Lights Through a Photographer's Lens



Text and Photographs by
DAVID SUMNER

The unnamed lake in this series of photographs lies astride the Continental Divide at 12,190 feet in southwestern Colorado's San Juan Range. It is one of seven lakes within a square mile—all in the heart of the Carson Peak Roadless Area, one of the state's top RARE II wilderness candidates.

I was camped immediately south of the lake for two days before it caught my eye. By simple "scenic" standards it is quiet and unspectacular. The shoreline is gentle and grassy, and neither grand peak nor great wall towers above it. Nonetheless, a late afternoon pattern of shadow and light finally intrigued me enough that I tried a few casual shots. Then I went back to readying supper.

Moments later I glanced up, and the lake was another place. The clouds had moved; all patterns had shifted, and the light had intensified. I ran back to the site of my first shots, a small tundra hummock, and photographed some more. An engaging counterpoint, I thought, content to let the matter rest at that.

But the lake kept on changing, becoming richer and more detailed, drawing me back. Toward sunset I set my tripod on the hummock and left it there overnight and for the better part

of the next day. Now I was after a flow of changing tones and textures in time. I followed the sunset down to darkness, resumed at dawn, watched the morning cloud buildup. Alone, singly, few of the shots were particularly arresting; together they danced. Even in dull afternoon drizzle, the lake was vibrant and alive.

A summer later, a long mountain trek took me past the lake again; it was like revisiting a good friend. I went straight to the tundra hummock and to work. I had only a few minutes in the evening before dark, and the same the next morning before my party hiked on. In those brief intervals more fresh images appeared—quickly, for the wind was up and clouds flying across the sky.

I now have more than 30 distinctly different photographs of the lake—all taken from the hummock with similar wide-angle lenses. This is an utterly infinitesimal record: bits and pieces of four days over two years. The lake has existed, about as is, for four-plus million days—more than 10,000 years—ever since the final Pleistocene glacier melted, leaving this alpine puddle behind. What other scenes have occurred here? The flow—the steady, rhythmic round that marks the ongoing wildness of this place—is beyond the reach of human imagination. □

David Sumner is a free-lance photographer and writer living in Denver. His next book on wilderness will be Colorado/Wild, to be published by Country Beautiful in 1979.

Population Projections

How They Are Made... And How They Make Themselves Come True

JUDITH KUNOFSKY

FOR ALMOST fifteen years, the Sierra Club has acknowledged that population growth is a cause of all environmental problems. The environmental effects of the almost 220 million Americans are compounded by an annual increase of almost 2 million; the Census Bureau's "medium level" forecast foresees a total population of 296 million in 2025—only 47 years away. A growing population intensifies pressure on fragile land, contributes to pollution of air and water, provides the impetus for the urbanization of agricultural land and the construction of an ever-increasing number of power plants. While growth rates have declined both in this country and in many other parts of the world, overall population continues to increase.

The way we evaluate how fast the population size is changing, what programs might help reduce the growth rate, how bad (or good) the situation might be in the future is through the use of population projections. Moreover, for many programs with significant environmental impact—sewage treatment facilities, major water diversion projects, massive regional energy development—the population projection for the appropriate region is used to justify the project. Ironically, in many cases, using a projection this way actually helps bring about the growth that was foreseen. In other words, sometimes the projection causes the growth!

A population projection for a given geographical area states what the population size and growth rate would be at certain dates in the future. It differs from a population estimate, which is usually a statement about the past or current population of an area. Projections are prepared for the world, for nations, states, counties, cities and smaller geographical areas, and can be prepared with a variety of detail and sophistication. Some projections give only the total number of people; others describe distribution by age, sex and sometimes race, religion or other group identification. Population projections are prepared using different models, or mathematical formulations, that express different theories about why and how population size and growth rates change. For example, one might assume that a community's overall population will continue to increase at 1% a year. Or one might make separate assumptions about family size, mortality, fertility timing and migration, and apply those assumptions to a detailed breakdown of the current population by age and sex. Alternatively, one might relate population change to a projection of regional job availability.

A projection is not a prediction; even in theory, a projection

need not tell us what is most likely to happen. A projection reflects the consequences of a continuation of "current trends" and the extent to which the model chosen accurately mirrors the real world. The difference between them is that current trends always change, and they change, at least in part, as a result of our evaluation of and reaction to those trends. For example, approximately one out of five births in the U.S. is to a teenager. One might prepare a population projection based on this situation. However, one might feel that as a society we will adopt programs to change the trend, and therefore project a *reduction* in teenage parenting.

Population projections are based on much accumulated experience and are almost always prepared to reflect what are believed to be current trends. Of course, it is difficult to distinguish between a current trend and a short-term aberration in behavior, in fertility or migration. It is important to realize that it is *not* a question of an adequately prepared projection being right or wrong, but simply that the world is much too complicated for there to be a correct guess of the future.

Demographer Peter Morrison has written that, "Forecasting is least effective when it is conducted as an exclusively mechanical process. It is tempting to adopt an approved method, plug in some numbers, and crank out some more numbers that tell people what to do. . . . It should be possible, however, to improve the odds on making right decisions not only by laboring to improve the models, but also by sharpening our ability to evaluate and assess the products of forecasting models. . . . Those who use demographic forecasts must exercise at least as much judgment as those who make them."

Population projections are used in three ways. Projections are used to give us an idea of population size and growth rates in the future. We can evaluate whether the U.S. has reached or will reach zero population growth, how fast our numbers might be increasing in the year 2000, what the contribution of immigration at various levels is to the U.S. population, the significance of the heavy migration to the Sun Belt, how fast Monterey, California, is gaining people or how fast another region is losing people. From these projections we can then evaluate the need for corrective or supportive actions, the wisdom of adopting various population policies to change or reinforce trends.

Projections also are used in determining the allocation of federal funding, the decision to go ahead with or to reject various federal, local and state projects. All major government investments—such as roads, dams, sewage treatment plants and

*Is it fair for a community
that consciously or unconsciously
submits an inflated projection
to receive a bigger chunk of the tax dollars?*

sewers—attempt to solve current problems (such as water pollution), or may provide for additional capacity to continue to abate a problem or to anticipate a future problem. A new reservoir may, for example, provide for the anticipated water needs of a community that does not now have a water shortage.

In order to determine these future needs, the agency proposing a project prepares a projection of the quantities involved, whether they're quantities of water, untreated sewage or vehicles expected. In each case, an essential component of the demand projection is a projection of the number of people who will be living in the area in question or who will be served by the facility. The population projection is then used to determine whether a project is needed, where it should be located, how large it should be, the cost-effectiveness of the proposal and, finally, the amount of money to be made available by the appropriate level of government. Population projections, therefore, are crucial and indispensable factors in the evaluation of needs by communities and by government agencies with funding authority.

Population projections are also used in devising computer models that involve both population and economic projections. These models are used to estimate the effectiveness of proposed environmental controls. For example, a model may postulate various types of air pollutants emitted by different sources, factor in topography and weather conditions, then evaluate various strategies for meeting federal air-quality standards. Modeling can also be used to gauge the effect *on* population of proposed energy development, a new industrial facility or water development. But population projections are much more than a rather academic, statistical exercise. The projections themselves can have a tremendous effect on growth. This is because construction projects often foster the population and economic changes that were projected. In other words, if a community provides sewer hookups for a doubled population, people may move to that community—because there are sewer hookups.

This situation poses certain problems:

- Is it fair for a community that consciously or unconsciously submits an inflated projection to receive a bigger chunk of the tax dollars?
- The growth that is induced by an inflated population projection may reflect the desires of only certain special interests in a community.
- One federal program may undermine the goals of another, as when the federal government funds a sewage treatment plant to solve current water pollution problems, and the reserve capacity of that plant facilitates growth in an area that depends heavily on the automobile. As a result, auto commuting increases, and air quality gets worse.

Another example would be if a city with decreasing population were forced to use a projection reflecting only the "current trends," thereby aiding and accelerating the population decrease. This direction might be contrary to an established federal or state or local policy of rebuilding the city's population and industrial base.

Different government agencies have experienced different problems connected with population projections. In the abstract, these problems may seem almost impossibly abstruse, but case studies shed some light.

**Water Development and a Wilderness Study Area:
The Forest Service and Medicine Bow
National Forest, Wyoming**

THE U.S. Forest Service, within the Department of Agriculture, has been developing a management plan for the Huston Park Unit of the Medicine Bow National Forest in Wyoming. The unit is near the city of Cheyenne, and the key point of contention has been the extent to which the Forest Service will accede to the Cheyenne Water Board's request that land be reserved for further development of the city's water supplies. Some of the remaining areas within the unit were to be made available for study for potential inclusion in the National Wilderness Preservation System. The five options presented ranged from reserving one third of the acreage requested for potential water development to reserving all the acreage requested. In area, the acreage requested for wilderness study ranged from none to 43,010 acres. The original choice made by the Forest Service was to reserve all the acreage requested for water development and to allocate 29,770 acres for wilderness study.

Substantial controversy arose, however, after publication of the Draft Environmental Impact Statement in late 1976. The Cheyenne Water Board had used a projection of 113,490 for Cheyenne for the year 2000, compared with 43,813 in 1973. However the Economic Research Unit of the Office of the State Planning Coordinator had projected a year-2000 population of 73,400 for the entire Laramie County, in which Cheyenne is located, of which about 60,000 would be in the city of Cheyenne. This discrepancy was noted not only by The Wilderness Society and the Wyoming Outdoor Council, but also by the Office of Industrial Siting Administration of the state and by the governor. Governor Ed Herschler wrote that, "The draft statement . . . fails to adequately address several important matters. . . . The discussion of the population projections and the increased demand for water resulting from the projected population should be more specific and definitive."

Objections were sufficiently compelling that in the final report, dated September 1977, the Forest Service had changed its recommended management plan to one allocating about half the requested acreage for potential water development and 36,840 acres for wilderness study. The city immediately appealed to the director of the Forest Service, and the matter is still being negotiated.

**Water Development and Hydroelectric Power:
The Army Corps of Engineers in Alaska**

THE Army Corps of Engineers has proposed building a dam on the wild Susitna River in Alaska. If built, this would be the most expensive hydroelectric dam project in the Corps' history, with costs estimated between \$1.5 billion and \$6 billion.

*The sum total of all state projections
used . . . should be equal to
or reasonably related to
a projection of U.S. population.*

Corps analysts have admitted that, "by making assumptions about future populations and economic growth and then providing energy sufficient to sustain such growth, the initial projections may become self-fulfilling prophecy." But the project's environmental impact statement takes a different, more simplistic view; it claims that the population and industrial growth will occur whether or not the dam is built and that the increased availability of power will *not* stimulate industrial development.

The Corps did point out, though, that "by presuming that energy needs must be met, the opportunity to use the provision of power as a tool to direct growth toward socially desirable goals is foregone. In the absence, however, of any such generally accepted growth goals, it seems highly presumptuous to do otherwise than plan as to satisfy the energy needs required to sustain that level of future development deemed most likely." The statement is somewhat circular, but it does point out clearly that unless we as a country begin to develop and articulate more clearly our national, regional and local population and development goals, the *de facto* growth policy will continue to reflect past trends—or the wishes of the most vocal and opinionated special interests.

If we are to use population projections intelligently and correctly—as planning tools rather than as pronouncements of unalterable preconditions—a few principles should be followed.

The federal government should continue to produce projections for the country as a whole that include a range of interpretations of current trends in U.S. population growth. Moreover the federal government should seriously consider producing alternative projections that present a more goal-oriented attitude towards U.S. population growth, i.e., that exhibit alternative population paths including fertility and migration assumptions that are not now regarded as current trends.

There is nothing wrong with the federal government continuing to produce a consistent set of population and economic projections for regions and communities, according to current trends (as does the Bureau of Economic Analysis for the Water Resources Council). However, population projections that are developed for use by the government in funding must satisfy the following conditions:

- Projections must be prepared using demographically acceptable techniques and must be periodically updated. This point should be no surprise.
- The sum total of all state projections used—or all projections for smaller geographical units—should be equal to or reasonably related to a projection of U.S. population. The sum of the parts must approximate the whole.
- Projections must take into account the relevance of goals as well as trends.
- There must be opportunities for input by state and local governments as well as the public.

- All federal agencies should use the same projections in a community or state.

Communities must be encouraged to prepare and use projections that reflect goals, not simply trends. This is particularly true for population distribution within a community but should also be true for population size itself. Implementation of the Clean Air Act, Clean Water Act and other national legislation has, in some communities, led to this type of innovative thinking, but this needs to be encouraged far more than it has been.

As the federal government improves its ability to articulate national policies for urban development, protection of agricultural land, water policy, housing, population growth and so on, these policies should be reflected in its population projections. There is good news about the federal government's use of population projections. The Environmental Protection Agency (EPA) has developed a new and environmentally sound process, one that follows the principles outlined above.

The EPA's process begins with the Census Bureau's "Series II" projection for the United States. This is the medium projection, the one most often quoted and used. It is the projection that gives a U.S. population in the year 2000 of 260 million—and one in which U.S. population never stops increasing. The Bureau of Economic Analysis (BEA) of the Department of Commerce periodically prepares a consistent set of population and economic projections for more than 600 geographical regions in the country, including each state. At EPA's request, the BEA divided the Census Bureau's single projection into 50 state projections. Each state would then divide its projection into a number of smaller projections for regions (such as those with water quality planning agencies—"208" agencies). Each region would further break down the projections for constituent counties, cities and sewage-facility planning areas ("201" areas). The available federal funding would be limited to 75% or 85% of the cost of a facility whose size would be determined by the EPA's population projection. Communities that wish to construct larger facilities could do so at their own additional expense.

The EPA procedure also includes provisions for reasonable exceptions and variations within strict limits. Environmentalists have praised the proposed EPA procedure because it involves a national overview of population projections; because states have an important role to play; and because communities can determine where and how they want growth to occur. Implementation of these regulations would go a long way toward remedying the problems involved in the use of population projections. But much would still need to be done: state governments and communities still have their own policies on how population projections are prepared and used. More importantly, the development of a community consensus on the most environmentally sound and socially beneficial projections for their area is a task that remains to be accomplished virtually everywhere in the country. □

Judith Kunofsky is president of Zero Population Growth and is the Club's population specialist.

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Rock Mesa: More Than a Pile of Pumice

BOB WAZEKA

UNLESS TEN DUBIOUS mining claims are ruled invalid, open-pit mining could begin in a wilderness area—a desecration that could have historic repercussions. The area in question is Rock Mesa, a small moonscape of obsidian-flecked pumice and rock located in the heart of Oregon's 243,608-acre Three Sisters Wilderness. The problem is that U.S. Pumice threatens to mine the mesa for its pumice, a mineral chiefly valuable for its uses as hamburger grill cleaner, kitty litter or decorative rock. Should a wilderness area be sacrificed for such trivial benefits? The obvious answer is "no," and nearly everyone agrees that Rock Mesa should be spared. Oregon Representative Jim Weaver in 1976 urged the House Interior Committee, the Agriculture Department and the Interior Department to withdraw Rock Mesa from mineral entry—to forbid any mining there. "Virtually all of my constituents," he wrote, "believe this withdrawal is in the public interest." Oregon Representative Al Ullman flatly stated, "Rock Mesa won't be mined," and he has indicated that he will join Mr. Weaver and Oregon's two senators, Mark Hatfield and Robert Packwood, in pushing for legislation that would enable the federal government to buy up U.S. Pumice's mining claims if other ways of preventing the mining fail.

Despite overwhelming public opinion and such political support, however, the threat continues. The battle is now in its seventh year, and no clear end is in sight. The source of the difficulty is the weak-



The starred area within the Three Sisters Wilderness is Rock Mesa.

ness of the Mining Law of 1872; under its provisions, exploration and mining are permitted on any public land that has not been specifically withdrawn from mining activity; about 68% of the almost 800 million acres of public land is open for mining. If mining activity conflicts with any other land use, mining is given first priority. If mining claims are judged valid, the miner can buy the land for a few dollars an acre.

