

SIERRA

THE SIERRA CLUB BULLETIN

MAY/JUNE 1981

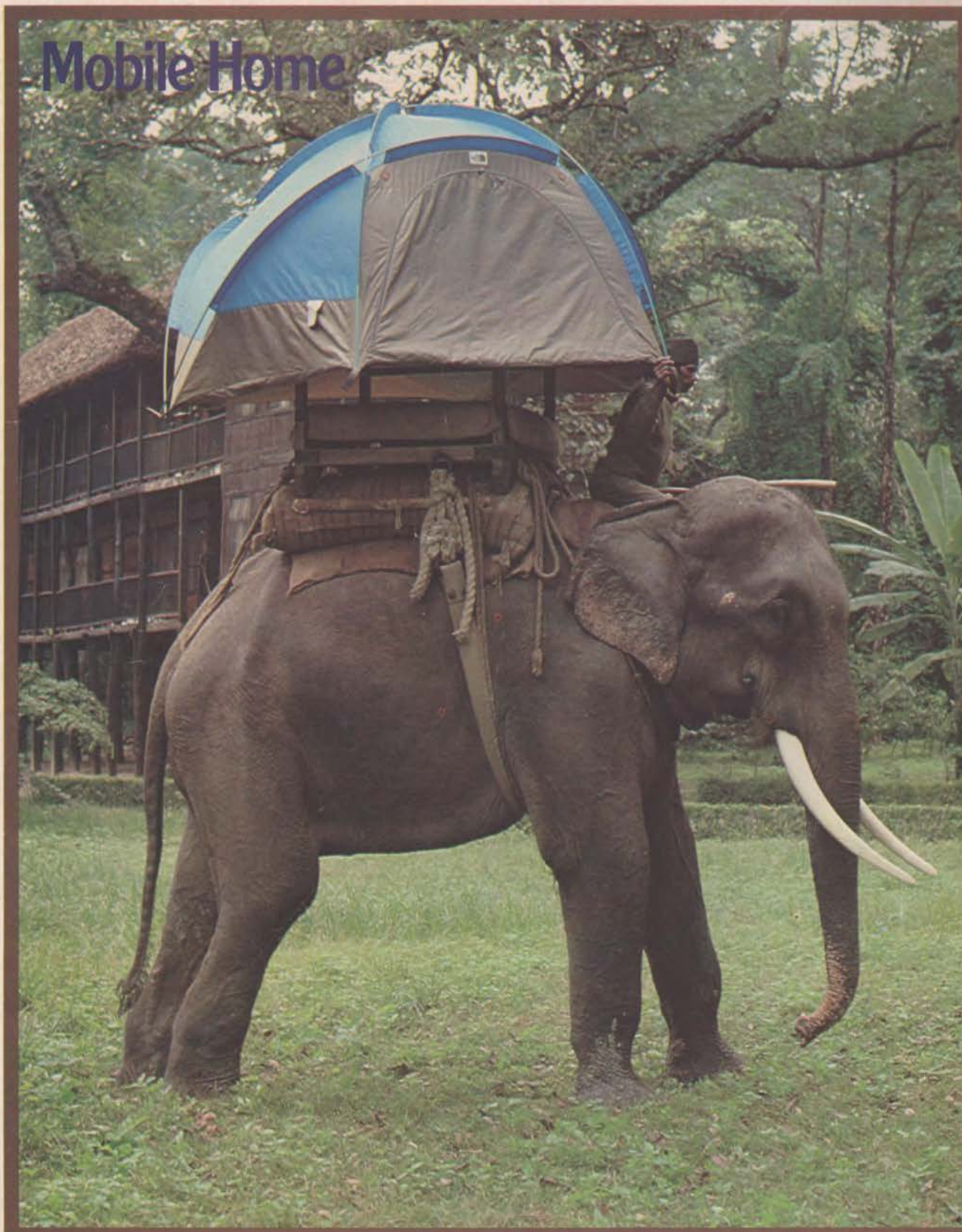
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Clean Air '81

"Dump Watt" Petition

See Page 82

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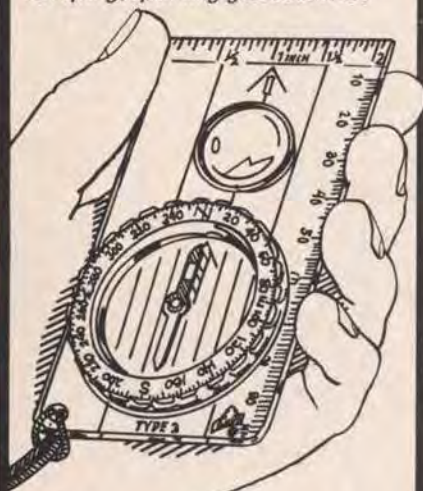
Cover: The clean look of sunrise from Haleakala summit, Haleakala National Park, Maui, Hawaii. The issue of clean air will become more visible this year. Photograph by Ed Cooper.

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Desecration of the Sinai

I just finished the article about the Sinai Desert in *Sierra's* November/December 1980 issue. I was very excited; I was one of the Israelis who left the field study center, where I spent two and a half years, because of politics.

All the historical details about the Sinai in your article are correct. All the details concerning Egypt are also correct; there is no doubt about that. But if you think that the president, the government with Dr. Hassan Hafez as the minister in charge of nature preservation, and the people of Egypt realize how important it is to preserve nature—specifically in the Sinai desert—then how come these people can allow that Belgian maniac who calls himself an artist to wander around the beautiful Naffach Valley, in the heart of the high, red granite mountains, and spread blue and black paint all over?

Thousands of gallons of water- and sun-proof blue and black paint are being spread on the magnificent natural granite to "decorate" the desert. What took nature thousands of years to create is being desecrated overnight! The way I see it, the Egyptian authorities are as guilty as this "artist" because they let him do it and even supported him.

Every organization like the Sierra Club should fight these kinds of man-made disasters. The Sinai desert is one of the last wilderness areas we have left, and the red granite high mountain region is special. Don't let it be destroyed. Please.

Isaac Tzarfat
Davis, California

Learning from "China's Sorrow"

Our new Secretary of the Interior might study the lessons learned in China more than 4000 years ago before he pursues his schemes for new sources of national revenue. The Yellow River, in some ways similar to our Mississippi, used to be bordered by great forests. People lived without taking more than the earth could give.

Then Emperor Shun came to power and decided to cultivate the banks on either side

of the 2500-mile river. Long stretches of forest were turned into ashes. For a while there was rejoicing over the land being plowed and seeded, because the land, rich in humus, grew crops more plentifully than expected. Emperor Shun's name entered into thankful prayers.

Eventually the topsoil washed into the river. Dust storms in summer and floods in spring turned the river valley into a vast wasteland. No longer restrained by forests, the river's waters became an enemy of the people, who grew poorer each year.

Two thousand years passed in this impoverished land until Emperor Chin appeared. He attempted to correct the vast error. "He who fails to plant a tree," his order read, "shall go coffinless to the grave." Unfortunately, this order was blocked by feudal lords who earned vast sums from the forests higher in the valley. Many people went to their graves without coffins; the land was not reforested. The Yellow River is still known as "China's Sorrow."

Mr. Secretary, we cannot afford to place the gross national product above all other considerations. We can, in one poor administration, destroy the collective inheritance granted this nation. Stripmining in Colorado, a parking garage at Lake Tahoe with a greater capacity than the one at San Francisco International Airport, throttling the wild rivers, drilling for oil near the few remaining coastal refuges may produce revenues in the short run but will leave us with a thousand American sorrows.

Michael A. Weiner
San Francisco, California

Bicycle Touring

Congratulations on "Bicycle Touring" by Raymond Bridge in the March/April *Sierra*. As an enthusiastic, experienced cyclotourist and a Sierra Club member, I am pleased you're at last promoting a travel method that is nearly environmentally respectable. (Sometimes the backpacker, nordicskier or rafter must travel in a car for hundreds of miles before the self-powered or non-fossil-fuel part of the trip begins.)

Despite the valuable information in Bridge's article, however, I believe more emphasis could have been given to cycling safety. A light multispeed derailleur bicycle can be difficult to keep upright, when it's loaded heavily or when a road surface is unexpectedly covered with mud, gravel or debris. Threading a way through a strange city on a loaded touring bike, especially at rush hour, can also present problems. Therefore I offer the following suggestions:

"MOSQUITO BITES" WHY SUFFER THEM?



THE PROBLEM



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I am extremely sensitive to mosquito bites, but since taking E-Z I am happy to report that I have not been bitten once, even though I have been repeatedly exposed. **G.M., Long Beach, Ca.** My son and I have had trouble all our lives with mosquito bites. Drs. couldn't help. Now that we take E-Z we are able to go outside and not be afraid. God Bless your firm. **Mrs. E.M., Calumet City, Ill.**

Your pills have made it possible for me to be outdoors without worries. **S.B., Stanton, Ca.**

I've talked to 6 campers today, and they all say your E-Z pills really work; not a single bite! **H.A.H., Garden Grove, Ca.** Used E-Z. I am impressed with the results. You've made a great break-thru for the outdoors person! **D.S.A., Belmont, Mich.**

These pills work so well. I have to give your address to everyone that tries them! **C.W.S., San Antonio, Texas**

E-Z has saved our lives! This is the first summer that we have been free of mosquito bites. If you want proof that E-Z works, we are prime examples! **Mrs. R.S.S., Abilene, Texas**

While others swabbed themselves with fly dope, smelling and feeling icky, we took two tablets and suffered much less than our companions. **B.R.P., Bedford, Ma.**

□ **ALL OF US KNOW...** the complete discomfort and apparent helplessness we have when confronted by swarms of mosquitoes every time we try to enjoy the outdoors. Even though its only the female mosquito who attacks you (to secure your blood to use for producing eggs and hordes of more mosquitoes) your defense against them is very limited unless you protect yourself.

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- Novice cyclists should learn to ride safely and defensively from much more experienced riders. As Bridge suggests, one approach would be to join a nearby bicycle club. Alternatively, one can enroll in one of the many courses in effective cycling offered by the League of American Wheelmen. The courses are held several times a year throughout the country.