The Rock Mesa case is especially significant because its resolution may have important repercussions in other areas where mining claims could threaten wilderness. A mining loophole in the Wilderness Act of 1964 allows mining claims to be made in wilderness areas until the end of 1983. This is not the source of the immediate problem in Rock Mesa, because the claims there were filed in 1962, before the legislation passed. But many wilderness areas could be affected by this loophole—and the precedent of a mining operation in the middle of a wilderness would be disquieting.

In 1962, Pumice, a subsidiary of Cardinal Petroleum Company, bought ten claims located on Rock Mesa. Two years later the Three Sisters Wilderness was established. In 1970, the company announced its intentions to mine the area, and the furor began. The claims cover 1460 acres that include the entire mesa, which is the largest in a series of dacitic domes and flows on the south flank of the 10,300-foot South Sister. Mining the mesa would not only ruin hiking in the area, but would result in "total destruction of the mesa itself," according to Friends of the Three Sisters President Jon Kemp. "No one knows how long the mining would take," explains Kemp. "It could be done only a few months out of each year. During that time, the whole core of the Three Sisters would be unusable as wilderness during the main part of the season." Besides the mining itself, an access road would be built, following an old jeep trail. The constant traffic of heavy-duty trucks and front-end loaders would be an extremely intrusive disturbance.

That is, if the mining would be worth doing. Environmentalists have pointed out that the presence of hard feldspar crystal in the pumice makes it unusable as grillstone; the feldspar would scratch and ruin grill surfaces. The same features that attract geologists to Rock Mesa from all over the world make it unattractive as a profitable mining venture. And the inexpensive min-

Opposite: Broken Top Mountain, in Oregon's Three Sisters Wilderness.



The Formation of Rock Mesa

According to a 1972 geological study by Douglas Stoeser and Frederick J. Swanson, Rock Mesa was formed about 2000 years ago by a series of extrusions that solidified and piled up to a thickness of 280 feet. Viewed from above, the extrusions appear as concentric rings emanating from a central shaft or chimney.

The extrusion process is similar to what happens when a bottle of lukewarm, slightly agitated beer is opened and the bubble-filled liquid pours out. Gas bubbles trapped inside the molten extrusions formed "vesicles," or openings, upon solidification. Pumice is relatively light because it is solidified froth.

Who's Involved?

Twelve environmental groups are now active in the Rock Mesa case. Frank Barry, formerly solicitor for the Interior Department and now an attorney in Eugene, Oregon, represents the Sierra Club, the Federation of Western Outdoor Clubs, Friends of the Three Sisters, The Wilderness Society, McKenzie Flyfishers, Oakridge Audubon Society, the Obsidians, and the McKenzie Guardians. Joining Barry are Portland attorneys Jan Sokol and Rick Josephson, who represent the Oregon Student Public Interest Research Group (OSPIRG), the Oregon Environmental Council, the Northwest Environmental Defense Center and the University of Oregon Survival Center. Jon Kemp, head of Friends of the Three Sisters, credits Mike McCloskey with first alerting the environmental community to the mining threat back in 1961, when McCloskey was the Club's Northwest representative. But the unsung hero of the entire battle may be Don Hunter, a Eugene, Oregon, resident who put together a Rock Mesa slide show and took it around the state showing it to all kinds of people—including senators and representatives.



Hikers descending South Sister Mountain. Ahead of them and to the right is Rock Mesa.

ing techniques U.S. Pumice uses elsewhere—such as front-end loaders—may not be feasible at Rock Mesa. As well as being interspersed with crystals of feldspar and spires of obsidian, the pumice is not uniform in structure. In fact, Rock Mesa pumice fails to meet standards adopted by the General Services Administration, one of the major users of grillstone, and by the state of California. Moreover, according to a 1976 Oregon Student Public Interest Research Group (OSPIRG) report, there is an "insufficient quantity" of usable material on eight of the ten claims. In short, environmentalists and government agencies alike claim that the pumice deposits do not warrant full-scale mining. And according to federal court interpretations of the Mining Law of 1872, mining claims must be potentially profitable to be deemed valid. The pumice is of poor quality, there isn't enough of it and other sources are readily available. Therefore, mining opponents reason, the claims should be declared invalid and the mesa left undisturbed.

A complex set of legal maneuvers and challenges has centered around the profitability and validity of the claim. Under the Mining Law of 1872, if the claims are declared valid, they can be patented, in which case the regulations of the Wilderness Act would apply. These regulations amount to a go-ahead for mining.

But even if the claims were patented,

the mining operation would still be subject to strict Oregon regulations concerning the impact of mining on air, water and undisturbed wilderness. Complying with these regulations would undoubtedly increase the costs of mining Rock Mesa—and further reduce already dubious profits. The Forest Service and environmentalists both agree that this situation is a strong argument against the validity of the claims.

But does U.S. Pumice really want to mine Rock Mesa? Once patented, the claims would give the company ownership of both the minerals and the land itself. Theoretically, the land could then be developed by the company as a ski resort or a condominium—or both—right in the middle of the Three Sisters Wilderness. Many environmentalists consider this a real threat.

On the other hand, U.S. Pumice indicated in 1975 that it might be willing to sell its claims. In fact, the company's apparently fervent desire to preserve unprofitable claims and its sporadic threats to mine the area may be tactical moves in an elaborate game designed to promote the best possible selling price for the claims.

In the past few years, the parties opposed to mining Rock Mesa have increased in number and political clout. The Forest Service's 1977 Grant-Magill report concluded that all ten U.S. Pumice claims are invalid. The U.S. Department of Fish and Wildlife, the Bureau of Land Man-



The pumice deposits on Rock Mesa make it a bleak place; it resembles a jagged moonscape surrounded by a gentle forest and mountain wilderness.

agement and a number of environmental groups have all joined in opposing the mining.

In October 1978, a trial was held before the Secretary of the Interior on the validity of the claims; next, final briefs will be filed. A final decision is due sometime this spring. Meanwhile, Congress can act to preserve Rock Mesa by authorizing its purchase, by banning mining in wilderness areas in general and by revising the 1872 Mining Act. But for the next five years, until January 1, 1984, it's up to environmentalists to keep the pressure on.

The fate of Rock Mesa may involve more than one pumice mine. As the Forest Service's RARE II program and the BLM's wilderness review (see page 46) progress, the general question of resolving controversies involving wilderness and mineral claims will become very important. Rock Mesa may be one of the precedents that future environmentalists will rely on to preserve other wilderness areas from destruction. □

Bob Wazeka is a free-lance writer living in Eugene, Oregon.

The "Prudent Man" Standard

There has long been controversy about whether mining claims must be profitable to be valid. The issue is highly legalistic, but in general it appears that a "discovery" must meet the "prudent-man" standard, classically stated in the case of *Castle v. Womble* (1894):

"A mineral discovery, sufficient to warrant the location of a mining claim may be regarded as proven, where mineral is found and the evidence shows that a person of ordinary prudence would be justified in the further expenditure of his labor and means, with a reasonable prospect of success in developing a valuable mine."

A related standard is that of "marketability." This concept is explained by the decision of the District of Columbia Court of Appeals in the 1959 case of *Foster v. Seaton*:

"With respect to widespread non-metallic minerals . . . the Department has stressed the additional requirement of present marketability in order to prevent the misappropriation of lands containing these materials by persons seeking to acquire such lands for purposes other than mining. Thus, . . . an applicant to justify his possession must show that by reason of accessibility . . . development, proximity to market, existence of present demand, and other factors, the deposit is of such value that it can be mined, removed and disposed of at a profit."

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Biomass Energy

The Promise and the Problems

WILLIAM LOCKERETZ



SOLAR ENERGY usually brings to mind flat plate collectors, photovoltaic converters or other devices that transform the sun's rays into heat or electricity. Yet long before these conversion devices were invented, the sun supplied virtually all of the world's energy requirements without technological help. It did this through one of nature's most fundamental chemical reactions, the synthesis of carbohydrates from carbon dioxide and water in the presence of light—photosynthesis.

Besides directly producing food crops, photosynthesis has yielded firewood for warmth and for cooking. Animals that convert the energy in their feed have transported us, tilled our fields and turned grinding wheels. From animal fats we've made candles to light our dwellings. But with the advance of technology, these simple conversions of photosynthetic energy have been increasingly supplanted by their modern fossil-fuel-based counterparts: steam and internal-combustion engines, electric light bulbs and furnaces fueled by coal, natural gas or petroleum. Even food production, once the exclusive domain of photosynthesis, now involves considerable use of fossil fuels. Now, of course, the problems resulting from heavy dependence on fossil fuels have become evident. So there is considerable interest in finding

ways to reverse this trend, and many methods are being developed for using the energy captured by photosynthesis—or, to use the more recent term, "biomass energy."

Biomass energy systems vary in the material that is the original energy source, in whether this material is produced primarily for energy, and in the process used to extract the energy in usable form.

Almost every type of plant can be a source of useful energy—trees, nonwoody perennials, cultivated annual or biennial crops, and freshwater and marine plants. Either the whole plant may be used, or only the residues after harvesting and subsequent processing steps; usable residues include cotton-gin trash, rice hulls and nut shells. And almost every type of plant can be transformed into a particularly rich and available potential source of energy—livestock wastes or, from humans, sewage sludge. Energy can be extracted, too, from municipal refuse, since much of it is paper, wood and related products.

Some of the materials used as biomass energy sources are produced primarily for that purpose—kelp grown in offshore energy "farms" is one example that has been

given considerable attention recently. But many of these materials are processed for some other purpose, with energy a potential byproduct. Some materials, in fact, occur naturally and need only be collected to be usable energy sources. Gathering fallen wood in an unmanaged forest is at one extreme among the many ways of exploiting trees for energy. At the other is the ultimate extractive use of forests—coppicing, or harvesting whole trees at three-to-five-year intervals from special plantations. (With an appropriate choice of species, such a plantation will renew itself—new trees will grow from the stumps left after harvest.) An intermediate system would manage a forest primarily for lumber, in an environmentally responsible manner, while extracting energy from chips and such unusable residues.

Such cultivated crops as corn could be grown specifically as an energy source. But since corn grain is more valuable as food, a more advisable scheme would be to extract energy only from the ordinarily unused residues (cobs, leaves, and stalks) as an adjunct to normal corn production.

Energy can also be produced from naturally occurring aquatic plants. In fact, obtaining energy from a plant that would otherwise be a nuisance, such as the water hyacinth, is a particularly attractive possibility—it offers an economic incentive for clearing the densely growing water hyacinth from clogged waterways. How-

ever, with many aquatic plants, obtaining enough material to justify energy extraction would require intensified cultivation, as in the kelp farms.

Many processes can be used to obtain energy from plant materials or organic wastes. The most obvious is simply to burn them. But except for wood, direct combustion is generally not very suitable, either because the material contains too much moisture, because it is not clean-burning, or because it is too bulky to be readily transported to where it will be burned. However, what is regarded as unsuitable in an affluent society might be a necessity under other conditions. Nineteenth-century pioneers on the treeless Great Plains burned hay and dried animal dung for home heating and cooking, and dung is still important in countries such as India. When the price of corn fell to disastrously low levels during the Great Depression, American farmers sometimes burned corn because it was cheaper to do that than to sell it and buy coal.

Even in affluent and technologically advanced societies, there are some circumstances—generally when the material is a waste that has to be disposed of anyway—in which direct combustion is a practical and economical way of obtaining useful energy. The Hawaiian sugar industry not only provides energy for its own use by burning bagasse (wastes from sugar-cane processing), it even generates a surplus of electricity, which it sells to the state's utility company. The pulp and paper industry also derives appreciable amounts of energy from its own wastes.

But for most materials, some kind of processing is desirable to produce a more concentrated and clean-burning fuel. Some of the many possible methods have been in use for a long time. Fermentation of plants rich in sugar has produced alcohol since antiquity, sometimes (but not usually!) for use as fuel. When livestock wastes, crop residues and other organic wastes are digested by anaerobic bacteria (those that grow in the absence of oxygen), a gas is produced that contains methane, the main component of natural gas. Anaerobic digestion is also a common method of stabilizing sewage sludge, and for several decades European treatment plants have collected the methane thus produced. (In the United States, the methane is often used to supply at least the treatment plant's own energy needs.) Combustion of wood or crop residues in a limited oxygen supply produces a low-energy gas containing carbon monoxide

and hydrogen. This process is similar to the old method of producing "town gas" from coal, which became obsolete with the abundance of natural gas. Gas made from wood was used in Europe during World War II because of severe motor-fuel shortages. This gas can also be converted to methanol, or wood alcohol—adding this to gasoline makes a more efficient, cleaner motor fuel.

Energy from biomass can also be obtained with more exotic techniques—some are in use now on a limited scale, and some are still being developed. In a process known as pyrolysis, organic materials

solar energy from satellites when as yet few homes have even simple solar water heaters.

Whatever disagreements exist among advocates of various biomass energy systems, methane generation from livestock manure by anaerobic digestion is near the top of almost everyone's priority list. Large quantities of livestock manure are constantly produced and must be disposed of in some way. The technology of methane generation is well established and, at least in simple form, is readily available. Thousands of methane generators are in use in India and other parts of

There is a natural tendency among researchers to work on whatever offers the most interesting research . . . while ignoring simpler approaches that could be applied right now.

are heated in the absence of air to yield a low-energy gas and a charcoal-like solid fuel. Or, to produce a liquid fuel from organic materials, they can be hydrogenated at high pressure. One of the most common forms of organic materials is cellulose, an important component of wood and crop residues, and this resists many of the simpler conversion processes. Now, considerable attention is being given to treating it with enzymes that break it down into sugars which can be fermented. Older techniques exist that use acids instead of enzymes to digest cellulose, but the sugar yield is much lower.

Of course, not every combination of energy source material, production method and conversion process results in a practical (or even physically possible) system for obtaining biomass energy. Still, there are many systems already in use, or that give considerable promise of becoming practical after further research. Each of these systems has certain benefits and limitations. If biomass energy programs are to evolve in a rational way, the advantages and disadvantages must be taken into account, and priorities must be assigned to the various schemes. There is a natural tendency among some researchers to work on whatever scheme offers the most interesting research—usually the most technically sophisticated one—while ignoring simpler approaches that could be applied right now. Biomass energy development will not be served by the kind of thinking that, in conventional solar research, has led to work on microwave transmission of

Asia, although they leave room for considerable technical refinement.

Methane is produced by letting bacteria digest a slurry of manure and water in a vessel from which air is excluded. Through a complicated chain of biochemical reactions, some of which are not completely understood, the complex organic molecules are broken down first to simpler organic compounds such as acetic acid (the acid of vinegar), and eventually to carbon dioxide and methane. If a gas with a higher energy content is desired, this mixture, frequently called "biogas," can be purified into a form that is essentially the same as natural gas. Besides removing the inert carbon dioxide, purification takes out trace contaminants such as hydrogen sulfide that otherwise would interfere with certain uses of the gas. Livestock manures can be made to yield methane on any scale, from a simple farm operation with a few head of cattle to enormous digesters handling wastes from several thousand head in a commercial feedlot.

Methane production from livestock wastes illustrates an important dilemma concerning biomass energy systems generally: Maximizing energy production is not necessarily compatible with environmental quality. With interest in renewable energy sources increasing, it is sometimes assumed that "renewable" automatically implies "environmentally sound." Certainly the inverse can be true: Although many nonrenewable energy technologies, such as offshore drilling, stripmining and use of supertankers, are not environmentally sound, it would be a serious mistake to assume that the potential environmental

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impact of biomass can be ignored just because the source is renewable.

With livestock manures, the conflict between maximum energy production and environmental protection arises because methane production has an efficiency of scale. Larger units are more efficient, especially in temperate climates where some of the methane must be burned to maintain the digester's temperature in the range required by methane-producing bacteria. Heat loss from the digester becomes less of a problem with larger facilities because of the decreasing surface-to-volume ratio. Consequently, net energy production is increased when livestock are concentrated into large feedlots or when the manures are collected from scattered smaller farms. In either case, one then has the problem of disposing of organic residues left in the digester.

On a farm, using the amount of organic material left from methane production is no problem; the material is very good as a soil conditioner and fertilizer, even better than raw manure. But the quantities accumulating at a large centralized facility might greatly exceed the carrying capacity of nearby agricultural land. Besides posing a potentially serious environmental threat, disposing of the residues by applying them to land at excessive rates or by means other than land application would be significant waste of a resource.

The same tradeoff occurs with systems that use plant residues left on the fields after harvest. Using all the available plant material will certainly maximize energy production, but it will also leave the soil unprotected against erosion and unreplenished by the decaying vegetation. Silting and sedimentation from excessive erosion is a serious environmental problem in many areas and, what is even more significant, it indicates the loss of an irreplaceable resource. It would be ironic if, out of a desire to find substitutes for one nonrenewable resource, fossil fuel, we increased the loss of topsoil, a resource that not only is not readily renewable but, unlike fossil fuels, has no substitutes.

There is also tradeoff between technical efficiency on one hand and, on the other, the ease with which a system can be used (and thus the likelihood that it will be adopted). Because biogas generation is very sensitive to changes in temperature and in the quantity and composition of the manure supply, net energy production can be increased by using more sophisticated monitoring and control equipment and by devoting more attention to the system's

operation. This may not pose a problem for a large, specialized facility primarily intended for energy production. On a farm, however, biogas production could only be a subsidiary activity. Presumably, farmers will not be interested in it if it requires too much care—especially during periods when their main concern is planting or harvesting on time. The design of biogas and other biomass energy systems is, unfortunately, sometimes approached only as an engineering problem, with little consideration given to the needs of the ultimate user. The system that works best when run by engineers under the highly controlled conditions of a laboratory or experiment station may not be the one most farmers would prefer. While farmers differ considerably in their attitudes towards risks and their willingness and financial ability to invest in expensive equipment, it seems likely that many would accept a lower net energy output in exchange for dependability, lower capital cost and relatively care-free operation.

Finally, there is the obvious question, how much of our energy budget can be supplied through biomass? If the supply of biomass is the only constraint considered, the answer is that all of our energy budget could be, although such an answer does not mean much. A better way to put the question would be, how much of our energy budget can be supplied through biomass with acceptable environmental impact, without excessive loss of other resources, and using systems that farmers and other users will find attractive? This question is much harder to answer; it is not easy to define "acceptable" and "excessive" and, even after environmental and other constraints have been agreed upon, it is still difficult to come up with a good estimate. But development of biomass energy need not be delayed until we have a precise answer to this question. We already know that biomass can supply enough energy to matter, certainly a lot more than we are getting from it now. Additional research will provide us with improved and more efficient systems. Available and appropriate technology, if put to use with adequate attention to environmental and resource factors and to the needs of eventual users, can make biomass energy a significant component of a sensible energy program. The most important question, therefore, is what are we waiting for? □

William Lockeretz is a research associate at Washington University's Center for the Biology of Natural Systems. He edited Agriculture and Energy (Academic Press, 1977) and serves on the Alternate Sources Subcommittee of the Club's Energy Committee.

TALCHAKO LODGE

In scenic Tweedsmuir Provincial Park

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Wildlife Throughout the Talchako wilderness a tremendous diversity of wildlife occurs—moose, deer, mountain goats, upland caribou, wolves, black bear, grizzly bear, wolverine, fox, otter, mink, marten, weasel, bald eagles, trumpeter swans, Canada geese, ptarmigan, grouse and many song birds are the most common species observed. Birdwatching is best in spring, and early summer. Eagles and bears are most common in autumn, swans and geese in winter.

Accommodations The Lodge offers hostel accommodations for up to twenty people, as well as four additional cabins equipped with wood cookstoves, bunks, kerosene lamps, and cooking utensils suited for families or small groups of up to six people. Showers and hot and cold water, as well as a few other amenities, are available, if at

times scarce. Quality meals are available at reasonable rates.

Access and Transportation Talchako is accessible by car, plane, bus or a combination of train and bus; it is a two-day drive from the Seattle-Portland area. The Talchako facilities are available year round, offering a group rate for more than ten people. Reservations should be made 60 to 90 days in advance for the summer season. Talchako has a slide show on the Lodge and surrounding area which can be used by individuals and groups. Requests for the slide show should be sent directly to the Manager at the below address, accompanied by \$5 to cover postage, insurance, and handling. For further information and reservations write to: Manager, Talchako Lodge, Hagensborg, B.C. VOT 1H0, CANADA or telephone: (604) 982-2489.

Sierra Club Outings at and around Talchako Lodge in 1979

#102 Talchako Lodge Wilderness
Threshold Family Trip,
July 25–August 2

#316 Junker Lake Chain, Canoeing
and Backpacking Trip,
August 7–15

The above trips are part of the Sierra Club Outings Program and are available only to Club members. Inquiries about these trips should be made to the Sierra Club Outing Dept., 530 Bush St., San Francisco, CA 94108 (not to Talchako).

The BLM Begins Its Wilderness Review

JOHN McCOMB

LAST YEAR was the busiest ever for wilderness supporters. Congress added more than 4.5 million acres to the National Wilderness Preservation System, by far the largest acreage added since passage of the original Wilderness Act of 1964. Most of the newly designated wilderness was included in such landmark legislation as the Endangered American Wilderness Act and Representative Phillip Burton's (D-California) Omnibus National Parks and Recreation Act. Additional important areas were protected in Montana, Colorado and Wisconsin by other legislation.

At the same time, the Forest Service was in the midst of its second Roadless Area Review and Evaluation (RARE II), which is scheduled to be completed by January 1979. Its purpose is to sort some 62 million acres of roadless areas within national forests into three categories: those to be proposed by the President for immediate wilderness designation; those to be made available for nonwilderness uses; and those to be studied further before a decision is made. Completion of the RARE II process will result in unprecedented political activity in Congress.

Now the Bureau of Land Management (BLM) is beginning its own wilderness review program. The BLM, an agency of the Interior Department, manages more land than all other federal agencies combined—some 450 million acres, located mostly in the West and in Alaska. In 1976 Congress enacted the Federal Land Policy and Management Act (FLPMA), commonly known as the BLM Organic Act, which established basic policies and procedures for the management and protection of BLM public lands. Section 603 of this law requires the Interior Secretary, through the BLM, to review all "roadless areas of five thousand acres or more and roadless islands of the public lands identified during the inventory . . . having wilderness characteristics described in the Wilderness Act." This requirement was strongly supported by wilderness conservationists. The implementation of this very broad mandate has become a major

and controversial program of the BLM; millions of acres of roadless lands will be affected by the wilderness review requirement.

In March 1978 the BLM issued for public comment draft wilderness policy and review procedures for conducting the required review. Many suggestions received during the comment period were incorporated in a *Wilderness Inventory Handbook* issued in the fall of 1978. The handbook is the basic guide for conducting the first stage in the review—the inventory of roadless areas with wilderness characteristics. This is a particularly crucial step because only the roadless areas identified by the inventory will undergo formal wilderness studies and receive the full benefit of the interim protection requirements of Section 603. Work on the inventory has already begun; by the time this article appears, the BLM probably will be inviting the first round of public comment.

The BLM will also be issuing detailed guidance on the interim management intended to protect wilderness in the roadless areas identified by the inventory, to be followed by instructions for the wilderness studies themselves. The entire process, culminating in specific wilderness recommendations, is scheduled to be completed by October 1991.

We can expect the first of these recommendations to be sent to Congress in 1980 or 1981, with others to follow over the next decade. Congress has established specific deadlines for completion of the reviews of certain areas. The wilderness studies of the California Desert Conservation Area, some 12.5 million acres of Southern California desert, are to be completed by September 30, 1980, as part of a comprehensive long-range plan for this area. An additional 55 areas, comprising all formally designated BLM primitive and natural areas, are to be studied by July 1, 1980.

As is true of other agencies working on wilderness studies, the BLM cannot make final decisions about which areas shall be designated as wilderness. Only Congress

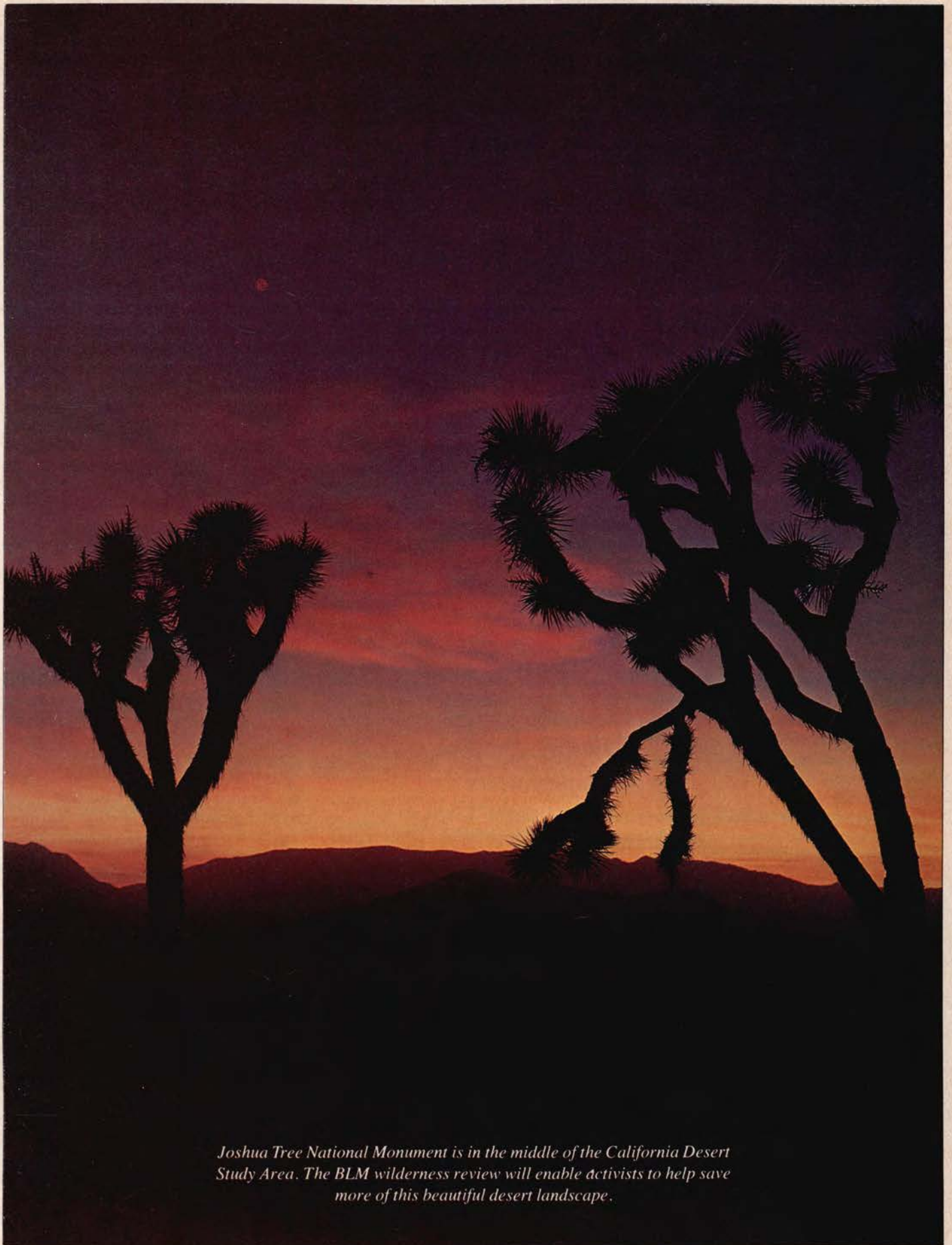
can do so, and it has no deadline for action.

The BLM will use a two-stage process in its inventory. The initial stage will divide BLM public lands into two classifications—those that clearly do not meet the criteria for identification as wilderness study areas, and those that possibly do meet the criteria; the latter will be subjected to a more intensive inventory, which will culminate in a group of lists compiled by BLM state directors to identify wilderness study areas. The initial and the intensive inventory stages will each include 90 days for public comment. Active citizen participation during both stages will be necessary to ensure that all deserving areas are ultimately identified as wilderness study areas and receive the full protection of the interim management requirements of Section 603 of FLPMA. The BLM hopes to complete the entire initial inventory before September 30, 1980. The wilderness studies themselves will be conducted in conjunction with the bureau's regular land-use planning process.

The BLM wilderness review requirement is a new ballgame not only for the BLM but also for wilderness activists more familiar with the reviews of such agencies as the Forest Service and the National Park Service. If the BLM review is to be meaningful, conservationists must become familiar with the BLM and the lands under its jurisdiction; they must also participate fully in the inventory and in subsequent steps in the wilderness review process.

With Congressional action expected on the Forest Service's RARE II recommendations and with the start of the BLM's wilderness review program, this year promises to surpass 1978 both in demands on environmentalists and opportunities for conservation gains. If you'd like more information about the BLM review program, contact the Sierra Club, 530 Bush Street, San Francisco, CA 94108. The BLM's *Wilderness Inventory Handbook* and information about BLM public lands are available from any BLM office. □

John McComb is a representative in the Club's Washington, D.C., office.



Joshua Tree National Monument is in the middle of the California Desert Study Area. The BLM wilderness review will enable activists to help save more of this beautiful desert landscape.

Protecting the California Desert

MARY ANN ERIKSEN

WHILE POLLS SHOW that most people revere the desert's special features—expansive vistas, clean air, flowers, wildlife, cultural treasures and starlit nights—others have perceived the desert only as a place to dump, mine, race off-road vehicles or to damage in a dozen other ways. Remember the proposal to cleanse the Los Angeles basin by drilling through the mountains and blowing L.A.'s smog into the desert? It was meant to be serious. More recently, some have suggested that the answer to Los Angeles and Orange counties' sludge problem is dumping it in the desert. Utility companies have turned to the desert to build transmission lines and to site power plants that would be unacceptable elsewhere. Miners seek to drill, dig and strip the desert: stripmining at Death Valley for borax and talc; cutting down Eagle Mountain for iron ore; exploring the Mule Mountains for uranium. Offroaders, thousands of them, want to race or run wild over fragile desert soil. Others steal desert vegetation or artifacts to sell for house and garden decoration.

All of these activities are taking place on 25 million acres—about one fourth of the state—known as the California Desert Conservation Area, established in 1976 by the Federal Land Policy and Management Act. The Bureau of Land Management (BLM) administers half of this acreage; the rest is military reservations, state and national parks and private lands. The act also orders the BLM to prepare and implement a plan for the management, use, development and protection of these public lands by September 30, 1980. Specifically, Section 603 of the Act mandates the BLM to review for possible wilderness classification "those roadless areas of five thousand acres or more and roadless islands of the (BLM) public lands having wilderness characteristics described in the Wilderness Act . . ."

The wilderness review provision applies to the BLM's holdings nationwide—some 450 million acres—but in California the

agency must accelerate the review to meet the 1980 master plan deadline for the California desert. The deadline for the rest of the country (except for other special project areas, mainly oil and gas leasing and other energy development) is 1991.

It is critically important that conservationists around the country become familiar with and involved in the California review; not only is the California desert of national significance, but the successes and failures of this rapid review will affect the procedure and tone of reviews elsewhere. In addition, the opponents of wilderness are well-organized in California. Mining, timber, oil, off-road-vehicle and even skiing interests are forming unprecedented alliances. Any victories won in California will surely be parlayed in other states.