- One should *always* wear a "hard hat" helmet designed for cycling, whether touring, commuting or running short errands. Numerous statistical studies show that head injuries sustained in cycling accidents are remarkably lethal—in fact, about 80% of bicycle fatalities are the direct result of the rider's head striking the pavement or some other hard object. Fortunately, well-designed helmets can be extremely effective in reducing cycling fatalities and serious injuries.

Despite my mild objections, thanks for a generally excellent article. Finally, thanks too for *Sierra's* photographic tribute implicit on the March/April cover to an arch-conservationist and a brilliantly effective environmental activist, Bernard DeVoto. Everyone should have a hero to try to emulate; "Bernie" was one of mine.

Daniel F. O'Connell
Palo Alto, California

Which Way Is Down?

I wish to comment on the article on page 120 in the January/February *Sierra* in which down was found to be up. I was quite surprised, since I had formed the opinion, from those who had occasion to get wet, that down was out. This in itself had been hard to fathom, since originally when I started out into the outdoor world, down was in. Now I don't know at all.

Joseph Mack
Capitola, California

The Editor replies:

Down is both up and in, except on wet occasions, when down is flat. Does that clear up the confusion?

Delaware Valley Toxics Coalition

In the March/April issue, "The Observer," which traced the Club's role in issues related to toxic substances, was impressive. As a long-time Club member, I was proud of the broad efforts spanning two decades.

In Pennsylvania, we have also been involved in the issue. Members of the Eastern Pennsylvania Group have been active in the Delaware Valley Toxics Coalition. This is a

coalition of environmental, community and labor organizations. Recently it won passage of citywide legislation that makes Philadelphia the first community in the country where community residents and workers have a right to know the names of toxic substances handled by local industry. The "Right to Know" law was backed by more than 40 organizations, including the Sierra Club. As a result of the legislation's passage, the coalition has received inquiries from government officials and citizens' groups across the country interested in protecting their communities' health.

Considering the current federal moves toward deregulation, there is a critical need for strong local legislation. Although the "Right to Know" law isn't a solution, it is a healthy step in the right direction.

Miriam Moss, President
Delaware Valley Toxics Coalition
Philadelphia, Pennsylvania

Poisonous Triggerfish

In reading the March/April issue, I find on page 30 a picture of a triggerfish and the mention that "some species are poisonous to humans." I recently returned from a trip to the Sea of Cortez, where we virtually lived on triggerfish. We found they had a delicious, firm meat, very much like chicken. I am curious if you could tell us if there are any publications available that enable one to tell which are poisonous and which are delicious to eat.

Nick Coates
Aspen, Colorado

The Editor replies:

Delicious or otherwise, some species of the triggerfish (which all belong to the genus *Balistidae*) carry ciguatera, a poison that is not water soluble or responsive to high temperature; it can't be cooked to harmlessness. Symptoms of poisoning vary greatly but often involve respiratory failure, and the mortality rate may be as high as 12%. The poison occurs mostly in fish in tropical areas and is associated with particular species, including most triggerfish, although a species may be toxic in one narrow area and nontoxic in an adjacent area. There's no easy way to distinguish which species is toxic. The most authoritative publication, according to Ed Miller, staff biologist at the Steinhart Aquarium in San Francisco, is the three-volume *Poisonous and Venomous Marine Animals* by Bruce W. Halstead, M.D., published in 1970 by the U.S. Government Printing Office. Maybe a nearby university library would have a set. □

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For more information, contact Leslie Fox, The Sierra Club Foundation, 530 Bush Street, San Francisco, California 94108, (415) 981-8634.

Editorial

When It Comes to Membership, Bigger Is Better



THE EARLY MONTHS of the Reagan Administration have certainly aroused the conservation community—the headlines almost every day declare new threats to environmental safeguards and wilderness protection.

Gone are the rather polite, gentle negotiations over environmental issues that characterized the Carter years. Instead, conservationists are encountering what appears to be a distinct, even deliberate hostility in the administration's actions: appointments of patently unqualified people to key federal environmental posts; short-sighted cuts in programs vital to environmental protection and especially those intended to benefit urban dwellers; increased

federal subsidies for nuclear power, and business as usual for unnecessary water projects.

But the news isn't all bad, especially around the Sierra Club. There is a new enthusiasm, a new surge of commitment and active interest among conservationists. Volunteers and staff are working even more closely together as the urgency of the situation reveals itself. Conservation groups are cooperating more actively than ever—and reaching out to form broader coalitions, too.

The Sierra Club's history is built on meeting challenges that at the outset seem greater than our means. Conservation victories have never been easy or cheap, but still we prevail against great odds. The strength and effectiveness of the Club's programs, on both the grassroots and the national lobbying levels, are the result of an active and involved membership.

And our membership is growing; in March we passed the mark of 200,000 members in the first major spurt of growth in several years, as more and more people realize that the environmental achievements of the past decade are in danger. The Sierra Club is returning to the source of its strength for renewal—and for results. That source is the grassroots, Sierra Club members.

"I'd better do something," seems to be an increasingly common notion among the thoughtful. Many people are realizing that protecting the environment *is not a radical action* to take—it *is a necessary one* if we are to use wisely our fragile and finite resources. We'd like to encourage that perception.

Now is the time to help the Sierra Club in one of the easiest, most natural ways possible—asking your friends to join us in our conservation efforts. The benefits are obvious: the greater the number of Sierra Club members, the more potent our defense of the environment.

We've found a new way to increase our membership, one that draws on our grassroots strength. It's a membership contest that involves everyone, and from which everyone can benefit: chapters will raise more money for local efforts, individual members have a chance at Sierra Club prizes and, most important, the conservation cause will benefit through the added strength of new Club members. Details of the contest can be found on page 21. We can all be winners if you'll take part.

As the need grows for a stronger Sierra Club, our membership size must also grow. When it comes to membership, bigger *is* better.

Joe Fontaine

ASIA & THE PACIFIC

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TO PROTECT the public's health, Congress passed the Clean Air Act in 1970, creating a ten-year timetable for cleaning up the nation's air. But in 1977 Congress reassessed the act and pushed ahead various emission standard deadlines to 1982, and to 1987 and beyond for some automobile-related pollution.

Despite the postponements, there has been progress. In a 1980 report to the President, the Council on Environmental Quality (CEQ) reported that "Overall, the nation's air quality is improving"; between 1974 and 1977, violations of air quality standards either remained constant or decreased. From the CEQ's point of view, even standing still is a victory, since the population and industrial base are expanding.

But the air is still seriously polluted in many areas across the United States and threatens to become even more so in new and dangerous ways. Each year our power plants pump 25 million tons of sulfur dioxide into the atmosphere, where much of it changes to sulfuric acid and returns to earth as acid rain, sterilizing lands and rivers and damaging crops, trees and property. The quality of air in most U.S. cities is poor enough to be considered unhealthy. Los Angeles averages 264 "unhealthy" days a year, of which 132 are "very unhealthy." Until 1979, when the Environmental Protection Agency (EPA), under White House pressure, relaxed the nation's photochemical oxidant (smog) standard by 50%, only two cities—Spokane and Honolulu—qualified as having clean air. The weaker standard immediately bestowed "clean air" on twenty additional cities.

Each year more highly toxic chemicals are produced and used; some find their way into the atmosphere. The EPA has barely begun to deal with the problem of airborne toxic wastes.

Still, according to the CEQ, the Clean Air Act saved 14,000 lives in 1978. But even more important, it has been estimated that 140,000 deaths a year in the U.S. can be attributed, directly or indirectly, to air pollution. Studies have estimated that the cost of pollution-related health problems in New York City and Chicago alone is \$43 million, and that the nation's laundry bill for soiling due to air pollution is \$11 billion.

What damages crops and forests, blackens and corrodes buildings and makes people ill is chiefly the residue of the fuels we burn. The Clean Air Act established standards for these common pollutants. They fall into several categories:

Smog is a mixture of hydrocarbons, carbon monoxide and nitrogen oxides, which combine in the atmosphere and, exposed to sunlight, form photochemical oxidants, the

A Clean Air Primer

I. Introduction

STAFF REPORT

scientific term for smog. These gases are emitted primarily by trucks, automobiles, refineries and petrochemical facilities. Smog causes coughing, wheezing and shortness of breath. There's also evidence that it decreases the lung's resistance to infection; recent studies have linked smog to premature aging and cancer in laboratory animals. In combination with sulfur oxides, the effects of smog may be heightened.

Sulfur dioxide is primarily a by-product of coal burning, and most of it is emitted by power plants and smelters. Alone, it is known to increase difficulty in breathing, and, in combination with particulates, it interferes with the body's defense mechanisms.

Particulates are tiny particles of various chemicals in either solid or liquid form. The most dangerous and hardest to control are fine particulates one to two microns in diameter (a human hair is about 100 microns thick). They're small enough to be inhaled deeply into the lungs, where they may remain for weeks or even years. Fine particulates are often toxic, and even when they aren't, they can serve as carriers of other pollutants and can impede the clearance of other inhaled material from the lungs. A recent study has shown that mutagenic (and probably carcinogenic) substances produced by coal-burning power plants are not caught by pollution control devices; they attach themselves to fine particulates that also escape into the atmosphere. Fine particulates can cause asthma, chronic bronchitis, emphysema and cancer. About 20% of the nation is polluted with particulates in excess of federal standards.

Toxic pollutants may number as many as 20,000, according to the EPA. Although the Clean Air Act provides the legal framework for reducing the emissions of highly toxic substances into the air, the EPA has been slow to act on these dangerous pollutants. Of that potential 20,000, only seven are currently included in the National Emission Standards for Hazardous Air Pollution.

One could hope that the health and environmental hazards of air pollution would speak for themselves when the Clean Air Act comes before Congress this year. But the legislation will be reviewed by people who may be willing to grasp at straws because of their concern with the national economy, and this situation may give industry a chance to cry about the costs of cleaning up its act. The old, discredited economic arguments against pollution control will be resurrected: that it contributes significantly to inflation, causes unemployment, diverts investment capital from more productive uses and forces many plants to close. The facts refute all these arguments.