In September, after considerable delay, the BLM finally issued its *Wilderness Inventory Handbook* (available free from the BLM, Interior Building, 18th and C Streets N.W., Washington, D.C. 20240) outlining the inventory, study and report stages of the national review and including definitions and guidelines to be used in the inventory. To judge whether an area is roadless, the BLM uses this definition: "The word roadless refers to the absence of roads which have been improved and maintained by mechanical means to insure relatively regular and continuous use. A way maintained solely by the passage of vehicles does not constitute a road." In addition, the BLM has listed these three criteria, from a strict reading of the Wilderness Act, that each area must meet:

- The area must be 5000 acres in size, although this minimum is not absolute.
- The imprint of human work must be substantially unnoticeable.
- The area must provide an outstanding opportunity either for solitude or primitive and unconfined recreation.

Using these criteria, the BLM released on November 1, 1978, a draft inventory map of the California desert. Comments from the public on this map will be ac-

cepted until February 1, 1979, and conservationists everywhere are urged to respond with strong support for maximum wilderness designation and, wherever possible, with specific information on particular units.

The importance of insisting on the most comprehensive inventory of areas to be studied cannot be overemphasized; any unit dropped from the inventory will immediately lose interim management protection. The remaining units may not be recommended for wilderness; before recommendations are made, the units will receive further study. In other words, the list adopted in February by the BLM will never get any longer, but it will surely get shorter as each area is subjected to intense scrutiny and to an ongoing process.

To look at the situation another way, consider these figures: If the inventory lists half of the BLM lands, and this is added to all other existing and potential wilderness, protection may eventually be extended to only about one third of the desert, or one twelfth of the state. That's not even tithing our land base, and in reality the proportion is likely to be much smaller unless there is considerable public pressure to afford maximum protection.

Conservationists have had a year of great successes in southern California: the Golden Trout, Santa Lucia and Ventana additions to the wilderness system; the creation of the Santa Monica Mountains National Recreation Area; and the final, victorious chapter of the long struggle to add Mineral King to Sequoia National Park. For these victories we depended heavily on conservationists around the country. Now, as we begin the book of wilderness protection on BLM land, we again need extensive support so that the first chapter, and the long story to follow, will stand as another well-written chronicle of the history of preservation in this country. □

Mary Ann Eriksen is the Club's Southern California representative.

Desert Areas That Need Help

HERE ARE FIVE potential wilderness areas that will be dropped from BLM's wilderness inventory unless there is strong public support to include them. The deadline for public comment on these and all other southern California desert wilderness areas is January 31, 1979. Letters about these areas and their qualification for inclusion in the inventory should be sent to:

BLM Wilderness Inventory Team
Riverside District Office
1695 Spruce St.
Riverside, CA 92507.

Information on other desert areas is also available from this BLM office.

- **Cadiz Valley**—The east portion of area 305 should be added to the inventory. The Sahara-like valley is unique in the California desert. The eastern half of this valley was excluded from consideration as wilderness because the several mining operations are visible across the broad valley floor; such an exclusion is an interpretation of the Wilderness Act unsuited to the desert and inconsistent with Congressional intent. The mining operations themselves could easily be excluded from the area by adjusting boundaries, without excluding the little-studied sand dunes and the usually dry lake beds that, after heavy rains, provide a desert refuge for snowy egrets and other migrating water birds.

- **Chemehuevi Valley**—Areas 309, 309a, 311 and the northwest section of area 307 should be included in the inventory. All are essential to the protection of the Chemehuevi Wash, a major drainage running from several desert mountain ranges to the Colorado River. The BLM withdrew them because a major ORV race course runs through it, but the traces of the race would fade if the event were rerouted to a less environmentally sensitive course.

- **Santa Rosa Mountains**—Area 341 rises a mile from the desert floor into pinyon-juniper woodlands; it holds some of the finest bighorn sheep habitat in Southern California. At the crest, this land abuts a Forest Service RARE

II area. Area 341 is a checkerboard of different ownerships, including the Nature Conservancy, the State Department of Fish and Game, private landholders and the BLM. The BLM should be commended for recognizing the area's wilderness values and including it in the inventory despite the complications posed by checkerboard ownership.



- **Algodones Dunes**—Areas 360 and 362 are part of the largest sand-dune system in California, a haven for rare and endangered plants and animals and the site of beautiful spring floral displays formerly enjoyed by many but now largely destroyed by dune-buggy activity. The BLM has given these areas high wilderness ratings but has excluded the half of the dune system open to dune-buggy use. The agency should include the entire dune system for further study.

- **Panamint Valley**—Areas 138, 138a, 139 and 140 are all part of this desert valley stretching to broad scenic vistas of the Panamint Mountains and the Argus Range. The BLM wants to exclude these areas because they are flat, in the belief that broad, unbroken landscape is not consistent with the wilderness experience. Conservationists believe that valleys such as this provide a type of wilderness experience unique to the desert. □

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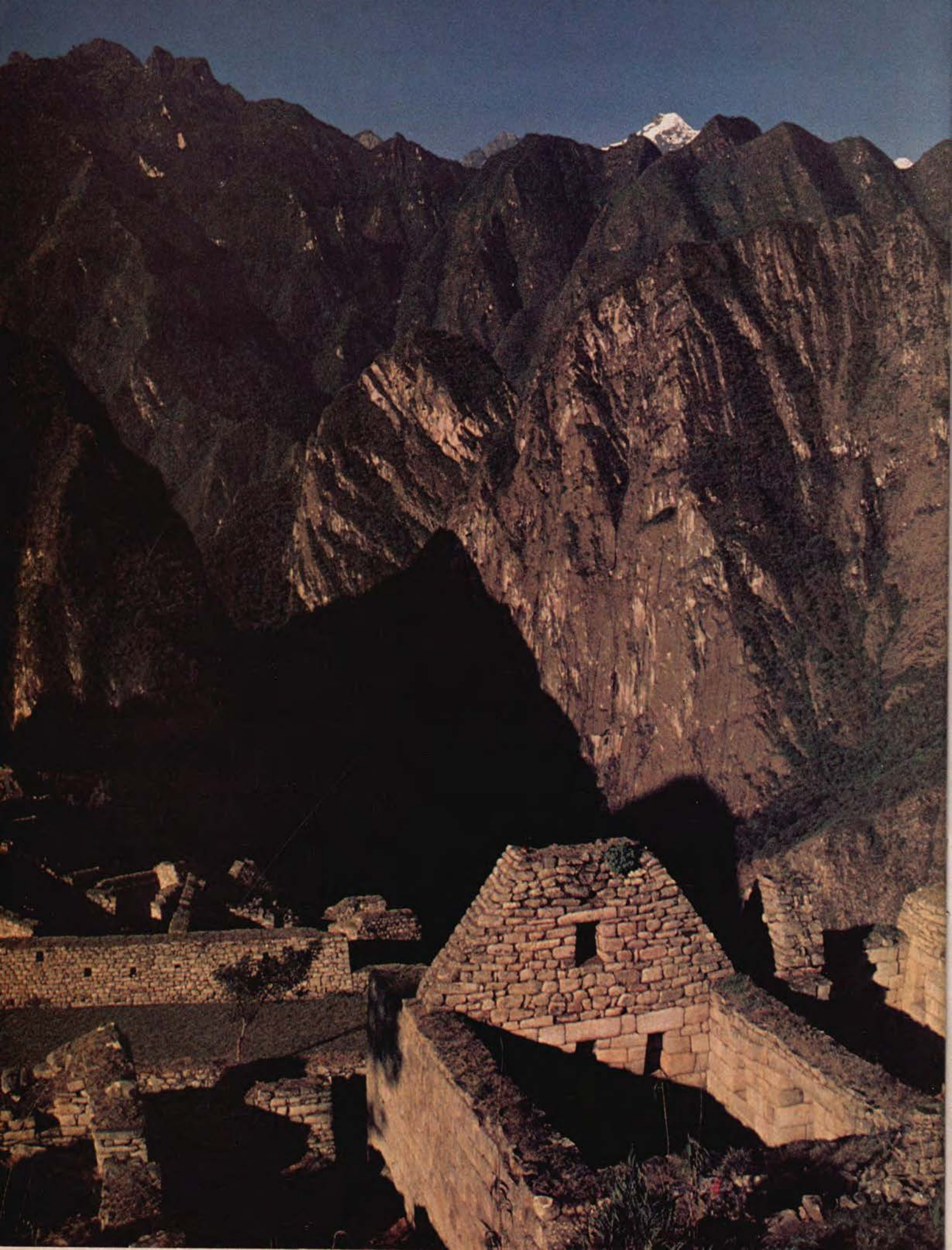
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On the Road to Machu Picchu

RICHARD B. SPOHN

MACHU PICCHU, once fabled as the Lost City of the Inca, is an exceptionally well-preserved ruin of an Inca city that to this day remains something of a mystery. It is well-preserved because the marauding Spanish *conquistadores* never found it, and a mystery because the Inca never developed a written language. (For that matter, neither did they develop a wheel, an oversight that warrants forgiveness considering the terrain they occupied.) Most historians now believe that it never was the Lost City of the Inca, though it once was lost. And these days it's found so frequently that the ancient "Inca Trail" to Machu Picchu and the splendid Inca ruins it passes through are in danger of being ruined by trekkers.

Cuzco, where our own trek began, is nestled in the Andes of southern Peru at 11,000 feet and is the oldest city in the Western Hemisphere. The tribal chieftains who once lived there undertook a campaign of expansion in the fifteenth century that rivaled any by Caesar, Alexander or Hannibal. At its height, the Inca empire ranged along the Pacific coast of South America past today's Santiago, Chile, into Argentina, north into Colombia and east into the Amazon jungle. The Andes formed the spine of the empire, and Cuzco was its center: in Quechua, the Inca tongue, Cuzco means "navel of the world."

When the Spaniards treacherously trounced the Inca in 1533, the reigning chief, the Manco Inca, retreated from Cuzco to the rugged Cordillera Vil-

cabamba section of the Andes, where he held out for nearly 40 years. His successor was captured and executed in 1572. In due course, the jungle triumphed over all: remote Inca cities and their silver mines became legends.

Machu Picchu was "discovered" in 1911 by Yale professor (later United States senator and Connecticut governor) Hiram Bingham, on a National Geographic Society expedition to search out the fabled Lost City. Within a month's span, Bingham scored an incredible triple-play. On tips from natives, he discovered the cities of Machu Picchu, Vilcabamba and Vitcos, all buried in the forbidding Cordillera Vilcabamba and long reclaimed by the indomitable tropical vegetation.

Faced with an embarrassment of riches, Bingham had to decide which ruin had been the lost capital. He chose Machu Picchu—by far the most spectacular, developed and commanding. It *looks* like a place to hold out! Had he penetrated the jungle to Espiritu Pampa, only a few hundred yards north of Vilcabamba, he would have come upon extensive ruins that today are considered the true site of the Manco Inca's last refuge. But these ruins have been so overrun by jungle that they have yet to be fully excavated. Machu Picchu remains the most exquisite, best preserved and most exciting ruin in South America. It is a spectacular monument, fully excavated by the Peruvian government in 1934 (to commemorate the 400th anniversary of the Spanish conquest) and an exotic wonder visited by travelers from all over the world, many of whom ride the narrow-gauge railroad from Cuzco and stay at the Machu Picchu Hotel near the ruins.

Machu Picchu rests on a saddle be-

tween two minor peaks, with sheer drops on three sides to the mighty Urubamba River, thousands of feet below. It was a remote citadel, but it was also a city, with distinct sectors for the ruling classes, the intelligentsia, priests, farmworkers, servants, and so forth. The Andes surrounding Machu Picchu soar out of deep river gorges, densely vegetated often up to the glacier line—with shades of green that darken in distant vistas and mists into infinity. In such a setting, it is not surprising that the Inca worshipped environmental forces. They were sons and daughters of the sun; the moon, water and thunder were all subordinate deities—the Inca cosmology was its theology.

The Inca Trail to Machu Picchu has become popular in the last few years. Once it was part of a marvelous system of footpaths and roads that connected the far-flung Inca empire, Tahuantinsuyu, "The Four Quarters of the World." On such trails, and for distances up to 300 kilometers (186 miles) from the coast into the Andes, runners regularly brought fresh fish to the Inca in less than 18 hours.

The trail, or road, is variously a dirt footpath, steep steps, a six-foot-wide boulevard or a good stone walkway with stones about one foot square and six-to-eight inches deep. Building the road—or any of the other Inca structures—was an especially impressive undertaking because the Inca had only bronze tools, which lack the strength and durability of iron.

The trail passes through a chain of well-preserved ruins of Inca towns and citadels, all built of granite but with varying degrees of craftsmanship. Virtually deserted today, the area was one

Opposite: The ruins of Machu Picchu, in Peru's Cordillera Vilcabamba.

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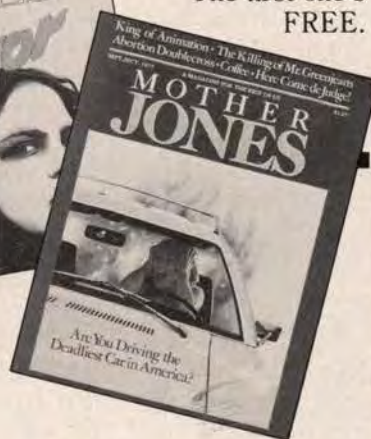
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Except for missing roofs, the buildings of Machu Picchu are mostly intact. The Inca constructed them without the use of the wheel, without iron tools and with only the llama as a beast of burden.

of the most heavily populated during the empire. The rugged Cordillera Vilcabamba, whose ridges the trail crosses, is the same magnificent challenge today that it was centuries ago.

Although Professor Bingham explored the trail in 1915, and an authoritative archeological study of the area was published in 1942, it was not until 1968 that the Peruvian government sent an expedition to assay the region and its ruins. In more recent years, the trail has become quite the jaunt among backpackers of romantic bent and sturdy lungs, from all over the world. The locals consider these foreigners a little nutty. Indeed, backpackers are rather looked down upon, adjudged too poor to be able to afford even the cheap local public transportation.

The hike to Machu Picchu begins in Cuzco about 4:30 in the morning—in order to reach San Pedro Station for the 5:30 local train to the Machu Picchu trailhead. The trick is to get through the already busy *mercado* (open-air market) and the jammed station with one's pack unslashed by little fellows who seem to have a peculiar lust for gorp, freeze-dried food, Lomotil or *some-*

thing gringos carry in their packs. The train is classic chaos and crush. We were lucky to get a spot to stand on the "first class" train for the four-hour meander.

For breakfast we had some fresh *pan* (bread) in the marketplace, and some coca *té*. Had we been daring and as savvy as the locals, we would have been tempted to purchase a good stash of coca leaves, used for centuries by Indians to ward off cold, hunger and fatigue—all conditions of life in the high elevations.

The Inca Trail begins at the 88-km mark on the train line out of Cuzco. We hopped off amid much teasing from the rest of the train. Crazy gringos! Two barefoot, ragged children also got off, schoolboys who were returning home for the weekend. Martín was nine, his little brother with big smile was six, and neither admitted to knowing who the Inca were. They hiked the Inca Trail twice a week, two hours to Wayllabamba Village after the three-hour train ride, then back again on their return to school. Chattering politely in response to our clumsy questions, they were delightful guides.

Starting in a lovely eucalyptus forest near an ancient irrigation canal, we crossed a suspension footbridge that was secured to Inca pilings and swayed nonchalantly over the roiling Urubamba River. The flora around us was semitropical, sprinkled with brilliant wildflowers.

Llacta Pata was the first clear set of ruins we came upon, and we were frankly disappointed; pictures of Machu Picchu had set our standards for Inca ruins. Our disappointment in the architecture was offset, though, by the presence of three peasant women rubbing wet clothes on smooth rocks by the stream that runs by the ruins—apparently the local laundry.

Then we hit the first grade, a relatively minor one but a taste of what lay ahead. At the crest, we came into a narrow canyon coursed by the Cusichaca River. The lower hillsides were cultivated by the occupants of rude huts on the far side, which was as steep as the side of a toaster. Cattle wandered here and there, as placid as they are anywhere.

We tried to combat the effects of the elevation by sucking on glucose candy,

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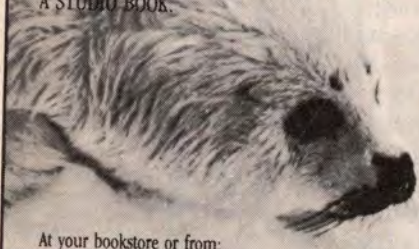
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as recommended by people in Cuzco, but all that did was to gum up the works and make us thirstier. Along the way we were accosted by a sweet little tot looking for candy and by a cordial fellow with a coca wad bulging out his right cheek. After prolonged and exuberant felicitations he inquired if we had any cigarettes—I asked if he knew where we could get some air!

Wayllabamba Village was just over the next rise, at the junction of Cusichaca and Llulluch'a Creek canyons. Since we reached it in half the expected time, lunch seemed an appropriate indulgence; a hillside thick with grass received our weary bodies. After a short snooze and a hasty survey of the ruins on which the village is built, including some tombs, we headed up the long, tiered valley to the first serious pass. The trail occasionally passed near a sturdy aqueduct, which we were sure was an Inca marvel.

Having huffed for hours (and temporarily lost the trail while trying to hurdle Llulluch'a Creek), we succumbed to the romance of spending the night in an abandoned native lean-to, high above Wayllabamba. If there were hermits among the Inca, one must have perched here, as we did for long stretches, to absorb the overwhelming silence and splendor on all sides.

The narrow canyon was tilled just below; above, nearly vertical cliffs with streaked granite outcroppings were covered variously with scrubby grasses, rich tropical vegetation and mosses. Ahead was a solid wall of mountains. Shifting clouds composed a new sky every two or three minutes, allowing occasional glimpses of snow and glaciers and of peaks we knew were higher than 19,000 feet. Even from our 12,000-foot reviewing stand, that was immense!

While pitching camp we were visited by a peasant mother and son and the boy's puppy. The woman stood off, all but ignoring us, while the lad, about eight, came up the hill to chat. This was *his* shelter, and did we wish to pay him the rent now or later? We fenced around with that one until mother and son moved on, only to return later, the woman loaded down with an absolutely staggering burden of firewood. She continued on, he stuck around and got some soup. He wanted us to pay him to take his picture, a proposition that fell flat. With good cheer, he bid us goodbye.

The next morning the boy returned at

dawn. We could see him on the trail from the village, coming back up the canyon—even trotting, it must have been a two-hour trip. He said he had not wanted us to take his picture the night before because his clothes were rags—they were indeed, and the morning was cold and wet. When we asked about his family, he said there were just his mother, himself and the dog. We asked with the greatest of Yankee tact about his father and the boy tensed, snapping "no hay" — "I do not have one." His old little eyes mirrored the suffering and chanciness of life in those harsh environs, where his ancestors had created some of the great wonders of the world. Aware of the ironies, we left some oatmeal and extra packages of Swiss Miss and Kool-Aid with him.

Since we had been drenched in a storm during the night—the shelter did not deserve the term—buried under ponchos as thunderclaps slammed back and forth against the mile-high-plus mountain faces, we were glad to start on the trail and get warm. Everything was uphill for the rest of the morning. We were grateful, too, for a cloud cover; at that elevation, the sun is merciless.

Soon the scrub gave way to dense rain forest with vines that begged for a Tarzan. After passing from the rain forest into another hanging valley, we stopped for a gorp break, anticipating the final push to the first pass.

The saddle ridge that had been in view for some time was indeed the first pass, El Abra de Warmiwanusqua, "The Pass of the Dead Woman." The higher we climbed, the more empathy I felt with the lady. The Inca must have had similar difficulty—just off the trail is a rock cairn where they deposited the chewed coca leaves that helped them up the pass, with the incantation, "With these leaves, I leave my exhaustion." Finally, we, too, made the top, where we flopped to the ground.

Our exhaustion soon turned to exhilaration—the mists swirling about us revealed staggering vistas. Cheese, *pan* and Gatorade had never tasted so good, and we capped our feast with an orange hoarded for the occasion. Exclamations and picture-taking gave way as, gradually, we surrendered our minds to the silence of the place and to the simple experience of time and space.

We sloshed and tumbled down the

other side of the pass; the road was still soggy and slippery from the night's storm. It eventually disappeared into a massive trample of the grasses and rocks characteristic of this glaciated area, a spot where hikers have gone astray. All at once the sun burned off the mists, and we could see down into the Pacaymayo Valley and across a ridge to two passes beyond—one of these had to be our route. The left path led to Palcá; the seemingly clear path to the right, down the Pacaymayo Valley into dense vegetation, was a swampy trap where snakes and bears escort one to the Urubamba, thence to the Amazon River. The Inca Trail, we knew, lay in the middle. Noticing neither bears nor snakes peeking at us from behind the green veil of the swamp forest to the right, we thrashed about in search of the trail, figuring it had to lead toward a ruin we could see halfway up the pass. The familiar white granite steps broke through the dense brush, and soon we were in Runku Raccay, a little gem of a citadel believed by Bingham and others to have been the first outpost of Machu Picchu. A square foundation sat at the base of a cliff. A hundred feet above perched a perfectly round fortress; within, five distinct rooms with interior niches surrounded a courtyard. While we were there, a majestic Andean condor—wingspan about ten feet—flapped off a nearby tree, soared on the winds over the promontory to our right and disappeared.

At 3:30 in the afternoon, prompted by the sun's slide behind the second pass and by the glorious view, we decided to call it a day. A full, 1,000-foot waterfall to our right, the Dead Lady Pass middle right, sheer cliffs dead ahead, jungle below, and the mystical darkness of the distant reaches of the cordillera on the left deserved an evening's contemplation.

The following morning, we crossed the second pass, fortunately over the steps of the Inca Trail rather than up a badly pocked, grassy slope that appeared to have mired many a hiker. We were completely in the clouds. At the top of the pass, massive jumbles of gargantuan rocks, oddly scattered, evoked fantasies of the Inca. Fuel for such idling were the stories of treasure caches along the Inca Trail, secreted there by the loyal subjects of Atahualpa, the last great Manco Inca. In about 1532, Pizarro promised Atahualpa safe con-

duct within the Spanish encampment but instead took him captive. Then, after receiving the roomful of gold and silver Pizarro demanded as ransom, Pizarro had Atahualpa killed. The riches are said to have been hidden by the Inca when surplus ransom had been brought down from Inca treasuries. In clear weather, the second pass provides a dazzling view of Mount Veronica (19,342 feet).

Hugging the southern side of the Yanoqocha Canyon, we passed a swampy pond ringed by garbage, attesting to previous campers. The cliffs and escarpments defining the gorge spurred us forward. Then, abruptly, a set of stairs went straight up to our left, to a spectacular bastion known today as Sayajmarca.

Sayajmarca compactly and completely occupies a needle-thin promontory that juts high between two valleys, the Yanoqocha and the Aobamba, and has a splendid view of the latter. It was a strategically placed community, fortified against virtually any assault. Here we saw the first Inca "baths," or liturgical fountains, along with worship areas, living quarters and streets. One charming feature was a stairway that ascended to a doorway, beyond which was a void—supposedly the Inca version of The Plank. Sayajmarca deserves a day's exploration of its high-quality construction and architecture, but we surged ahead, back down and across the Yanoqocha, up the other side across a dry lake bed and into more jungle and quagmire. Just as the heavens we had been tramping through exploded in a vengeful thunderstorm, we came upon the Tunnel, a minor miracle considered by Bingham the most fascinating feature on the trail.

Traversing a near-vertical slope, the trail enters a hole and descends stairs leading to a sitting chamber lit by a natural skylight before it becomes a 50-foot tunnel. The trail then goes right through a massive rock. It was a short walk from there to the third pass; to the north, the mighty Urubamba's gorge opened up as the river rushed on to join the Amazon.

Within an hour we hit Phuyupatamarca, roughly translated as "town above the clouds." Like all the ruins on the trail, it lies in terraces that make the most of the mountainside. (There simply were no flat places to build!) Although some of the stone work is clumsy and the site lacks the drama of Sayajmarca, Phuyupatamarca does



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contain an interesting chain of liturgical fountains flowing down the slope and a huge and curiously carved boulder in a place of worship.

We stood on a broad "plaza" and gazed northward. By now we had picked up the scent; the urge to reach Machu Picchu was upon us, and so we moved on, passing three good-sized cave shelters, littered as usual with garbage left by previous hikers.

The trail passed through grasses and brush along the mountains above the Urubamba. We were out in the open at this point, more than at any other—it felt good not to be so closely towered

over. Coming out of a stretch of woods, I saw in the distance, between two modest peaks, a pattern of rocks obviously laid out by a planning being: Machu Picchu! What a thrill—already we had outdone Pizarro!

We stumbled down the grassy ridge, heading in the direction of Machu Picchu, picking up the Inca Trail near some power lines from a hydroelectric station on the Urubamba, the first sign of the "advanced" culture we had escaped for nearly three days. The trail did not jibe with our map's description of it, so the search for the next ruin and that night's camp was a tense one.

Eventually we came to Wiñay Wayna, "The Eternally Young One," named for a local flower. The ruin is nestled in a cleft of the steep slope of the Urubamba, high above the ruins of Choquesuysu. The site consists of an upper group of structures, including fountains, and a long staircase flanked by ten more fountains leading down to a main cluster of apparently residential buildings. Some of these are two stories high. High gabled walls make Wiñay Wayna look like something out of a fairy tale. In the lower portion, another doorway leads only to the abyss below. Agricultural terraces abound.

Exhausted from the long day, we pitched our tent in the upper area. A "waterfall shower" was shown on the map. I could not find it, but a tumbling stream provided some relief from the accumulated grime of three days on the trail.

A group of very bedraggled French backpackers showed up at dusk, disappointed to find that we occupied one choice spot and an international foursome the other. They were two British geologists from Africa, a Swedish woman and an Austrian woman, whom we later overheard preparing *strawberry tarts!* They had found something resembling wild strawberries high up on the slope, had raided a bird's nest for two eggs, and were going at it. There'll always be an England, and probably also freeze-dried Americans feeling not a little outclassed.

After a restless night, we arose at 5 a.m., hoping to reach Machu Picchu by sunrise. Fat chance. I was lucky to get there alive.

We had worked our way along the side of the gorge until we came to a deep slash in the ridge immediately south of the peak named Machu Picchu.

We had been told that some American investors were putting in a hotel there, and indeed there were signs of attempts to lay some structural foundations.

The excavation had buried the trail with a landslide that reached down 3000 feet to the Urubamba; our reconnaissance suggested a course across the top of the rubble to a likely point on the other side. When we got there, we found various epithets scrawled on the rock wall, including "*idiotas constructores*," which needed no translation.

But our relief was premature. We had not found the trail, only a short construction path. My companion had gone ahead, spotted the real trail some 50 feet below and scrambled down a path that became another slide that became a sheer drop to the trail.

I started down the path and when I hit the slide, slide I did. It was a terrifying view—a 30-foot drop to a three-foot-wide trail that ran above the full slide—3000 feet nearly straight down to the audibly raging Urubamba.

I twisted violently and lunged at the undergrowth beside the slide, grasping thorny vines and loose junk to break my fall. I clung in a cloud of dust, my feet digging for a nonexistent hold. Slowly slipping, I wrenched back around, hoping to make it down on my rear end, only to have the bottom of my packframe snag and begin to pitch me forward to my eternal reward. My last chance for life was offered by a protruding root—I grabbed at it on the way by with my left arm, which has been less than dependable since a childhood bout with polio. But it held, and my right foot found a rock that was crumbling more slowly than the rest of the mountain. "Yawning chasm" describes the view, but I wasn't yawning. I was fighting hysteria.

I gazed out at the incredibly gorgeous, emerald-matted precipices across the Urubamba, reaching up to snow and glacier lines, and realized that I had only a brief time before my hold gave way. The sun had just appeared and was beating directly and furiously on my sun-burned, scratched, bitten and bruised body. Sturdy Timex on left wrist showed 7:15 a.m. As a youth I had often served the 7:15 mass at St. Ignatius Church in San Francisco, and I had also worshipped the sun. Why couldn't I get a break now in this wild, crazy place!

Dangling desperately from my root, I concluded there was no way to make it



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down with that frame on my back—all else having failed, I turned to sweet reason, which suggested I get rid of the damned thing. The nylon cord I had carried for years in a side pocket for an undefined emergency was reachable; with my one free hand I untied it, shook the tangles out and agonizingly knotted it to the top of the frame. Delicately contorting, I eased the pack off my right shoulder, twisted to grab the root with my right hand to slip the pack off my left arm and, with the cord wrapped around my handkerchiefed hand, slowly eased the pack to the trail below. The only fatality was my Sierra cup—it dislodged in the descent and pinged and sparkled into oblivion.

Liberated, I was able to claw and crash down the drop. When I hit the trail, I took two steps and two huge gasps and collapsed against the mountainside in a sobbing heap. I cried for fifteen minutes. I had seen it. I had been born again, and I felt like an infant, weak and defenseless. But *Pacha Mama*, Earth Mother, was not being especially cuddly.

The thrash through the jungle that clung to the north side of Machu Picchu peak—with the same dreadful drop ever on our right—was, to say the least, anticlimactic. Every time we hit a break in the foliage, the sun hit hard. A long, tortuous ascent of many steps brought us, giddy with anticipation, to Intipunku, "The Door of the Sun," so-called because from certain sacred points in Machu Picchu the sun is occasionally framed by this stone entrance to the city.

One observer has nicely noted that "Machu Picchu will knock your socks off." Another has referred to its "almost spiritual bewitchment." As we passed through the Door of the Sun, we were bewitched and gladly knocked off our weary feet.

From Machu Picchu peak we looked down on our goal, the city straddling the narrow saddle that runs across to the sugarloaf, Wayna Picchu. (In Quechua, Machu Picchu means "old peak," Wayna Picchu "young peak.") The Urubamba bounds the site on three sides, in a hairpin bend, several thousand feet down cliffs that for the most part seem to deviate only a foot or two from the plumb line. Machu Picchu is there, cleared, as solid as it has stood for 400 to 800 years.

Machu Picchu's fine masonry suggests a royal residence or retreat. Its massive carved stones are joined with

no cement or mortar, sometimes so perfectly that neither pin or razor can be inserted between them. The craftsmanship is splendid, of the ages.

It remains a mystery how the Inca carved the huge stones or, for that matter, built the city up there at all! More than 200 structures, most of them intact save for roofs—temples, palaces, plazas, shops, stairways, observation towers, agricultural terraces and irrigation systems—all are surrounded, across the Urubamba, by still-soaring mountains. Among the most notable structures is Machu Picchu's *Intihuatana*, a huge sundial to which the high priest would tether the sun during the winter solstice lest it stray any farther from its worshippers. Each of these monumental constructions was accomplished without the wheel, without iron tools, with only the llama (which carries at most 80 pounds) as a beast of burden.

The old adage proves itself constantly; the enemy is us. The garbage along the trail and in the ruins is a defilement and a disgrace—French sardine tins, American food wrappers, Peruvian sausage cans, candy wrappers, Marlboro hardpacks—a full display, courtesy of the international fraternity of slobs. We saw ancient walls in the ruins used as firewalls. We saw carved-out pegstones from sacred baths used to line firepits. We discovered that people had used the few decent campsites as toilets, and we saw morons' names carved on temples.

Perhaps Johns, firepits and waste receptacles outside the ruins would prevent more destruction. Much of the Machu Picchu area has been designated a national archeological park, but this will prove a futile exercise in nominalism if the archeological wonders continue to be defaced and slowly ruined.