The CEQ has taken a detailed look at the effects of the Clean Air Act on inflation and found that, for the period from 1970 to 1986, the Consumer Price Index would, on the average, be only 0.3% higher each year than it would be without air pollution abatement. Moreover, the CEQ found that the inflationary impact was greatest in the early years, and that for 1978 to 1986 the contribution to inflation would be only 0.1% to 0.2%.

The study also looked at unemployment and found that, during the period of analysis, the unemployment rate was actually lower with pollution control expenditures than it would have been without them. The decrease ranges from 0.1% to 0.4% between 1970 and 1986.

In terms of cost efficiency, air pollution control actually saves money. A 1978 CEQ report has estimated that the savings in health care and other air pollution damage amounted to \$21.4 billion. But the cost of meeting clean air standards was only \$16.6 billion. In other words, the nation profited by \$4.8 billion.

The EPA collects data on the number of jobs lost to industries and utilities because of environmental regulations. Since 1971, 136 firms have been listed as threatened with closure because of the cost of meeting clean air regulations. In 1980 only 26 firms were so listed and, of the 111 removed from the list,

only 21 reported they closed for environmental reasons. Of these, in some instances there might have been other contributing factors. At least one company, Ketchikan Pulp Co. in Alaska, is known to have played environmental blackmail, alleging it would have to close if forced to clean up its operations. In the end, after pressure from community and union officials, the company managed to make the mandated changes and is in operation today.

Other companies can do as well. One industry that appears due for rapid expansion is the coal industry. The world market for coal is expected to double or triple by the year 2000, and we can expect the coal industry this year to argue that clean air regulations will hinder its expansion. But the Electric Power Research Institute, an arm of the utility industry, reports in its *Journal* that "The amount of capital needed to triple the production and use of coal and greatly expand world coal trade is well within the capacity of the world's capital markets. . . . For the most part, the technology is available to comply with the most stringent of the current environmental standards in each country at costs that leave coal competitive with oil at mid-1970 prices." The U.S., it might be added, does not have the most stringent national regulations.

The battle lines are being drawn: our country's biggest industries are on one side, backed by incredible financial resources, and on the other side . . . well, that side could include just about anyone who breathes and who cares what's in the air.

Industries' financial power is not to be underestimated. "Where . . . public interest groups rely on the size of their memberships—individual citizens casting their votes, which is what a democracy is supposed to be about—political action committees [PACs] rely on money," says EPA's former administrator Douglas Costle, referring to private industry's growing use of these committees. "What they cannot hope to gain at the ballot box, they plan to obtain through the judicious use of their checkbooks."

For a congressman, he asks, "What could be easier, and safer, than giving a sympathetic ear to an executive who helped elect you and wants to change a law that not one citizen in 100,000 would willingly read? Unless enough voters are alerted," he concludes, "I am afraid that the necessary, desirable process of improving the Clean Air Act will be subverted by special interests."

Joe Fontaine, president of the Sierra Club, puts it simply: "Here's a law that the conservation movement put on the books, and now industry's going after it. It's up to us to stop them."



Gordon Anderson

Tall stacks help disperse emissions, lessening local pollution but creating problems downwind. The Navajo Generating Station (above), in Arizona, does not control its sulfur emissions, which turn into sulfates and other particulates that pollute national parks to the east—Canyon de Chelly, Mesa Verde and others.

"The Sierra Club's role will be its grassroots efforts and lobbying in coordination with the Clean Air Coalition. Our focus needs to be on influencing members of Congress. Influence comes in many ways, and one doesn't necessarily need to understand the details of the Clean Air Act in order to be

effective. We have a great variety of jobs for people to do."

"Make no mistake," said House Interior Committee Chairman Morris Udall after the recent national election, "the days ahead will see major changes in how environmental issues will be debated and decided. But I want to urge my conservation friends all across the country to a renewal of activism, organizing and political involvement. Determination, spirit, and positive activism will be essential in maintaining our past achievements and in the new progress I am confident we will make." □

FOR ALL PRACTICAL PURPOSES, federal protection of the nation's air quality will expire on September 30, 1981, unless Congress acts to reauthorize the Clean Air Act. Industries doing the heaviest polluting have already begun a campaign to convince members of Congress to gut the act, proposing to dismantle the carefully crafted system that is cleaning up areas of dirty air, protecting clean areas from further degradation, and saving lives. These industries, including public utilities, oil companies, mining companies and auto manufacturers, are claiming that they only want to make minor adjustments in the act—they call it "fine tuning." But the changes they recommend would constitute a major retreat from our nation's commitment to clean, healthy air.

Industrial lobbyists have been planning their anti-Clean Air Act campaign for more than a year; but people working to protect and strengthen the act have been making plans, too. The kickoff of the fight came when the House and Senate began hearings to review the reports and to discuss the whole issue.

The Clean Air Act is the cornerstone of our national air-pollution control program. Since its passage ten years ago, it has been responsible for dramatic reductions in several major pollutants, including particulates, sulfur oxides and carbon monoxide. But many areas of the country have yet to attain healthy air quality, and there are a host of air-pollution problems that the current programs hardly acknowledge. The act *must* be renewed.

Congressional reconsideration will provide an opportunity for progress on many fronts that have largely been ignored. For example:

- The smallest particles in the air (those less than 1/10,000 of an inch in diameter) are the most dangerous to human health. They cause serious damage to health, the environment, visibility and man-made materials. Despite growing scientific recognition of their harmfulness, the EPA has thus far been able to take no action. Air-quality standards for fine particulates are needed to supplement existing standards for total suspended particulates and sulfur oxides. *Congress must direct the EPA to set standards for fine particulates and to establish a specific timetable for action.*
- Of the dozens of cancer-causing chemicals that are commonly found in urban air, the EPA regulates only four hazardous pollutants. *Congress should protect public health by putting the EPA on a speedy schedule for regulating more hazardous air pollutants.*
- Acid precipitation is increasing in the United States and Canada, killing fish in

Clean Air II. The Politics

STAFF REPORT

hundreds of lakes and streams and threatening forests, crops, historic buildings and public health (see "Acid Rain," *Sierra*, May/June 1980). The EPA recently set standards for acid-forming pollutants from new power plants, but most existing power plants are older and are still poorly controlled or not controlled at all. *Congress can substantially reduce emissions of acid-forming pollutants by requiring pollution control for power plants existing before 1970.*

• The biggest and dirtiest sources of air pollution still defy clean-air requirements after a decade of lax enforcement by federal, state and local governments. *Congress should authorize more resources for vigorous enforcement of the Clean Air Act.*

Attacks on the most important clean-air programs are often disguised as attempts to reduce red tape. Improvements in the regulatory process are desirable, but changes in the law must not impair the goals of the clean-air effort.

At the heart of the Clean Air Act are the air-quality standards set for major pollutants. Some industries argue that these standards should be weakened because of the costs involved in achieving them. But we

must not abandon our goal of protecting public health. The act already takes costs into account in determining how each plant must clean up, and Congress considered costs in setting the deadlines for attaining the standards. But the standards themselves must not be weakened. They are based on scientific health evidence aimed at protecting human lives.

Where the air is dirtier than the standards allow, states are required to have cleanup programs. A central provision of the programs is to plan so that growth reduces rather than increases pollution. Industries starting up in such areas and unavoidably emitting some pollutants must see that an existing source reduces its pollution by more than the amount the new source will create (this is an "offset"). In this way, total emissions in the area will decrease. Many industries argue that such offsets are difficult to find and that the requirement should be abandoned. But the offset program is a necessary compromise between health needs and industrial expansion—one that brings about steady progress toward cleaning our air. The point of this policy—crucially important given today's political temper—is that economic growth can occur without sacrificing public health. An offset need not be a trade-off.

The largest proportion of the nation has air free of significant pollution. The program for preventing significant deterioration (PSD) keeps clean air from being degraded to the levels found in our major cities and industrial areas. Without the PSD program, there would be no protection for the air quality of national parks, wilderness areas and other clean-air areas. The PSD program also serves other important functions: it prevents economic dislocation by reducing the temptation for industries to move away from developed areas to avoid pollution-control requirements; it protects public health against as-yet-undetected harmful effects of air pollution; it provides a mechanism for thoughtful planning of emission increases in clean-air areas; it protects such important values as visibility; and it helps clean up dirty areas by reducing pollution from upwind sources. □



Public Opinion and Environmental Protection

KATHRYN UTRUP

THE 1980 ELECTION RESULTS were a clear mandate that the American public is ready to slay the dragons of taxes, inflation and unnecessary government spending. But **caution!** Opinion polls find that the public won't have these problems solved at the expense of environmental protection.

In 1979 a Louis Harris poll found that 69% of the respondents favored cutbacks in federal spending. In the same poll, the public was asked to respond to this tradeoff question: "Would you oppose a major cutback in federal government spending if it meant cutting back on spending for environmental protection?" A majority of 57% said they would oppose such a cutback.

In 1978, Resources for the Future (RFF) in Washington, D.C., conducted the first national environmental survey of public opinion to assess trends in public attitudes toward environmental protection. In 1980, the President's Council on Environmental Quality (CEQ) and several other agencies decided to follow up the RFF survey with another to understand trends in environmental opinion for the decade of the 1970s. RFF designed and analyzed that survey as well. Final results show that the public still supports environmental quality and that "we are a nation which is willing to pay the price for environmental quality."

Since the mid-1960s, "environmental protection" has mainly come to mean, to the American public, controlling air pollution, water pollution and the dispersal of toxic chemicals. Over the years the public has consistently expressed concern about these issues and endorsed pollution control programs. All of these problems were addressed by legislation during the environmental decade of the 1970s. The groundswell of public sentiment aided the passage of the 1970 Clean Air Act in particular. Later, in 1977, this act was amended, and now, in 1981, Congress faces decisions on reauthorizing the act.