Yet Inca grandeur overshadows all, easily the average backpacker's delight of a lifetime. To our great regret later, we'd compulsively charged along to get to Machu Picchu, reaching it in 72 hours. Ideally, several days should be allotted to explore the ruins within striking distance of the trail. Respect for the ancient culture and civilization so spectacularly memorialized deserves a leisurely examination, a steeping, and a communion with the spirits that linger in the Cordillera Vilcabamba. □

Richard B. Spohn is director of California's Department of Consumer Affairs.

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The Sierra Club Cosponsors a Major Environmental Conference



The "City Care" conference will have community workshops in Detroit neighborhoods. Shown here is the city's Civic Center Plaza.

Detroit Free Press—Taro Yamasaki

City Care: Toward a Coalition for the Urban Environment

STAFF REPORT

SIERRA CLUB members, as is true of environmentalists in general, are people who are concerned about the condition of the natural environment, the human environment. There is plenty to be concerned about: cancer-causing substances in the air we breathe and the water we drink; unhealthy water in our lakes, rivers and streams; less and less open space. These environmental problems are most severe where most people live—in cities. As with most national environmental organizations, the majority of Sierra Club members and local groups are centered in urban areas, and the Club has a long history of involvement with urban environmental problems. The establishment of the Golden Gate National Recreation Area and, most recently, the Santa Monica Mountains NRA, the protection of Boston Harbor and of Overton Park in Memphis, Tennessee are just a few examples of Club successes with urban issues. But until now environmentalists have not been able to successfully coordinate attacks on urban pollution or to get help from other activist groups in this crucial fight. Now, however, a new campaign has begun.

The Sierra Club will join the National Urban League, the Urban Environment Conference and Foundation and several federal agencies in sponsoring "City Care," a major national conference on the urban environment to be held in Detroit, April 8 through 11, 1979. Other environmental organizations are also being asked to join the list of cosponsors. From 800 to 1000 grass-roots environmental and urban activists will gather to formulate a battle plan and to forge a new alliance—the first stages of an active campaign against urban pollution.

In sponsoring this conference, the Sierra Club is not setting out in a new or unfamiliar direction. Environmentalists have long been active in such issues, and the Club's goals will remain environmental—green areas, clean air, clean water, safe energy, proper land use. The traditional supporters of conservation will not be enough for the large, but necessary task of making our cities livable. Environmentalists need new allies, new friends. The Sierra Club will seek the active cooperation of city residents, labor unions, businesses and minorities.

This new, even unique, coalition shares broad goals. But different members will undoubtedly use their expertise and involvement in different ways, and some disagreements may be inevitable. As Ver-

non Jordan, president of the National Urban League, put it, "There may be situations where blacks and whites violently disagree, but if the air isn't pure, it may not make any difference." The Sierra Club will stress, in its own efforts, the preservation and improvement of the environment.

In a way, wilderness issues are also involved in this urban environmental conference. Arguments against wilderness preservation are often presented in terms of adverse effects on cities. For instance, some timber companies argue that establishing wilderness areas deprives the nation of lumber needed to create housing and construction jobs in cities. But by approaching urban problems directly, we will be better able to protect wilderness. Wilderness needs an urban constituency; this conference may help to expand it. Even now, virtually all the votes in Congress for Alaska and wilderness are cast by representatives from cities.

"City Care" will be a working, practical conference—more of a town meeting than a series of speeches by high officials. The stars of the conference will be the grass-roots activists; the purpose is to enable local environmentalists from all over the nation to develop coalitions with other groups involved in urban matters.

"City Care" will focus on specifics—on success stories and local victories. Participants will pool their tactics and resources in what could become a national network for urban activists. To accomplish this, the conference will feature an unusual format. Each person will be assigned to a core group of approximately 30 members for the duration. Each group will reflect diverse issue and regional affiliations. As "melting pots," they will facilitate individual interaction, often a difficult task at a large conference.

During the conference each participant may attend five workshops, divided into two broad categories. Some will deal with the individual's relationship to the immediate neighborhood and community. Other workshops will deal with the interaction between the individual and the overall city and region.

The skills required for problem-solving on these two levels—neighborhood and region—differ markedly. The neighborhood/community workshops will be held in Detroit neighborhoods, where brief walking tours and structured field meetings will show participants the actual results of grass-roots action.

Each workshop will examine three aspects of specific issues: a general overview of the "what" and "why" of the subject area; successful and unsuccessful efforts

that have been made to solve specific problems; and ways to acquire the skills, contacts and resources needed for solving these problems.

The following topics have been tentatively proposed for workshops.

- How to accomplish neighborhood revitalization and environmental improvement without displacement
- Community recycling of vacant lands: urban gardening, forestry and neighborhood parks
- Fostering neighborhood environmental jobs and the economy
- Preventing environmental disease through community health care
- New neighborhoods in urban areas
- How to safeguard health in the workplace and in the home
- Using pollution control legislation to protect health
- The sanitation crisis: energy, health and jobs
- Healthy, affordable energy supplies for cities
- Maintaining vital urban services to promote development
- Who owns the parks? Matching facilities planning, access and transportation with recreational needs
- Regional migration and balancing national development
- Urban reinvestment and bringing people downtown
- Improving urban environments through zoning.

Last year, at the Sierra Club's annual banquet, EPA Deputy Administrator (and former Sierra Club activist) Barbara Blum told Club leaders, "It's time to recognize that there is no place to hide. It's time for *all* urban residents, inner-city and suburban, to acknowledge that they share a common destiny. And it's time for the environmental movement to forge a new urban vision and make a sustained commitment to create a healthy urban environment." We will be doing just that. Detroit, April 8 through 11, Radisson-Cadillac Hotel. See you there. □

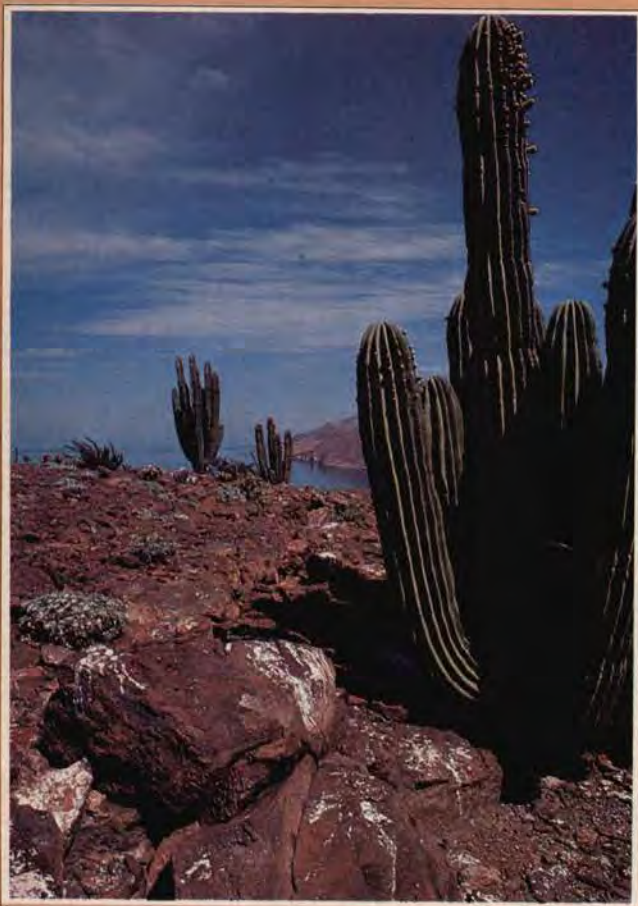
To Become Involved

If you would like more information about attending the conference, or want to be kept informed as the program develops, contact Judith Kunofsky, Sierra Club, 530 Bush Street, San Francisco 94108.

If you want to suggest workshop panelists and leaders or possible speakers for "City Care," write to Neil Goldstein, Sierra Club, 800 2nd Avenue, New York, NY 10017.

Tracks and Signs

Text and Photographs by
TUPPER ANSEL BLAKE



Below: An acorn woodpecker stores acorns in holes pecked into the bark of a Douglas fir (Point Reyes, California).



Left: Guano-splashed rocks near the sea mark the nesting colony of brown pelicans (Isla San Lorenzo, Gulf of California). Above right: These tiny tracks were made by beetles (Kelso Valley, in California's Mojave Desert). Right: A grizzly bear raked this tree with its powerful claws (Great Bear Wilderness, Montana).



THE EARLIEST WRITING primitive peoples had to understand was the tracks and signs left by wildlife. To be able to follow such signs and find animals or birds very often made the difference between eating and starving. For most of us who love the out-of-doors, though, knowing how to read the tracks and signs of wildlife is a matter of fun; it helps us more easily see the full course of life around us.

The first peoples of North America, the Indians, learned this skill well. And later, as other people settled on this continent, the new-found wealth of fur-bearing mammals led a few hardy souls across the plains, up the river valleys and over the mountain ranges. To be successful in their search for furs and to find food to eat, these Mountain Men absorbed the Indians' knowledge. Trappers with names like Grizzly Hugh Glass, Broken Hand Fitzpatrick and Blackfoot Smith learned the native ways of reading tracks and signs. And with time, their knowledge was passed on to those who later

homesteaded the plains and settled in the woods and mountains of our country.

Soon there came a new breed of trackers who made biological surveys of the flora and fauna of their new homeland. Naturalists and field biologists such as John Muir, Joseph LeConte, Ernest Thompson Seton and the brothers Adolph and Olaus Murie all became readers of tracks and signs to aid them in their research. The tracker turned from gathering food and fur to gathering facts.

People today who love the out-of-doors will also benefit by picking up the basics of tracking. A whole new dimension opens up; for one can answer questions like "Who lives here?" or "What went on here yesterday?" Like those who have gone before us, we can learn tracking skills by reading or by talking with experienced trackers, and we can also learn first-hand about the silent world of tracks and signs.

The best place to start is in areas where the tracks are most obvious, such as in new snow, mud or wet sand. Perhaps a rabbit moved through the snow after a storm, or a bear wandered along a river sandbar or a coyote

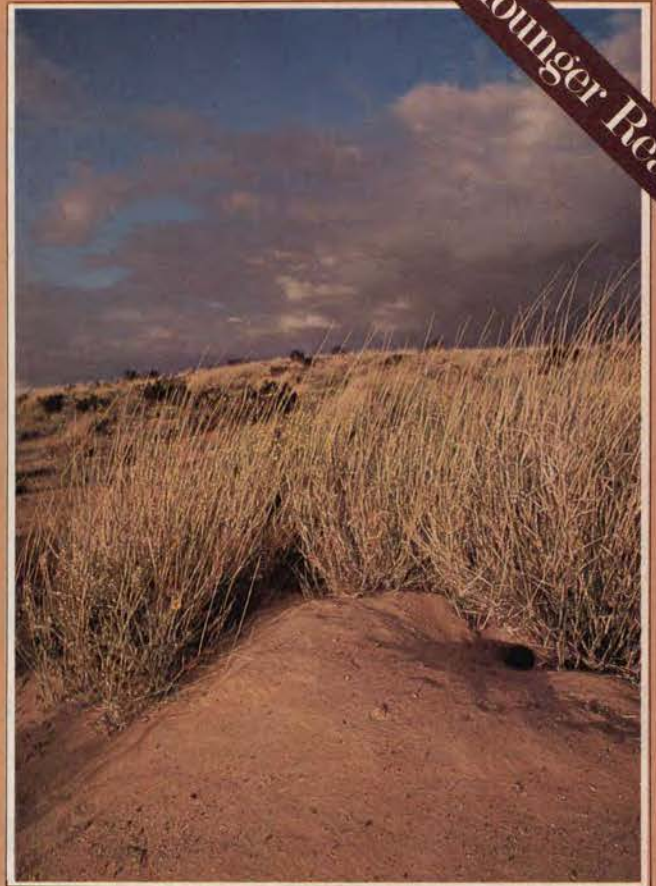
Right: A coyote made these tracks in the soft mud at a shrinking desert water hole (Woods Mountains, in California's Mojave Desert).



Below: These are the cores of Bishop pine cones eaten by western gray squirrels (Point Reyes, California).



Right: These tiny pits in the bark of an alder tree were pecked by the yellow-bellied sapsucker (Point Reyes, California). **Far right:** The kangaroo rat digs its burrow in the shelter of shrubs and grasses (Kelso Valley, in California's Mojave Desert).



Don't Forget

Keep these important points in mind as you begin: first, never step on the tracks, but walk to the side. This allows you to go back and take another look, if you need to. Second, track into the sun. This will allow shadows to fall into the tracks, making them stand out more clearly.

walked in the mud of a shrinking desert waterhole. As your skills improve, you will become able to tell which animals have been in an area and what they were doing.

Here are some things about tracking that you should know:

- The depth of the track aids in telling whether the animal was heavy or light.
- The design of the track shows which way the animal was traveling.
- The farther apart the tracks, the faster the animal was moving.
- Wildlife that generally place their feet in pairs—or parallel—usually live in trees (squirrels and jays, for example).
- Ground animals place their feet in a diagonal pattern (foxes and quail, for example).

Twigs, limbs and trunks of trees can show where deer and elk browse, porcupines gnaw, where pileated woodpeckers bore and acorn woodpeckers store acorns. Other signs to look for are the homes of wild creatures—dams, nests, dens or burrows. In fact, nearly all activities of an animal leave clues for the de-

tective who asks “Who was here?” or “What went on?”

The Indians of Baja California called vultures “tracks in the sky.” In the old days, they would not kill a mountain lion or vulture because the mountain lion caught animals that were hard for the Indians to kill, and vultures showed where the catch was waiting. Today, vultures still point the way for trackers.

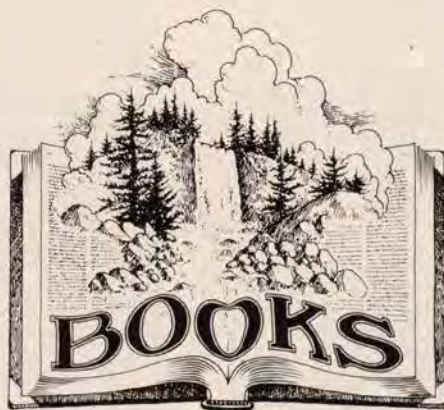
With time and experience, tracking and reading signs become easier. Well, maybe “easier” isn't really the right word, but you will be able to read more from each track you come across. Don't feel you must solve every mystery or read all the writings of wildlife. Many experienced trackers have been stumped. The important thing is to step into the wild and, reading some of what is written, to be more a part of this world. □

Tupper Ansel Blake has explored much of the wildlife habitat between the Rockies and the Pacific and has exhibited his photographs widely.

Willa Cather's Pastoral Vision

Going Home to Rural America

JAMES KEOUGH



DESPITE SOME RECENT attention, Willa Cather is an all-but-forgotten author for modern readers. Her life spanned the intense period from the Spanish-American War through World War II, in which the United States developed into a modern industrial giant, but Cather was not a modernist. Unlike her contemporaries, who sought ways to cope with modern life, Cather hearkened back to a dimly remembered, other America. In fact, she turned her back on the twentieth century and its consuming ethos of progress. She was a lover of older ideals about society, about culture and, most of all, about the land. In this she was ahead of her time, calling into question the direction being taken by American society. Like Wendell Berry in our time, she sought to counter those forces that were driving society apart. She was at heart a preservationist, and her strong voice speaks directly to the 1970s—not stridently, but with great passion and understanding.

Cather dedicated her life to the pursuit of artistic perfection; she wished her work—not the stuff that fills biographies—to be the expression of that life. To that end, when she died in 1947 her will forbade the publication of her private papers or letters. Except incidental biographical information—who she knew, where she lived—the record of Cather's adult life lies in her novels.

Taken together, Cather's two "first novels" (she herself said there were two) represent the central conflict she faced both as an artist and as an individual. She had dedicated her life to the pursuit of artistic perfection and to the attainment of numerous cultural goals, yet her most creative impulses were triggered by the remembrance of scenes and emotions with seemingly little inherent artistic value. *Alexander's Bridge* (1912) is a "drawing room" novel set in the London of Henry James and Edith Wharton. It depicts attitudes and characters that, Cather said later, a novel of the time *should* portray, even though, for Cather, those characters and attitudes were shallow—observed rather than experienced. *O Pioneers!*, on the other hand, is a novel drawn directly from Cather's childhood memories of life on Nebraska's great prairie. Its background is distinctly nonliterary (a distinguished New York critic said about the book, "I simply

don't care a damn what happens in Nebraska, no matter who writes about it"), and its characters know very little of the *beau monde* beyond Kansas City or St. Joe. *O Pioneers!* speaks of the land and of the past, of an earlier era in American life. It is an age Cather revels in, sharing its pioneer spirit and its nurturing relationship with the land, and one whose passing she mourns.

Nearly twenty years after the publication of these two works, Cather declared *O Pioneers!* was the better novel; she had written it entirely for herself after she had "recovered from the conventional editorial point of view" that she felt had marred *Alexander's Bridge*. But the success of *O Pioneers!* runs deeper than this. For the first 40 years of her life Cather had struggled to escape the Divide—the western part of the Great Plains—and the provincial society that prosperity had brought to a richly diverse frontier world. She had striven to join the "urbane" or "literary" world of *Alexander's Bridge*—and she succeeded, only to find that while she could live there, the wellspring of her art lay in the very place she had fled. Her writing became an act of reconciliation, and in all her works one feels the tension between a drive for cultural perfection and a passion for the pastoral life. Throughout her work she continued to lash out at the small-minded, petty people she felt inhabited the towns of the Great Plains and, like herself, most of her protagonists or narrators seek to escape the prairie; but like her, too, they always return—spiritually if not physically—to the land where their emotions and their beings first took root.

Willa Cather was born in Back Creek Valley near Winchester, Virginia, on December 7, 1873. When she was ten, her family moved to the farm country near the bustling settlement of Red Cloud, Nebraska, established a scant fourteen years before. The family struggled through none of the hardships Cather later depicted in her novels (Jim Burden's situation in *My Antonia* or Thea Kronberg's in *The Song of the Lark* most likely describe Cather's family life in Nebraska), but farming did not appeal to Cather's father, and the next year the family moved into town, and Charles Cather became a farm broker.

From the start the young Willa was a misfit in Red Cloud. She

wore her hair very short and dressed in boyish clothing; she answered to the name Willy but was happiest when called the more masculine Billy. Cather spent little time with her peers; instead she enjoyed the talk of older people, especially men, people who had seen something of the world beyond Red Cloud. She also was more interested in the immigrant settlers who were trying to carve a living out of the tough prairie than she was in most of the townfolk. To her the townspeople were self-satisfied and intolerant; their towns brooded on the landscape, were an insult to it, and bred people whose minds "were as stuffy as their houses." About the immigrants she felt differently, and she would often ride out to visit their rough sod dwellings. Later she would see in these Bohemians, Swedes, Russians and others a rich cultural past capable of adapting to and at the same time of transforming the harsh frontier.

At seventeen Willa Cather left Red Cloud for Lincoln, Nebraska, and a year of preparatory school before entering the University of Nebraska there. Cather had planned to study the sciences and then medicine, but early success as a writer and an inherent love of literature led her to pursue a strict course of study in the humanities. She wrote for the school paper and the literary journal, and she had essays and stories published in *The State Journal*, for which she also wrote drama reviews. Her unbending critical standards and her absolute fearlessness—no one was too important to be pilloried for an indifferent performance—soon earned her a reputation among the traveling companies as the "meat-ax young girl."

After graduation and her failure to obtain a teaching position at the university in Lincoln, Cather became an editor and writer for the *Home Monthly* in Pittsburgh, Pennsylvania. She spent a year at this stifling job—the magazine sought to provide "entertainment for the idle hour . . . pure and clean in tone"—and then resigned to work for Pittsburgh's *Daily Leader*, an evening paper, where she was an editor, copy reader and drama critic. In 1901 she quit journalism to teach high-school English and Latin. Journalism had sharpened her skills, but teaching allowed her time and the peace of mind to write, and her work began to be accepted more frequently in the literary monthlies.

In 1903 Cather published her first major work, a book of poems entitled *April Twilights*. But while the volume enjoyed a modest success and some of the poems were soon anthologized, Cather's poetry is a very minor achievement. Her first few published stories, written while she was in Lincoln, drew upon characters and situations she remembered from life in and around Red Cloud. They depicted many character types and developed many of the themes of her most popular novels. *April Twilights* abandons these characters and themes for more conventional rhetoric, for a consciously poetic style that rings false. Cather forces her poetic images—birches on the Nebraska prairie are Wagnerian Brunhildas standing stoically in winter moonlight. As her writing matured and her sense of material grew, she allowed simple natural images to appear unadorned, unkeyed to a mythic or artistic background. In her later fiction the effect of her landscape is cumulative, and we remember her powerful images because they have unfolded themselves to us, not because we have been told their meanings.

The Troll Garden, a collection of short stories published in 1906, continues the direction taken by *April Twilights* away from western themes. We are thrust into a world filled with artists and urbane conversation. The three stories that deal with western characters or settings do so negatively, although they illustrate the ease with which Cather can handle material drawn



Willa Cather as managing editor of McClure's.

University of Nebraska Press

from her own past. Her small-town characters are all alive; they breathe as the characters of more "continental" fiction do not.

In "A Wagner Matinee," Cather's youthful resentment of her Nebraska days, heightened by her devotion to Art, appears most strongly. Her description of the vastness of the prairie makes it clear how confining such open expanses can be: "The world there was the flat world of the ancients; to the east the cornfield stretched to daybreak; to the west, a corral reached to sunset; between, the conquests of peace, dearer bought than those of war." The price of victory over the prairie was self-abnegation. Aunt Georginna, a Nebraska relative whom the narrator (himself an escapee from the plains) takes to the matinee of the title, has traded a music career and life in Boston for a life of hardship. Throughout the performance, Aunt Georginna's soul feasts on the music, and long after the musicians have packed up the instruments she sits crying, "I don't want to go, Clark, I don't want to go!"

"I understood. For her, just outside the concert hall lay the black pond with the cattle-tracked bluffs; a tall, unpainted house, with weather-curling boards, naked as a tower; the crook-backed ash seedlings where the dishcloths hung to dry; the gaunt molting turkeys picking up the refuse about the kitchen door."

This is no generous vision, but the statement of an expatriate whose reasons for leaving are still uppermost in her mind. Financial security, travel and acceptance in the literary world would lessen this anger, and the freedom that physical and temporal distance bring would allow Cather to realize that her strength as a writer lay in the imaginative re-creation of her Nebraska memories.

The Troll Garden established Willa Cather as a prominent figure in the East Coast literary world. S. S. McClure, publisher of *McClure's Magazine*, one of the most important "serious" monthlies at the time, offered her a position on his staff after reading this collection of stories. Cather worked for the difficult McClure (she was hired after the entire senior staff quit in protest to McClure's mercurial manner) for six years.

herself, and the writing of this book went far differently than had its predecessor, *Alexander's Bridge*:

"Here there was no arranging or 'inventing'; everything was spontaneous and took its own place, right or wrong. This was like taking a ride through a familiar country on a horse that knew the way, on a fine morning when you felt like riding."

The result was a powerful book about the land and the first generation of Nebraska settlers. It is their history, a recollection of their special character and of the endurance that enabled them to work the prairie. In charting the life of Alexandra Bergson, *O Pioneers!* expresses two of Cather's most central themes, themes that would determine the outcome of future novels that seem only tangentially connected with the frontier.

Each important character in Cather's mature fiction holds dear some ideal landscape drawn from memory, usually of life on the prairie. This act of cherishing is itself more important than the particulars of a specific western location. For example, it is because Bishop Latour in *Death Comes for the Archbishop* (1927) was sensitive to the nuances of the French countryside as a child that he is able to relate strongly and compassionately to the vastly different New Mexico wilderness. Likewise, Professor St. George's (*The Professor's House*, 1925) easy sympathy for Tom Outland's experience at Mesa Verde stems directly from his close childhood communion with Lake Michigan.

For Cather, this relationship is established early or seldom at all. Sebastian Clement (*Lucy Gayheart*, 1935) is a world-renowned singer of lieder, an artist who has achieved the pinnacle of his profession; still, he is profoundly melancholy:

"He had missed the deepest of all companionships, a relation with the earth itself, with a countryside and a people. That relationship, he knew, could not be gone after and found; it must be long and deliberate, unconscious. It must indeed be a way of living."

This way of living was the way of the pioneers. In confronting nature for survival, they formed bonds with the land—they effected a union with it. In fact, an essential part of the pioneer spirit stems from the land itself, just as the spirit of a settled land reflects the culture of its settlers.

In contrast to Clement, Alexandra Bergson in *O Pioneers!* looks upon the land as on a lover:

"For the first time perhaps, since that land emerged from the waters of geologic ages, a human face was set toward it with love and yearning. It seemed beautiful to her, rich and strong, and glorious. Her eyes drank in the breadth of it, until her tears blinded her. Then the Genius of the Divide, the great free spirit which breathes across it, must have bent lower than it ever bent to a human will before."

Clement meets an untimely end—ironically, he drowns—while Alexandra outbraves fortune to become a successful steward of the land and to garner her measure of happiness.

In *O Pioneers!* and *My Antonia*, her two Nebraska novels, Cather makes her most unambiguous statements about the land. The novels are about hardship, too, and self-denial; about foregoing many things in order to settle a land to prosper. But primarily they are about the type of relationship one can establish with the land, depending on one's ultimate goal. They describe the paradoxical nature of the pioneer—at the same time a conqueror and a nurturer of the soil. Cather's pioneer does not



Honored by the American Academy of Arts and Letters in New York in 1944 were, left to right: Samuel S. McClure, Willa Cather, Theodore Dreiser and Paul Robeson.

During this stable and highly successful period Cather met Sarah Orne Jewett, a New England writer much Cather's senior, in Jewett's Charles Street (Boston) home. The two formed a deep friendship. From Jewett's writings and undoubtedly from her conversation, Cather learned that powerful emotions and sentiment (as opposed to sentimentality) could be conveyed in unadorned prose about unglamorous places—in Jewett's fiction, the New England countryside and farming communities of an earlier period. Jewett praised Cather's Jamesian fiction, but her own writing suggested to Cather that true art came only from a creative attempt to capture those things in an artist's life "that haunt him . . . in trying to get these conceptions down on paper exactly as they are to him and not in conventional poses supposed to reveal their character." It was a rich store of memories about Nebraska that haunted Cather, not drawing-room conversations about art. Slowly but increasingly she became aware of this fact; she needed only the force of direct experience to convince her of the worth of her own past.

After publishing *Alexander's Bridge* in 1912, Cather quit McClure's and journeyed to Winslow, Arizona, to visit her favorite brother, Douglas, a trainman for the Santa Fe. This visit proved the turning point in her career as a writer. In the open vistas of Arizona, in the spirit of the frontier that she still found there among Douglas' railroad friends, in the Mexican and Indian people she met and respected, and especially in the cliff dwellings, Cather found images that bespoke ideals far more elemental than anything she had encountered in contemporary European society and in the Jamesian turn of contemporary fiction. Her vacation became a pilgrimage to the past and awakened in her the desire to recapture both the spirit of the land she had known as a child and the spirit of the people who had settled there.

Cather did no writing on this trip, but she returned to Pittsburgh free of those influences that had bound her art. She began "a story about some Scandinavians and Bohemians who had been neighbors of ours when I lived on a ranch in Nebraska, when I was eight or nine years old." It was to be entirely for

exploit the land and its resources. She deplures people who merely take from the land with no moral commitment or attachment to it.

If there is one image in Cather's fiction that best captures this complex interaction, it is the orchard; bringing beneficial trees to a place that had been a desert of grass is both an arbitrary act of conquest and an act of creation. Both novels attest to the labor needed to carry water from the well in buckets to nourish the young trees, but the effort involved only underscores the importance of the endeavor: Alexandra's brothers, who farm only for profit and prosper only to become petty and rather vulgar caricatures, haven't the patience to plant an orchard of their own. If they want fruit they must visit Alexandra, whose singular ways unsettle them. Antonia, on the other hand, loves her trees "as if they were people," and has struggled through drought to keep them alive. She need "only . . . stand in the orchard . . . put her hand on a little crab tree and look up at the apples, to make you feel the goodness of planting and tending and harvesting at last."

In the later novels, the symbolic importance of the orchard is transferred to the garden. Professor St. George's ornamental bushes and flowers and Captain Forrester's roses attest to the importance, even in men ostensibly divorced from the soil, of some interaction with the land—these spots are oases of repose, careless places in which the spirit is restored.

Always in Cather's works there is the land, and if it is treated properly it is a source of well-being. But if the sole object of one's interaction with the land is material advancement, the implicit pact between pioneer and a yielding earth is broken, and the sanctity of the farmer's relationship with the soil is destroyed. The farm may continue to prosper, but like Alexandra's brothers, the farmer will seek to fill his spiritual void with objects, the trappings of success.

This erosion of the pioneer spirit is the cause for the lament implicit in the title *O Pioneers!* and a theme that would grow in Cather's later novels to become almost an obsession. As Alexandra and her brothers prosper, they begin to part ways spiritually and ideologically. Oscar and Lou had always been rather reluctant stewards of the prairie, and one is sure both would have failed miserably but for Alexandra's faith in the land and her strong management of the family holdings. Once successful, the three divide their property. Oscar and Lou, severed from even their tenuous link with the "Genius of the Divide," lose their individuality in an effort to blend in with the rest of American society—and in so doing they cease to be pioneers. At a family get-together all conversation must now be in English because Oscar's sons do not understand Swedish—his wife is embarrassed at having married a foreigner and won't have the language spoken in the house. Oscar himself "still has a thick accent, but Lou speaks like anybody from Iowa." Both men and their wives rush to purchase automobiles, bathtubs and hot-water heaters, any expression of prosperity that will belie their connection with the soil—with dirt. Alexandra herself succumbs enough to build a new house, but she does this as a monument to her father. She decorates the parlour with contemporary furniture, but in the rooms that are lived in daily, she still uses the furniture from the first house her father built on the prairie.

Cather despised the gadgetry of modern life—she lived until 1927 in a New York apartment that had gas lamps and no central

heating. "Machines," she wrote in *One of Ours* (1922), ". . . could not make pleasure, whatever else they could do. They could not make agreeable people, either." With appropriate technology she had no qualm, but she never became completely reconciled to the automobile and only grudgingly assented to the phonograph. As she got older, this estrangement from modern American life became more acute, and she reacted more generally to what she had begun to see even in *O Pioneers!*: the deadly sameness of American society and the cultural conformity that twentieth-century life demanded. For Cather, modern America's economic imperative—*increase!*—coupled with a society divorced from the elemental activities of life spelled the demise of an aesthetic vision of the world:

"Restlessness such as ours, success such as ours, do not make for beauty. Other things must come first; good cookery, cottages that are homes not playthings; gardens, repose. These are first rate things; and out of this first rate stuff art is made. It is possible that machinery has finished us as far as this is concerned. Nobody stays at home any more; nobody makes anything beautiful any more."

Cather wrote that "the world broke in two in 1922 or there about," and throughout her later work she proclaimed that this was because the old pioneers and their special courage had died. Only a few individuals among the second and third generations inherited the pioneer legacy, and they were exceptional people: Antonia Shimerda, Thea Kronberg, Tom Outland.

Cather's disenchantment with modern America arose from



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her perception of society's wholesale denial of the past. Second-generation Nebraskans sought to obliterate their heritage—they abandoned their languages, their customs and even their recipes. And to what end? To have "a big rich farm where there was plenty of stock and plenty of feed and a great deal of expensive farm machinery of the newest model, and no comfort whatever."