In doing so, Congress will definitely have to take into account the climate of public opinion and should seriously consider some of the following data:

Three out of four Americans polled in the 1980 RFF/CEQ survey are still concerned about reducing air pollution and continue to feel it is a problem. Half of the respondents felt air pollution was a serious problem in their own communities. People who lived in cities of 250,000 or more and in the suburbs of these cities, as well as people aged 18 to 34, were significantly more concerned about air pollution than other sectors of the public.

As we look back over the decade, however, air pollution is no longer considered the crisis it was in the early 1970s. When ranked with other major domestic problems, air pollution held a position of precedence in 1970. In 1980, the cost of living and the national energy supply ranked first and second, respectively, and air pollution fell to eighth place in a field of ten.

This decline is best understood if one considers the progress

made in solving air pollution problems over the past decade. In the 1978 RFF poll, 72% of the respondents thought "some" or "a great deal" of progress had been made in reducing air and water pollution throughout the country.

The CEQ also notes that the public correctly senses the progress made in air pollution control. Between 1971 and 1978, federal environmental expenditures for pollution control (both air and water) increased about fivefold. In 1978 federal air-pollution program expenditures totaled \$16.6 billion, with \$7.6 billion devoted to control of mobile-source air pollution (cars, trucks, buses, etc.). Overall, national air quality has improved.

However, the public still needs to be enlightened regarding the major source of air pollution. Only 45% were aware that autos are the major source of air pollution; 46% incorrectly thought that industries and incinerators were the major source, and 9% didn't know at all.

The question of a tradeoff between air pollution and new industrial growth was posed in the 1979 Harris polls. The majority of the public (59%) generally favored new industrial growth in their communities when no pollution conditions were assumed. When the new industry "makes the air a little dirtier," however, public support fell to 49%, and when it "makes the air a lot dirtier," only 15% favored new industrial growth in their communities; 80% opposed it.

So, will the public consent to the environmental protection tradeoffs when faced with cost considerations? The answer in 1980 was still no! The public is still reluctant to weaken environmental control programs. Response to the following questions will illustrate this point. In 1979, Harris asked this strongly worded question: "Would you enforce the toughest environmental standards possible even if they increased the cost of things to both business and the consumer?" or "Would you be satisfied with somewhat lower standards if this turns out to be less costly?" Forty-five percent favored enforcing the toughest environmental standards even at the increased cost, while 36% chose the lower standards at less cost. Twelve percent responded in a middle ground, saying "it depends."

Therefore, both the CEQ and the RFF surveys as well as a number of other public opinion polls taken over the decade of the 1970s illustrate that, while the environment is no longer viewed as a crisis situation, strong public support still remains for environmental protection. The public, while still faced with an inflationary economy and uncertain energy supplies, will not be willing to backpedal on the progress made in controlling pollution during the 1970s. □

Kathryn Utrup, an international consultant on natural resources, lives in Colorado; she worked on the Resources for the Future survey.



What Is the Clean Air Act?

HARRY DENNIS



Rural areas are not spared the effects of air pollution. Slickrock country (above), in Glen Canyon National Recreation Area, is often affected by pollution from the Navajo Generating Station in Arizona.

THE FIRST federal air pollution control legislation was passed in 1955 (the Air Pollution Control Act), but the Clean Air Act as we now know it really came into being in 1970. That act:

- Required the Environmental Protection Agency to set National Ambient Air Quality Standards (NAAQS). The standards were, and remain, designed to protect human health with a margin of safety. The standards were to be set without regard to the cost of attaining them.
- Required that air quality nationwide meet those standards by 1975.
- Tightened auto exhaust standards.
- Limited emissions for major new industrial sources (New Source Performance Standards or NSPS).
- Required states to draw up State Implementation Plans (SIPs) for meeting standards established by the EPA under the act.
- Set up a structure for regulating hazardous air pollutants.
- Gave citizens the right to sue industry

or the government for not complying with the act.

By 1977, it was clear that most states would not be meeting the deadlines set under the 1970 act. So the amendments passed in 1977 included, among other provisions, delayed deadlines for compliance with the standards. Congress also relaxed auto emission standards.

On the other hand, the law set limits on emissions from existing industrial sources, set stricter standards for areas with relatively clean air (the Prevention of Significant Deterioration—PSD—program) and authorized federal sanctions against states that did not comply with the new, more relaxed standards.

What is Regulated?

The air pollutants for which National Ambient Air Quality Standards have been set, and their sources, are:

- Particulates—primarily industrial sources and power plants.

- Sulfur dioxide—power plants and industrial sources.
- Carbon monoxide—motor vehicles.
- Hydrocarbons—motor vehicles and some industrial processes.
- Nitrogen dioxide—motor vehicles, combustion at major industrial sources.
- Ozone—reaction between hydrocarbons and nitrogen dioxide.
- Lead—motor vehicles, smelters.

The EPA also has the authority to regulate hazardous air pollutants, but has so far set standards for only four. These are asbestos, beryllium, mercury and vinyl chloride. The EPA is developing standards for benzene, radionuclides and certain forms of arsenic.

Standards are also set for emissions from particular industries, but the substances listed above are the only ones for which national standards exist. □

Harry Dennis is associate editor of Not Man Apart; this article is reprinted with permission of Friends of the Earth.

THE TWIN CONDITIONS of acid rain and carbon dioxide buildup in the atmosphere pose severe and almost unprecedented problems for human society and the environment that support it.

Acid rain, for example, threatens aquatic ecosystems, forests and plants throughout North America, northern Europe and the rest of the industrialized world. Carbon dioxide (CO₂) buildup in the atmosphere offers the novel opportunity to observe rapid changes in climatic patterns across the globe and may let our descendants see a 15- to 25-foot rise in sea levels, at which point boats could be launched from the steps of the U.S. Capitol.

The culprit in these dramas is fossil fuel. The Council on Environmental Quality (CEQ), in its 1979 report, observed: "Acid rain is recognized as one of the two most serious global environmental problems associated with fossil fuel combustion, the other being the accumulation of carbon dioxide in the atmosphere."

Solving both problems will require a measure of restraint and a commitment to the interests of future generations that will severely tax us all, even under the best circumstances. They are solutions that will require the dedication of generations of people, in a sustained effort far outlasting entire political careers.

Carbon Dioxide: Heating Up the Earth

Many scientists now believe that doubling the carbon dioxide in the atmosphere will lead to warming the climate by an average of 2° to 3° Celsius, with an even greater impact in the polar regions. In the past few years the National Academy of Sciences, the Council on Environmental Quality, the World Meteorological Association, the National Research Council and the National Commission on Air Quality have all come to the same conclusion. In April 1980, a panel of the NRC said, "By the middle of the next century, we may have a climate almost as different from today's as today's is from the peak of the last glaciation."

How will this happen? Carbon dioxide is a trace element constituting 0.03% of the atmosphere. It is continually moving from the air to terrestrial life and the oceans through photosynthesis and other interactions between air and surface; it returns to the air through respiration and evaporation. About 160 billion metric tons of carbon are thus exchanged annually. At present, about 700 billion metric tons of carbon are suspended in the atmosphere, an estimated increase of 15% to 25% over pre-industrial-era levels.

By contrast, the amounts of carbon stored

Clean Air III. The Global Dimension

JEFFREY KNIGHT

in other forms are considerably larger. The oceans are estimated to contain about 40,000 billion metric tons, terrestrial life about 800 billion, soils and humus about 3000 billion, and fossil fuels about 7000 billion.

Although carbon dioxide is a minor component of the air, it can have a major impact on climate because it absorbs long-wave infrared radiation. Solar heat reaches the earth in short waves that are transmitted to the surface by the air. Some of the heat is subsequently radiated back to space as longer infrared waves, but some heat is absorbed by the carbon dioxide in the air. As more CO₂ accumulates, more heat is retained, and the atmosphere gets warmer. This process is known as "the greenhouse effect."

Though the first prediction that this would occur came in 1900, it was not until the 1970s that sufficiently accurate long-term measurements of the CO₂ content of the air confirmed that its quantity is rising. Observations taken regularly on Mauna Loa since 1958 show that CO₂ in the air has risen from about 315 parts per million (ppm) to around 335. (Estimates of CO₂ levels before the industrial age range from 260 to 290 ppm.) There are annual variations, and measurements elsewhere on the planet vary somewhat, but all confirm the fact that the CO₂ level is rising.

The source of the rise is the combustion of fossil fuels that began with the Industrial Revolution in the nineteenth century and that has increased rapidly since World War II. About 150 billion metric tons of carbon (among other pollutants) have been added to the air since the Industrial Revolution began. From 1945 to 1973, use of fossil fuels in the United States rose at a rate of 4.3%; since 1973, the rate of increase has slowed to 2.5%. Depending on estimates of the level of future use and on the mix of fossil fuels, the amount of CO₂ in the atmosphere may be double the pre-industrial concentrations

as early as 2010, and more certainly by 2050.

Currently people discharge about 5.5 billion metric tons of carbon dioxide into the atmosphere annually by burning fuels. According to various projections, this could rise to anywhere from 11 billion to 16 billion metric tons by the year 2000, and from 14 to 28 billion tons by 2025.

About half the CO₂ added to the air is somehow absorbed by the oceans and the biosphere. The mechanisms that accomplish this are not fully understood; neither is the role of forests. Some scientists believe that, by reducing the amount of global vegetation, deforestation and destruction of soils have contributed as much CO₂ to the atmosphere as fossil fuel combustion. This notion has been disputed, however. The ability of the forests to provide CO₂ to the air is limited, as is that of the oceans and terrestrial life to take up more carbon and thus retard the buildup. In its 1979 report, the National Academy of Sciences said, "We have tried but have been unable to find any overlooked or underestimated physical effects that could reduce the currently estimated global warmups." And Dr. Gordon MacDonald, a founding member of the CEQ and a member of the Scripps Institute, says, "We can now, with confidence, predict that the earth will warm, and the warming will be greater in the high latitudes and less in the tropics."

Most estimates concur that an average global warming of 2° to 3° C will accompany an atmospheric doubling of the current levels of CO₂. They also agree that the warming in the northern polar areas may be as high as 6° to 10° C. The rise in the Antarctic would be less but still significant.

The local impacts of this temperature rise cannot be predicted with certainty. The global climate is a marvelously complex mechanism that is poorly understood. However, broad generalizations are possible. The most obvious change resulting from the global warming would be the expansion of warmer temperature zones, bringing

warmer and longer growing seasons to regions such as Canada and northern Russia. Whether this would increase agricultural output in these areas is uncertain, since the soil quality there is poorer than in the middle latitudes.

There will also be changes in the quality and amount of precipitation, in patterns of rainfall, in temperature, growing seasons, winds, storm frequencies, rates of photosynthesis (which will rise, to a point)—all of which will lead to major shifts in agricultural patterns. "Increased variability makes agriculture in particular a more uncertain venture," writes Dr. Charles Cooper of the San Diego-based Center for Regional Environmental Studies. The most important variable may be the availability of water. The shift of warm temperature zones toward the poles could lead to prolonged mid-continent droughts in Asia, Europe and North America (i.e., Kansas and Oklahoma), while in the arctic the permafrost would be turned into bog.

How specific crops would respond to change is a matter of conjecture; one study concludes that U.S. corn production would drop 11% for every 1°C increase in the global temperature; soybeans would be severely affected as well. Cotton production, it seems, would not be reduced, and rice production might well increase.

Changes in precipitation could also affect human communities. Any reduction in rainfall in the Colorado River basin, Dr. Cooper notes, would bring severe hardship to areas supplied by its already overdrafted river system.

The changes in temperature, winds and precipitation would change the patterns and

strength of the oceans' currents, which could have significant but unknown effects on the quantity and distribution of marine life. For example, it has been suggested that a substantial anchovy population off Peru decreased as a result of slight increases in ocean temperature that were related to changes in the atmosphere.

Although some areas might ultimately benefit from increased precipitation or warmer temperatures, the real problems would occur during the transition. Any transition would require massive adaptation by social, political, cultural and economic institutions that might not be capable of it. In agriculture in particular, there would have to be a redistribution of labor and physical infrastructure.

Recent history shows clearly that even minor changes in climate have caused major negative impacts on life. The 1972 and 1974 droughts in India and Bangladesh killed more than a million people. New technology may hinder as well as help adaptation. Modern technologies that increased water supplies and livestock populations in the Sahel inadvertently made that region more vulnerable and less resistant to the subsequent drought that parched the region in the late 1960s and early 1970s.

A global warming might also melt the west Antarctic ice cap, raising global sea levels from 15 to 25 feet. The ice caps sit on bedrock below sea level and is fringed by ice shelves susceptible to warming. A 3° to 4° C rise in the Antarctic Ocean's temperature could melt much of the ice cap in less than a century. (Arctic ice might melt, too, but that would not raise sea levels appreciably since the ice is already afloat.)

In the United States, such a rise would hit coastal areas severely. From 30% to 50% of Florida would be wholly or partially inundated; 25% of Delaware would sink beneath the waves. Much of tidewater Virginia, lowland areas in the District of Columbia, New York City, Boston and Atlantic City would be flooded; so would Savannah, Georgia, and Charleston, South Carolina. New Orleans, already several feet below sea level, would be covered, as would such Texas coastal cities as Beaumont, Port Arthur, Corpus Christi and Galveston. A 15-foot rise in the sea level would displace an estimated 11 million Americans and cause the loss of \$110 billion in unmoveable property. With a rise of 25 feet, the figures would be 15 million Americans and \$150 billion. In addition, certain crucial coastal facilities could be damaged or destroyed with possible severe consequences. Ten nuclear power plants would face inundation by seas rising 25 feet.

This cursory glance at the possible results of a CO₂ doubling ought to make plain the magnitude of the threat. Nevertheless, solutions, even a commitment to solving the problem, are practically nonexistent. Until the recent spate of studies and one or two congressional hearings, the U.S. government's official awareness of the problem was nil. Carbon dioxide's effects have never been considered in an environmental impact statement, nor are they included in national energy planning. Even the Clean Air Act is silent on the subject, as has been the Environmental Protection Agency.

A few technical solutions have been suggested, such as removing CO₂ from stack gas and injecting it into deep oceans, or increasing forestation so terrestrial life could take up more carbon dioxide. All are very expensive, questionably effective, and would require a commitment and cooperation similar to that required to curb our use of energy significantly.

But some adaption will no doubt be necessary. This point is strongly implied by one of the final reports released by the Council on Environmental Quality (CEQ) in Jimmy Carter's term. In "Global Energy Futures and the Carbon Dioxide Problem," the CEQ investigates the implications for global energy policy if the ultimate amount of carbon dioxide were limited to 150% and 200% of pre-industrial levels. The study applied policy choices to two future energy scenarios drawn for the next 120 years. One scenario assumed high energy growth, the other low growth. The answers are chilling.

To limit carbon dioxide to 150% of pre-industrial levels, fossil fuel use could grow only by 1% annually in the 1980s, and would have to drop to 0.7% in the 1990s and to zero by the turn of the century. That way, fossil



"The air today is smoother to the touch, but it doesn't taste very good."

fuel use would peak in 2007, still 15% higher than it is today. But if we were to wait ten years to take action, letting use of fossil energy grow by 2.5% a year in the 1980s, the peak would have to come six years sooner and the dropoff would be faster.

Limiting carbon dioxide to 200% of pre-industrial levels is somewhat easier but still causes problems. If we were to act now, fossil fuel use would have to peak in 2042 at the latest, and the use would be 67% higher than today.

The impact on other energy resources is startling. Currently the world uses 26 quads (quadrillion BTUs) of non-fossil-fuel energy annually. To achieve the 150% goal, these resources would have to increase fivefold by the year 2000, to 135 quads, even under the low-energy-growth scenario. Under the high-growth scenario, they would have to increase ninefold to 235 quads. Using the goal of 200% of pre-industrial carbon dioxide levels, the situation becomes even more extreme.

With aggressive increases in hydropower, other energy sources would still have to increase at annual rates of 8% to 12% for the rest of the century, and at 4% to 5% after that. A prodigious exercise.

If the choice were delayed a decade or two, matters would be even worse. The CEQ case with the least impact on energy (doubling CO₂ under the low-growth scenario) would still require non-fossil energy sources to increase at 7% a year through the rest of this century, a rate that would be a serious challenge to any government. It is particularly unlikely under an administration that is slashing its solar-energy and energy-conservation budgets.

The policy suggestions that have emerged include: (1) giving the highest priority to the CO₂ issue as a central part of all our energy planning; (2) increasing to the fullest extent possible the role of energy conservation and renewable resources; and (3) undertaking significant international efforts to educate other nations about CO₂ buildup and attracting international attention to it.

In the use of fossil fuels, favoring natural gas over oil, oil over coal and coal over synthetics would also reduce the CO₂ output per unit of heat. (Oil, coal and synfuels are, respectively, 38%, 66% and 127% higher emitters of CO₂ than natural gas.)

These choices are pitted against the skepticism toward anything happening, indeed that any such international cooperation to safeguard the health of future generations could be achieved. As Blake Early, the Sierra Club's lobbyist for air quality, says: "The total lack of movement on international regulation of chlorofluorocarbons should be instructive."



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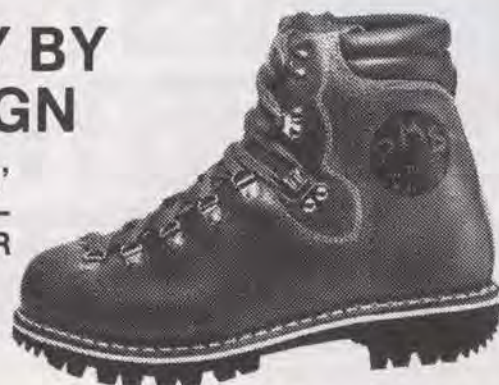
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"The biggest difficulty," says Early, "is how to grapple with it. The political climate is such that people aren't willing to look down the road in Congress right now."

What's needed, Early feels, is an energy bill that links carbon dioxide with energy conservation. "In essence, we have to get ourselves off fossil fuel."

Acid Rain: Sterilizing the Water

The problems caused by acid rain may seem more limited than those arising from carbon dioxide, but because they involve all regions where industrial growth and massive use of automobiles and trucks occur, and because the regions can cover thousands of square miles, the magnitude of the impacts could be similar.

Acid rain is created when oxides of sulfur and nitrogen, which are released by burning fossil fuels, stay in the atmosphere long enough to interact with water and create sulfuric and nitric acid. The sulfuric acids emanate primarily from power plants, while the nitric acids come both from power plants and from autos. Sources in the United States currently emit 26 million tons of sulfur dioxide and 22 million tons of nitric oxides a year; Canada's figures are 5 million and 2 million tons, respectively. (See "Acid Rain" in *Sierra*, May/June 1980.)

The acids can remain in the atmosphere for as long as five to six days and can travel thousands of miles. When they are deposited on the land (usually as precipitation), they cause extreme changes in local ecology, particularly in water quality and in closed aquatic communities.

Water is naturally acidic, with an average pH of about 5.6. The pH scale is a measure of the acidity or alkalinity of solutions; a balanced solution has a pH of 7. Below that, the solution becomes more and more acidic; above it, more alkaline. The scale is logarithmic, so that a change in measurement of one unit, say from a pH of 5.6 to a pH of 4.6, means that the 4.6 solution is ten times as acidic as the 5.6.

Today, the accumulation of nitric and sulfuric acids in rain and snow has brought water's pH down in many areas of the continent. Rainfalls with a pH below 5 are almost the norm, and below 4 are not uncommon. In many parts of the Northeast, the water has a pH of 4 to 4.6, 10 to 50 times higher in acid than normal. The most acidic rainfall ever recorded was in Pitlochry, Scotland, in 1974, where the rain was measured at pH 2.4. Vinegar has a pH of 3.