Those members of the new generation that retained the pioneer spirit maintained a strong link with their forebears. The past is embodied in Antonia—she is an elemental expression of the human spirit, the salt of the earth. Thea Kronberg's and Tom Outland's attachments to the past are a direct outgrowth of profoundly mystical experiences triggered by the remains of ancient Indian cultures in Panther Canyon and at Mesa Verde. The cliff dwellings and the pottery they contained—indeed the mode of life they bore silent witness to—revealed to Thea and Tom the continuity of human endeavor, and the obligation one has to strive to fulfill the desires for perfection of ages past.

Cather had learned very much the same thing during her visits to and then extended vacations in the Southwest. As she became increasingly aware of the paucity of pioneers in modern America, she recreated them from her memory or found them, as she had the Archbishop, in the frontier history of the New World. But if she found the best of her fiction in the past, Cather also came to dwell too completely there and to mourn too much the passing of the old ways. "The Old Beauty," one of her last stories, is a painfully shrill longing for the years before the Great War. One could cautiously call the story self-parody. But a

longing for the past, for what is perceived as an ordered world, is a theme that will appeal to many contemporary Americans who seek alternatives to growth and to new-fangledness in general. We have begun to feel that we have lost our center, and with Cather we have begun to see that "We come and go, but the land is always here. And the people who love it and understand it are the people who own it—for a little while."

Almost crudely, one can judge a Cather character by his or her relationship to the land—no matter if that character be a great singer or a missionary priest. But Cather's novels are not merely celebrations of the people who settled the prairies. They depict a type of imaginative heroism coupled with extraordinary endurance that ran through the whole pioneering race that had turned a vast wilderness into a great nation. What Cather wrote of Sarah Orne Jewett's work applies more appropriately to her own fiction:

"One might say that every fine story must leave in the mind of the sensitive reader an intangible residuum of pleasure; a cadence, a quality of voice that is exclusively the writer's own, individual, unique. A quality which one can remember without the volume at hand, can experience over and over in the mind but can never absolutely define. . . ."

By this measure, Cather wrote many fine stories indeed. One comes away from Cather's work haunted, as she herself was, with images from a rich and varied landscape. □

James Keough is director of communications for the Association of Western Hospitals and is editor of Hospital Forum.

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The Direct-Mail Appeal for Funds

PROBABLY most members agree with the idea that supplemental revenues are vital to sustain the Club's strength and growth. Some believe the best approach is a straight-out, no-nonsense, direct-mail appeal for money. Under certain conditions, that strategy has worked remarkably well. Often, however, it has seemed hardly worth the effort. This year the 4600-member Ohio Chapter exceeded its \$8000 goal by \$1729. The appeal by the Loma Prieta Chapter brought in about \$9000 in two months, plus another \$4500 from an anonymous donor who gave \$2 for every \$1 of the \$9000 earmarked to support the California coastal coordinator program. An astounding \$50,000 was contributed by the 3200 members of the North Star Chapter and other friendly Minnesotans in the latest of that chapter's fund appeals.

However, a number of chapters, probably a majority of them, have experienced some difficulties with their direct-mail appeals, which are conducted between February 15 and March 15 in order to avoid any conflict with other, national Club fundraising efforts. The San Diego Chapter found that fewer than 5% of its 4700 members contributed in its 1978 drive, which netted \$2600. The Redwood Chapter, too, reported discouraging results, only \$900 from its 2500 members.

What accounts for the great discrepancies in the results of direct fund appeals? Fund drives succeed, it would seem, if there are two elements present: a well-defined purpose for the money sought and an efficient, well-organized apparatus for collecting it. Appeals that are vague about uses of the money (merely stating "for conservation"), or that depend solely on coupons that must be clipped out of a newsletter generally do poorly. Dick Flint, the North Star Chapter's chair, tells how his chapter has been able to do so well. Several years ago the executive committee came to the conclusion that if the chapter was to do the job that had to be done on just the most urgent of Minnesota's environmental problems, substantial sums of money had to be generated. That meant that some major donors had to be found. The average member of the chapter (then about half its present size) had plenty of drive, talent and energy—but little money. Many were students. Some few dedicated members, however, did have substantial funds but little time to be activists. They were approached and were receptive. Then one agreed to match, dollar for dollar, all other contributions up to a limit of \$20,000. From that point on, the fund ap-



ROBERT A. IRWIN

peal took off and hasn't slowed down.

In essence, North Star's fund-raising method is simple, Flint insists, and should work as well or better in any other metropolitan area. While his chapter continues to encourage contributions from all of its members, it concentrates its efforts on donors of \$50 or more. Personal letters go out to such individuals pointing out such specific needs as, for example, the campaign to expand the Boundary Waters Canoe Area. Face-to-face visits are made by members of the fund-appeal committee. Foundations also are approached for grants. At this stage only educated estimates of funding needs are presented, not a finely tuned, detailed budget. Later, however, the donors do receive feedback on just what use was made of their money, with a detailed accounting of expenditures. Flint stresses the importance of giving such feedback to the donors, and also of impressing them with the tight rein that is held on expenses, which adds to the effectiveness of each dollar they give. One of the major economies is in legal fees, which usually are nominal or donated.

Of the \$50,000 received in the latest North Star appeal, \$31,000 was nontax-deductible, or "hard" money, and thus usable for lobbying. The other \$19,000—in "soft," or tax-deductible, money—was collected separately by a chapter foundation whose directors are appointed by the chapter's executive committee. The board is made up of well-known, substantial community leaders, most of whom are also Sierra Club members. Thus, they are in an advantageous position to tap new sources of funds, Flint points out. But the funds that are generated do not pile up and sit idly in a bank account. They are used. As a matter of fact, they are usually exhausted three quarters of the way through the year, according to Flint. As a result, the chapter goes into each of its fund appeals lean and hungry, and never sets too modest a goal!

For more details on how North Star does it, write to Richard R. Flint, 300 Roanoke Building, Minneapolis, MN 55402.

Fairs, Sales and Special Events

The one major drawback of most direct appeals is that member involvement ends with the mailing of a check. On the other hand, such successful money-raising events as the auctions of the Juneau Group or of the Columbia Group in Oregon have the added advantage of getting members and public alike involved, building morale, generating goodwill and increasing environmental awareness.

For years many chapters and groups have augmented their dues income by selling Sierra Club books, calendars, cups, pins and patches. More recently they have added items of their own such as T-shirts, trail guides, stationery and belt buckles. A wide range of other ways of raising money have been tried. They include:

- Hard-ticket, outdoor-oriented or environmental programs presented by such well-known figures as mountaineer Galen Rowell. Sellouts in large auditoriums have been quite profitable.
- Garage sales, flea markets, sales or swap marts for outdoor equipment, and raffles. Most of these net only modest amounts, but they are fun. The Ventana Chapter, however, reaped \$800 from its first Trail Sale last spring and will hold another this year.
- Competitive events with entrance fees such as cross-country runs, bicycle races, ski touring and white-water canoeing.
- Special ecology or natural history cruises or trips with fees that more than cover expenses. The proceeds are often earmarked for protection of a particular threatened area or species.

In all instances—even for the more-or-less routine sale of Club items—thorough planning and careful preparations well in advance are required. A key element in the preparation is publicity, for the members as well as for the general public. Ads, posters, handbills, special mailings, newsletter notices, news releases (with personal contacts if possible) to the local press, TV and radio—all will help boost attendance and income.

Sierra Fest '78

Last April 29 the San Francisco Bay Chapter took a bold new fund-raising step by staging its Sierra Fest '78. It melded many of the above money-raising techniques and especially underlined the importance of the three P's—planning, preparation and



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publicity. The Fest was a grand mixture of fun, environmental education, exhibition, theater, carnival, foot-races, auction and more. For a first-time effort, it also proved a grand success, netting more than \$4500.

The idea of holding a Sierra Fest was conceived in October 1977 as a rather modest Knapsack Section affair. By January other activity sections and three of the chapter's regional groups wanted in, and the idea expanded. The next month a location was found—63,000 square feet of floor space at Fort Mason in the Golden Gate National Recreational Area. Then absolute panic. How in the world to fill one and a half acres of floor space? By then, the Fest's coordinator, Olive Bavins, recalls, "All we had was a good entertainment program (all volunteer) and a good slide and film program."

With a little luck and some fast footwork by Bavins and the other five members of her committee, everything somehow all came together. A food-and-drink concessionaire agreed to participate—for 15% of the gross take; a pretzel man with carnival wagon and a balloon man were found—all adding a festive flavor to the event. Exhibitors started signing up, \$50 for commercial and \$25 for craft booths. About 2000 attended, the adults paying a \$1 entrance fee. Decorations were begged or borrowed—festive balloons from the balloon man, 200 colorful national shipping flags, potted trees and park benches, and 150 free yellow chrysanthemum plants (later sold for \$98). Raffle tickets peddled in advance covered 35% of the expenses—not the 100% that had been hoped for. There weren't enough volunteer salesmen, Bavins explains.

The auction, conducted by Maynard Munger, a former Sierra Club director, proved to be the Fest's most successful source of income. As did the Juneau auction, it offered such items as a two-day river trip down the Stanislaus for two, kayak Eskimo-roll lessons, and tents and other outdoor gear donated by more than a dozen dealers and manufacturers.

The all-day Sierra Fest enjoyed extensive press and television coverage. A baker's dozen of ecology and environmental organizations cooperated. And chapter members had a good time raising money in a most painless way. Olive Bavins and her fellow committee members—Paul Tamm, Joan Sextro, Dick Macdougall, Sy Gelman and Ken Maas—are prepared to answer questions and offer suggestions to any other chapters or groups considering their own Sierra Fest. Send inquiries to Olive Bavins, 3781 16th Street, San Francisco, CA 94114. □

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| <input type="checkbox"/> Contributing | 100.00 |
| <input type="checkbox"/> Life (per person) | 750.00 |

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
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Sierra Club Annual Election

EACH YEAR, the annual election of the Club is held on the second Saturday of April as prescribed by the bylaws. On April 14, 1979, five directors will be elected, and several bylaw amendments will be voted on.

A ballot, information brochure and return envelope (not postpaid) will be mailed by March 2 to each eligible member. Packets for members living within the contiguous 48 states will be sent by third-class mail; for members living in Alaska, Hawaii, Canada and Mexico, packets will be sent first-class. Packets will be sent airmail to members overseas. With the exception of junior members (under 15 years), all those listed in the Club records as members in good standing as of January 31 (about 177,000) will be eligible to vote.

The eight candidates for directors selected by the Nominating Committee are, in alphabetical order: Ann Duff, William Futrell, Robert Howard, Tony Look, Roger Pryor, Leslie V. Reid, Ted Trzyna and Ellen Winchester.

The information brochure will contain a statement from each candidate regarding pertinent background and his or her views as to the direction the Club should take, together with a picture. The brochure will also contain the text and arguments regarding the proposed amendments to the Club bylaws.

If you do not receive a ballot by mid-March, or if you mismark it, write a note of explanation to: Chairman, Judges of Election, Sierra Club, Department E, 530 Bush Street, San Francisco, CA 94108. Enclose the voided or mutilated ballot if you have it. If addressed any other way, attention to your letter will be delayed. After appropriate checking, an effort will be made to send you a replacement ballot in time for it to be returned by the date of the election. This procedure is under the control of the Judges of Election. Ballots are to be mailed back to the Elections Committee, Sierra Club, P.O. Box 2178, Oakland, CA 94621. They will not be opened until the time for counting.

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*How Massachusetts Is Attacking a
Growing Land-Use Problem*

Preserving Agricultural Land

WILLIAM G. SCHELLER

William G. Scheller is a free-lance writer on travel and conservation. He is a former editor of the New England Sierran.

LIKE OTHER STATES in which city populations have spread to areas of lower density, Massachusetts has sacrificed much of its farmland to suburban sprawl. Small farmers have often found themselves faced with a sad but simple choice: continue coping with the economic difficulties of modern agriculture, or sell their land at the inflated prices offered by developers.

As fields went fallow to await subdivision, Massachusetts' dependence upon food imported from out of state increased to 85%, and beautiful open landscapes receded farther from populated areas. It has been hard to argue with the farmers' economic logic—but new state legislation, currently being tested in a pilot program, may remove the temptation to sell without taking away the financial sweetener.

The idea is simple: A farmer's acreage has a certain value as farmland, and another—often higher—monetary value as a development property. By paying the owner a sum equivalent to the difference between these two established values, the state effectively purchases development rights to the land. The farmer has been compensated, without the necessity of sacrificing arable fields.

The idea of state acquisition of development rights—referred to in the Massachusetts legislation as Agricultural Preservation Rights, or APRs—is not entirely new. Both Suffolk County, on New York's Long Island, and the state of New Jersey have recently initiated similar experiments. But Massachusetts' is the only such project that will be tested statewide.

According to one of the act's sponsors, State Senator Robert D. Wetmore, Massachusetts citizens polled through their Growth Policy Committees have expressed interest in the preservation of farmlands. Nevertheless, conservationists' lobbying was crucial to the bill's passage; as Wetmore put it, "there's always opposition when state money is involved." Contributions from municipal coffers, however, will help cover the

cost of APR purchases in areas where development pressures have driven land values inordinately high.

As envisioned, the program will be entirely voluntary. A landholder wishing to sell APRs must submit an application through a municipal conservation commission. The Agricultural Lands Preservation Committee established by the act will then make its decision after considering such factors as soil classification, the farm's contribution to the state's economy and the ultimate agricultural benefit of the APR purchase to the state. After the rights are purchased, the land remains under private control, its owner retaining all prerogatives except the right to develop for more intensive purposes or to destroy the agricultural potential of the land. The restrictions remain with the land, which may be subsequently bought, sold or inherited at its restricted value.

Five million dollars have been appropriated for the pilot program. Regulations to govern the disbursement of these funds will be adopted by the end of this year.

Warren Colby is the assistant to the Commissioner of Food and Agriculture in charge of getting the project started. "We've got to advise farmers on possible changes in their capital gains and estate tax responsibilities," he points out, "and we have professional appraisers looking into the problem of determining the value of the restrictions. Appraisals and negotiations for our first acquisitions will probably begin in the fall. In any event, it's doubtful that more than 20 or 30 parcels will be involved; \$5 million won't go very far."

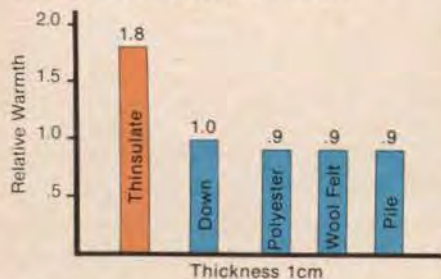
Despite the limitations imposed by the pilot funding, both Colby and Wetmore feel that the state stands to learn a good deal from the experiment. "We'll be watching to see if the program makes sense, if people can use it properly," Wetmore remarks hopefully, "and ultimately to see if the state acquires preservation rights to the right lands." Assuming all goes well, Colby looks ahead to the project's ultimate benefits: "The nice part of preserving farmland is that it's not only open country that's pleasing to look at, but you can eat off it as well. Meanwhile, you're circulating jobs and money locally." □

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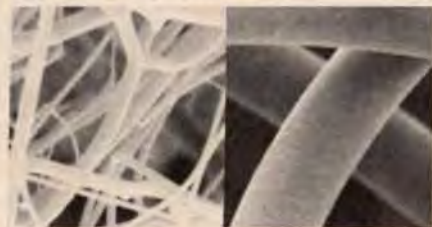
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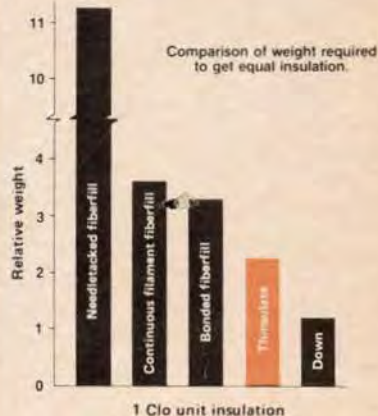
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