In much of New England, recent studies show the water's pH to be around 4. The same is true for New York and southern Ontario. The area receiving acid precipitation extends into the Midwest and through

the middle Atlantic states. Other areas beginning to be affected include the southeastern United States and parts of the West. The most rapid increase has occurred in the South, paralleling the rapid industrialization and urban growth in that region. In 1979, for example, southern regions had four rainfalls with a pH of 3.3.

In the West, where there is relatively little power-plant combustion, the problem is more limited. In Colorado, the Los Angeles basin, the San Francisco Bay Area, Portland, Spokane and Tucson, however, acid rain is becoming a problem. Here the culprit is the automobile. A two-year study just completed of rainfall in Pasadena showed a mean pH in that area of 3.9. Rainfall measuring 3.7 pH is common in San Jose.

Not all areas are equally vulnerable to the ravages of acid rain, however, as Dianne Dumanoski pointed out in her *Sierra* article last year. Depending on their composition, all soils have a greater or lesser ability to neutralize the acid falling with the rain. Some lakes, such as Cayuga near Cornell University, will never become acidic because they are in areas rich in limestone. The limestone amounts to a built-in "Rolaids" that neutralizes significant quantities of acid. Other soils have only limited amounts of limestone, which can be quickly exhausted.

The effects of acid precipitation are observed first in lakes, rivers and streams, where increasing acidity places great strains on fish and amphibians. Water with a pH of 5 to 6 inhibits reproduction functions in fish and amphibians, and a pH below 5 causes their extinction in the ecosystem. The New York Bureau of Fisheries has found that more than half the high-altitude lakes in the Adirondacks have an acidity below pH 5; nearly all of these lakes have no fish today; only 4% of them had no fish in the 1930s. Hundreds of lakes in southern Canada have been rendered lifeless by acid rain, and the Canadian minister for the environment, John Fraser, estimates that 48,000 lakes in Ontario alone are threatened with similar results.

Besides inhibiting the reproductive capacity of fish generally, spring meltings of acidified snow cause acid "pulses" to rush through streams and rivers and into lakes, resulting in massive fish kills. Because spring is spawning time, entire generations of fish populations can be wiped out.

Acid rain also affects fish by its capacity to leach such toxic and heavy metals as aluminum, mercury, cadmium and lead from the soil. Normally these elements are combined with particles of soil and leach out slowly, but acid rain speeds up the process. The result has been the accumulation of heavy metals in lakes and rivers; the heavy metals are

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taken up by microorganisms, plants and fish. The concentrations can reach levels deadly either to the fish themselves or to the animal or person who eats them.

Wilderness can be affected as well. One recent study of the impacts of acid rain on the Boundary Waters Canoe Area/Voyageurs National Park found reduced bacterial decomposition, increased accumulations of organic matter, aquatic areas choked by the few plant species (such as peat and moss) tolerant of a low pH, a drop in the diversity and productivity of phytoplankton, zooplankton and benthic invertebrates, and reductions in fish and amphibian populations.

Aside from the accumulation of heavy metals in fish used for food, acid rain can affect humans in several other ways. Many water systems in the Northeast have low pHs, and this acidic water can leach out copper and lead from water pipes and soldering. In many areas, residents are urged to run their taps for three to five minutes each morning to flush out heavy metals that may have accumulated in the stagnant water overnight. In Sweden, *The New York Times* reports, residents of one region watched their hair turn a reddish color from water carried through pipes corroded by acid rain.

The causes of acid rain are pollutants now regulated by the Clean Air Act. Several elements of the act's program—prevention of significant deterioration, non-attainment, new-source performance standards—have reduced the increase in acid rain. But other factors, such as the widespread use of tall smoke stacks to disperse pollution over wider areas, actually exacerbate the problem. Since 1970, more than 175 stacks over 500 feet tall have been built in the United States, all but eight by electric utility companies. The tallest stack is at the International Nickel Company smelter in Sudbury, Ontario; it rises 1250 feet.

Technology does exist to reduce sulfur oxide emissions from power plants, but controls on new sources are only part of the problem. The Clean Air Act does not regulate sources that existed in 1970, and they can emit seven times the sulfur permitted under the new-source performance standards. One estimate suggests that in 1990, 70% of emissions from power plants will still be coming from pre-1970 sources.

As for nitrogen oxides, the technical problems in power plants are more severe. Oxides of nitrogen are formed at the high combustion temperatures that exist in the plants. Redesigning burners, modifying operations and other proposed measures all aim at reducing combustion temperature, but they would simultaneously reduce generating capacity and efficiency. In autos, nitrogen

Continued on page 75

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Five Solar Homes

MOST HOMEOWNERS are determined to find ways of trimming their fuel bills. Many have already taken the obvious steps—turning down thermostats, caulking seams, and adding weather stripping and extra insulation. Once energy savings are realized from those measures, what's left for a homeowner to do? Well, every year more and more are taking a fresh look at solar energy and deciding to put it to work for them.

Homeowners seeking to harness the power of the sun can choose between active and passive methods—or a combination of the two. What's the difference?

Active systems employ solar collectors (usually mounted on a roof, but they can be anywhere near the house) containing a transfer medium—either air or some type of liquid—that absorbs energy when sunlight strikes the collectors. Electric pumps move the heated air or liquid through the system's ducts or pipes to the house for heat or into storage for later use.

Passive systems, on the other hand, collect and transport heat by nonmechanical means. The house itself—or a part of it, such as an attached greenhouse—functions as a solar collector, and heat is distributed throughout the structure by thermal convection. Every passive solar system requires two elements: south-facing glass or transparent plastic to let in the sun, and a so-called thermal mass to store the sun's heat. That mass may be masonry—ordinarily concrete blocks or stone but sometimes adobe, as in the El Paso home—or it may take the form of water in containers or a rooftop pond. Water stores heat more efficiently than masonry but is, of course, more troublesome to contain. Whether masonry or water, a substantial thermal mass is needed to make a passive system work.

A thermal mass works simply enough: during the day it absorbs heat from the sun. At night, when temperatures drop, thermal mass radiates the stored heat, warming the house. In hot climates with cool overnight temperatures, the process can be reversed. By shading the thermal mass from the sun and venting the house properly, relatively

little heat will be absorbed during the day. At night, outdoor air circulates inside the house and cools the mass, which will then help keep the house cool the following day.

A passive solar system can be one of three types—direct gain, indirect gain, or isolated gain. All three, of course, incorporate thermal masses and south-facing glass.

In a direct-gain system, the house itself becomes a live-in collector, heat storage unit and heat distribution system, all in one. The system works continuously—collecting and using all of the available energy. The direct-gain method works equally well in cloudy areas with great amounts of diffuse solar energy but not enough hours of direct sunlight for active solar systems. Be forewarned that a direct-gain system can turn a house into an oven if you don't provide adequate venting and shading.

An indirect-gain system places a thermal mass between the sun and the space to be heated—for instance, on the roof or in an exterior wall. Vents and shading devices regulate the accumulation and transfer of heat.

An isolated-gain system collects and stores solar energy away from the rooms to be heated, sending heat to the living areas when needed. The most common type consists of a flat plate collector and a heat storage tank or rock bed. Warm air or liquid from the collector is drawn into storage, displacing cooler material that flows back to the collector; the circulation of the air or liquid through the house provides the heat.

Whatever type of solar heating system you choose, it won't work properly unless your home faces the sun. South-facing solar collectors are best by far, but you can sometimes get by with southeastern or southwestern angling if you plan your system carefully. In any event, your home must be thoroughly insulated so that heat won't escape through walls, ceilings and floors. In some cases, you may have to install double or triple glazing throughout the house. Check also the positioning of deciduous trees and awnings: ideally, they should provide shade in the summer while allowing maximum sunlight to enter the house during the winter.

The five solar homes described on the following pages are located in very different areas—from Vermont, where winter can be cruel, to Texas, where summer is scorching. Each of these homes uses one or a combination of the solar systems described above to help an owner deal with his own personal energy crisis.

Brick-paved courtyard at the front of the Collins house in California provides a private spot for entertaining; the kitchen is just inside the door. Circular stained-glass window illuminates the bathroom in the master bedroom suite. The house is clad with red cedar shingles. They provide a bit more insulation than ordinary wood siding.

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Photographs by George Lyons



1.

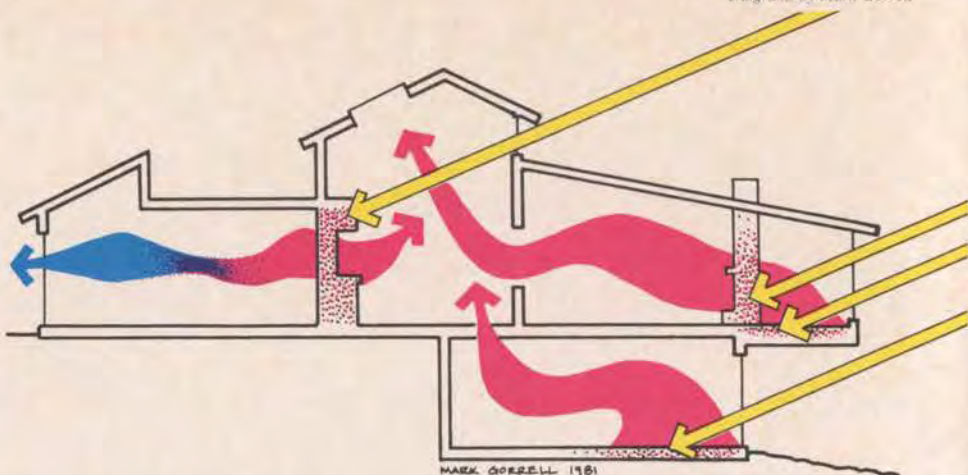
Location: Orange County, California.

Climate: June-August temperature average, 74°; December-February average, 59°.

Area: Original floor area—2016 square feet. Solar retrofit addition—213 square feet. Total—2229 square feet.

Type of energy system: Passive.

Features: South-facing glass, brick floor and wall for heat storage, and vents for air circulation.



Brick floors and fireplace absorb heat from the sun that enters the house in winter months through south-facing glass. At night, as temperatures drop, the heat is released from the mass. In the summer, south-facing glass is shaded by overhangs and trees. Low vents on the south side allow cool ocean breezes to enter, forcing warm air out the high north-side windows.

When Budge and Lynn Collins decided they would add onto their Southern California home, they wanted to incorporate passive solar features as part of the remodeling. However, building a passive solar system on an existing house can be a tricky process. Architect Brion Jeanette had to deal with problems that wouldn't surface in new construction. First, he had to plan for a site orientation that was already established—luckily with a generous amount of southern exposure. For heat storage, he decided to incorporate heavy brickwork into the house's structure. And to give the house needed additional insulation, 2¼-inch-thick foam panels were added to the roof, giving it an R-21 rating; the walls, padded with four-inch-thick batts, are now rated R-11.

The kitchen and adjacent living and dining areas were the main spaces in the house to be remodeled. The Collinses raised the roof over the front part of the house to create a cheerful, two-story kitchen and a loft area that opens onto a new sundeck built over the garage.

A massive skylight provides cool north-west light for the new space. The original kitchen is now a conversation area with a corner fireplace and brick windowseat, both of which function as storage mass for heat.

A steep, coastal canyon running along the back of the house allows the Collinses to take full advantage of ocean breezes and the house's southern exposure. Cool air enters the house through low vents on the south-facing window wall in the living room and the new sunporch. Warmer interior air exits through high, operable windows in the kitchen on the north side of the house.



Bricks used in floors, the cooking alcove and the corner fireplace act as part of the mass for heat storage. The bricks were split in half to reduce the considerable weight, often a problem when adding thermal mass to an existing house. Raised roof over the kitchen improved air circulation and made room for a study loft leading to a deck.



Windowlike openings just below the ceiling form an integral part of the passive heating and cooling system, allowing a free flow of air. Circulation in the main part of the house is also aided by the open floor plan, which provides easy access to all the living areas.



Glass-walled dining area, part of the new brick-floored sun porch, provides a view of the Pacific. Openings below the double-glazed windows admit cooling ocean breezes in summer. In winter, low rays of the sun warm the brick floor and help heat the room.

2.

Location: El Paso, Texas.

Climate: June-August temperature average, 84°; December-February average, 50°.

Area: 2600 square feet.

Type of energy system: Passive.

Features: 18-inch adobe walls, atrium (heat sink), insulating shutters, windowless north and west walls, storm doors, recirculating fireplace and solar hot water system.

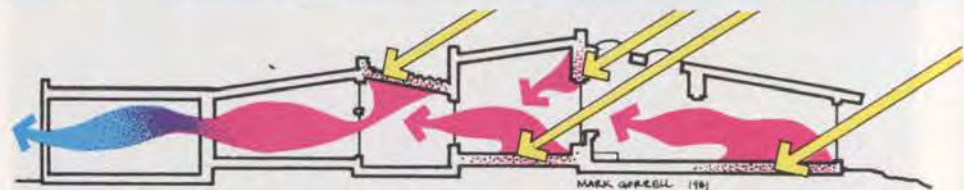
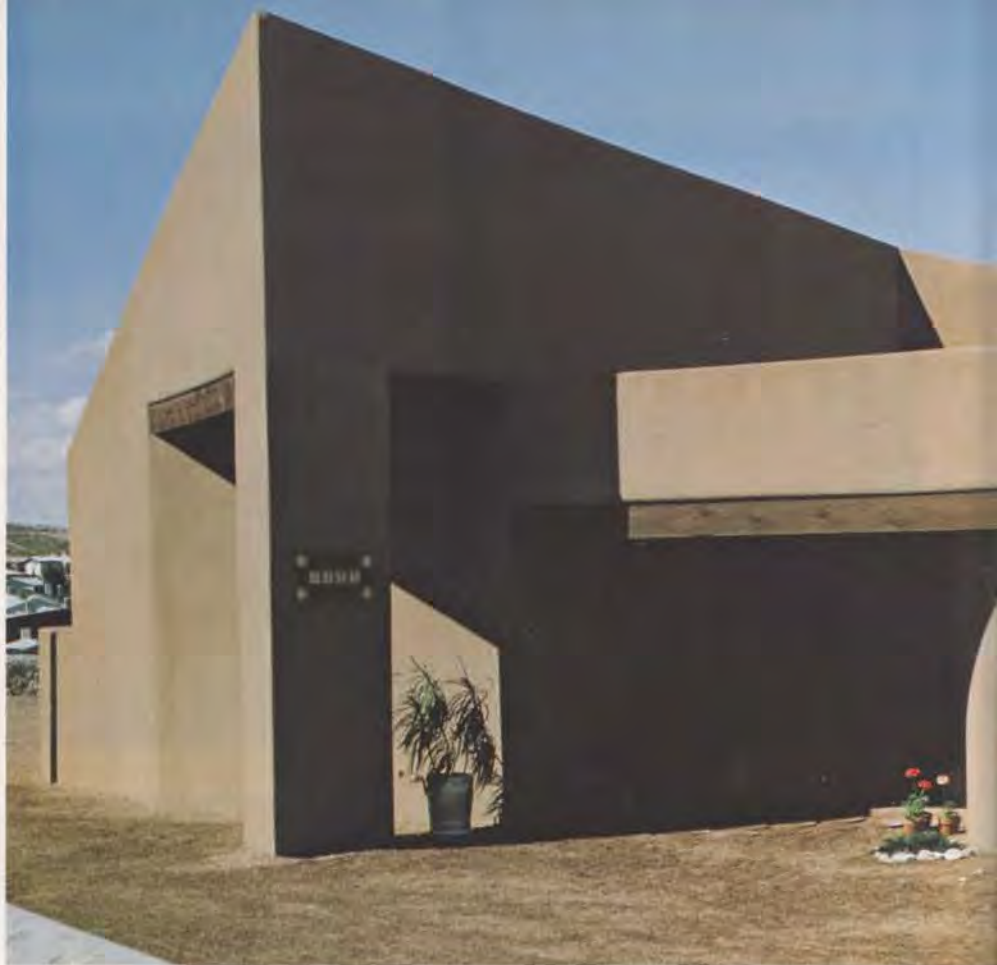
Built to take advantage of the winter sun and summer breeze, the passive solar home of Ray and Louise Duncan perches on the edge of the desert near El Paso, Texas. Aptly named Casa Soleada, meaning "house that works with the sun," the newly constructed home was designed by architect Mack Caldwell and built by John Edmondson. It employs a variety of solar systems designed to handle 50% to 80% of the home's heating and cooling needs.

Design, construction, site orientation and the proper placement of windows, shutters and skylights work with nature to heat and cool the home. Walls are 18-inch-thick adobe bricks, coated with stucco on the outside, plastered on the inside and then sprayed inside and out with a tinted stucco coating.

In the living and dining rooms, which face south, large expanses of glass draw in the sun during winter. The sun's heat is stored in the walls and the built-in adobe benches, called *bancos*. During the winter months, shutters on the south-facing glass are closed at night to conserve heat, then opened early in the morning to capture available sunlight. In summer, the shutters block the sun during the day, while allowing air to enter the open windows for ventilation.

At the core of the house, an atrium with four operable skylights allows the winter sun to heat the interior adobe walls and terra-cotta floor. A fan moves the warmed air from the atrium to the two north-facing bedrooms. During the summer months, the skylights are covered with heat screens to block the sun. An eye-pleasing fountain runs year-round to add moisture to the otherwise dry desert air.

Builder Edmondson installed a three-panel solar water heater on the roof directly above a triple-insulated, 80-gallon storage tank. The system can be drained should it ever be in danger of freezing. An electric booster heater stands ready to heat water should it be needed.



Thick adobe walls and masonry floors create a thermal mass in the central atrium. Skylights over the atrium allow heat from the winter sun to penetrate the home's interior. In summer, they're screened with a reflective film. Adjustable shutters on the windows block unwanted summer sun while still admitting cooling breezes.



Central atrium helps keep the Duncan house warm in winter by storing solar heat in the adobe walls and terra-cotta floors. The skylights, which open for ventilation during the summer, can be screened to block sunlight when it's unwanted. Shuttered doors permit air circulation between rooms.



Windowless west wall of this passive solar home in El Paso, Texas (above), protects against cold winter winds. Thick adobe bricks combine with a south-facing orientation, shuttered windows and operable skylights to trim the cost of heating and cooling to half of that of similar-size houses.

Exterior shutters in the south-facing living room (below), operated by a spring mechanism from inside, can be set at varying heights to regulate the amount of sunlight entering the house. Built-in adobe benches provide comfortable seating as well as additional thermal mass for storing heat during cold periods.



3.

Location: Springfield, Vermont.

Climate: June-August temperature average, 70°; December-February average, 29°.

Area: 2000 square feet.

Type of energy system: Passive.

Features: Slab beneath first floor for storage mass, wood-burning stove, thermal shutters, R-32 insulation in the ceilings and R-19 in the walls.

Combining the traditional shape of a New England barn with a simple passive solar design, this prefabricated home in Springfield, Vermont, offers an alternative to more expensive, custom solar homes. The two-story clapboard house was manufactured by Green Mountain Homes of Royalton, Vermont, a company that specializes in solar designs. Panels were shipped with the windows already in place, so the factory-produced house took only three months to complete from the time it was ordered until the owners moved in.

During the winter, east-, west- and south-facing glass creates a greenhouse effect—solar radiation passes through the glazing and warms the inside air, which transfers its heat to an insulated slab beneath the first floor. The stored thermal energy is released as surrounding temperatures drop. Manually operated shutters and sliding glass doors are closed at night to reduce heat loss. In the summer, the shutters are closed during the hottest hours of the day, then opened at night to allow cool air into the house. This cool air lowers the temperature of the thermal mass, which then can counteract heat during the following day.

The house also uses other passive features to take advantage of or block the sun's warming rays. The dark-colored exterior absorbs solar heat, for example, and large trees on the south side of the house provide summer shade. A wood-burning stove in the family room supplements heat from the solar system.

In the two winters the house has been occupied, the backup gas furnace has been turned on only once. That was when the owners were away and wanted to be sure a minimal level of heat was maintained in the storage mass. In even the coldest months, the house maintains a comfortable 70 degrees, needing only the sun's energy and the wood stove.



Brick-floor foyer acts as a buffer to moderate outside temperatures. Extreme heat loss or gain is lessened because interior living areas are not directly affected by the opening and closing of the front door.

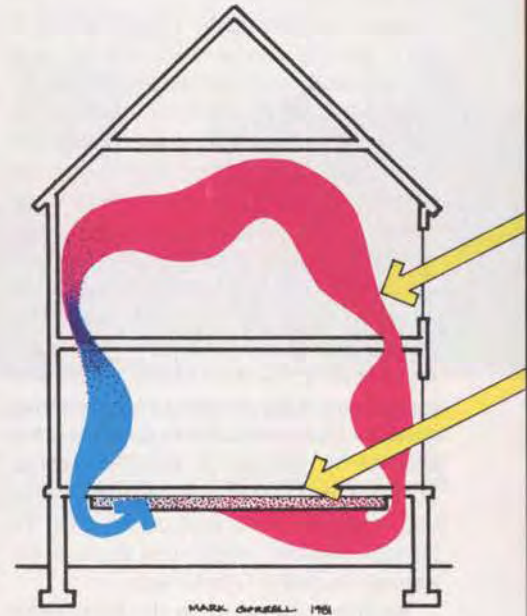


Wood-burning stove in the family room supplements the house's passive solar system. In the winters since the house was built, temperatures have been maintained at a comfortable 70°, using heat captured by the solar system and by burning wood gathered by owners.

Photographs by Michael Campbell



This prefabricated passive solar home, resembling a New England barn, is ideal for its rustic Vermont setting. The house combines direct- and indirect-gain systems and a wood-burning stove to defeat New England winters. Maple and birch trees shade the house in the summer months but don't block the sun's rays in winter.



The sun enters the house through east-, west- and south-facing windows and glass doors to heat the house. Excess heat is stored in the slab under the first floor. Thermal shutters, operated manually inside the house, reduce heat loss at night. To reverse the system during the summer, night air is allowed into the house to cool the concrete slab, which keeps the house comfortable the next day.

Low, south-facing windows in an upstairs bedroom (left) catch the winter sun but are protected from direct sunlight in summer by the roof overhang. The windows also help vent hot air when it begins accumulating.

4.

Location: Seattle, Washington, area.

Climate: June-August temperature average, 67°; December-February average, 41°.

Area: 2300 square feet.

Type of energy system: Passive.

Features: Trombe wall, partial berm, two wood-burning stoves, heavy insulation and awnings.

Planned for convenience as well as efficiency, this new home near Seattle takes advantage of a full southern exposure and a rolling hillside lot to produce a working passive solar home. Designed by architect Gerald Cichanski, the house is partially bermed (buried) on three sides. The almost-constant temperature of the earth protects against heat and cold.

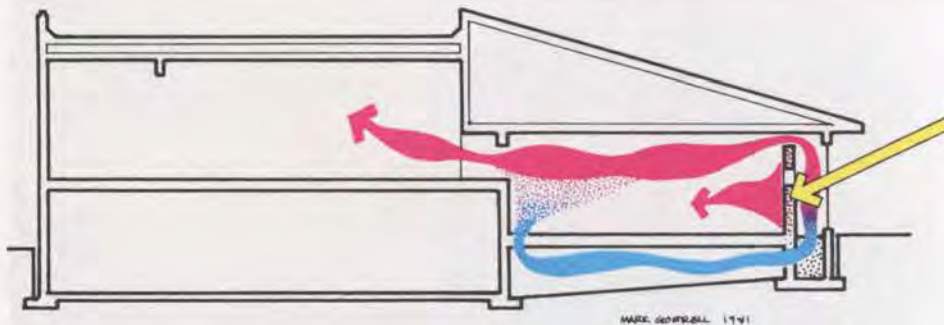
The south side of the house contains a brick thermal-storage wall, known as a Trombe wall, enclosed on the outside by sliding glass panels. Heat that builds up in the sizable airspace left between the bricks and the glass is absorbed directly into the storage wall and is radiated into the house as the interior temperature drops below that of the wall. Also, as air in the space becomes warmer, it rises and flows into the house through vents at the top of the wall. This pulls in cooler interior air through another set of vents at the base of the wall. These vents regulate the amount of heat entering the house; the process can be reversed in hot weather by opening the vents at night to draw cool air into the house. If faster circulation of air is desired, fans can be used. To prevent possible overheating in summer, awnings shade the Trombe wall.

Wood-burning stoves in the living room and family room act as backup sources of heat. Together with the Trombe wall, the stoves will supply an estimated 30% of the heat needed for the living areas. A pass-through woodbin next to the stove links the family room to a garage wood-storage area large enough to hold a cord of wood.

Ceilings in the living areas are comparatively low, from seven to ten feet, to help keep warm air in the lower parts of the house before it rises naturally to the upper level. Bedrooms and utility areas can be closed off when not in use. All the rooms have supplementary radiant heat.



Thermal storage wall of bricks, faced by glass, forms the backbone of this house's passive solar system. Vents in the gravel floor can be adjusted to regulate the flow of air into the heating chamber.



A thermal storage mass called a Trombe wall, made of brick and enclosed with glass, occupies the south side of the living/dining area. As the sun heats the bricks and the air between the bricks and glass, the warm air rises and flows into the house. Cool air is drawn into the heating chamber through ducts connected with a crawl space. At night and on cool days, the brick radiates heat to the interior of the house. For summer cooling, the process can be reversed by using cool night air and shading the glass and brick during the day with awnings.

Photographs by Vern Green



The rear of the house (left), nestled into a hillside, faces its thermal wall squarely to the south. The angular exterior (below) is faced with cedar shingles, which act as an additional layer of insulation. The house is bermed (partially buried) on three sides with 3½ feet of dirt to take advantage of the earth's considerable insulating ability.



Fixed windows in the Trombe wall (left) let plenty of light into the dining area. Air warmed by the sun comes into the room through vents near the ceiling and circulates to the rest of the house. If that air becomes too hot, the sliding glass doors that are part of the wall can be opened to break the convection cycle.





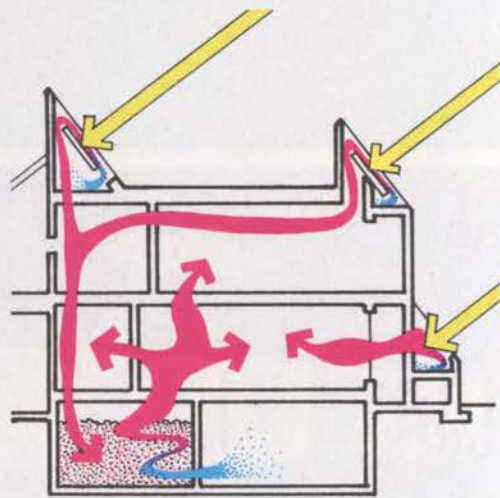
A snow-covered landscape, overcast sky and temperatures below zero don't negate the efficiency of this solar heating system. Sun is drawn into the house through south-facing windows, a greenhouse and rooftop collectors.



The open floor plan allows air to circulate freely between the floors. The air-lock front entry and triple-glazed windows help to maintain a constant temperature.

Photographs by Steve Grubman

During winter months, the sun's heat enters the house through south-facing windows, greenhouse and rooftop collectors to be stored in thermal mass and rocks below the house. In the summer, breezes enter the house through first-floor windows, and warm air is vented through upstairs windows.



MARK OCKRELL 1981

Solar Information

READERS WHO WANT MORE information on solar energy can find hundreds of books, magazines, movies and pamphlets available from many organizations. The short list below describes some of the best publications to date, including two annotated bibliographies for more extensive lists and two organizations that can be particularly helpful.

Organizations

National Solar Heating and Cooling Information Center, P.O. Box 1607, Rockville, Maryland 20850; toll-free number, (800) 523-2929, or (800) 462-4983 for Pennsylvania residents. This federally funded organization can direct people to all types of information on solar energy, including manufacturers, bibliographies, tax credits, codes, warranties and instruction.

The Solar Lobby, 1028 Connecticut Avenue, N.W., Washington, D.C. 20036; member-

ship \$15 per year. This lobbying organization is one of the most effective promoters of solar energy in the capital. Members receive *Sun Times*, a monthly newsletter.

Magazines

Solar Age, Solar Vision, Church Hill, Harrisville, New Hampshire 03450; \$20 per year. This is a first-rate monthly feature magazine that covers all solar developments promptly in lay language.

Solar Engineering, Solar Engineering Pub-
continued

5.

Location: Chicago, Illinois, area.

Climate: June-August temperature average, 74°; December-February average, 30°.

Area: 1700 square feet.

Type of energy system: Active.

Features: Rock-bed thermal mass beneath house, rooftop solar collector, airlock front entrance, triple-glazed windows, heavy insulation, wood-burning stove, and brick wall and ceramic floor tiles for thermal mass.

Located on a wooded acre lot outside Chicago, this contemporary solar home owned by Doug Blout is attractive as well as highly energy efficient. Designed by the Hawkweed Group Ltd. of Chicago, the house has a two-story, block shape and careful site orientation that are considered optimal for solar heating during the cold winters.

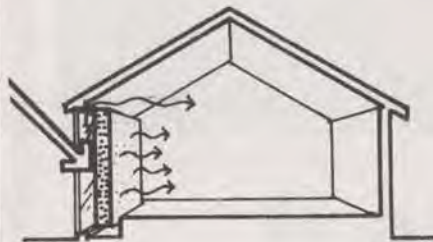
South-facing windows and a greenhouse work in conjunction with rooftop solar collectors that heat air and transfer it to a rock-bed storage area beneath the house. This reservoir of heat serves the living spaces all winter. Originally, a brick fireplace was planned for the living room, but Blout preferred a cast-iron stove. He retained the brick fireplace wall, however, to obtain additional thermal mass. Blout, who has lived in the house since April 1979, estimates that he used about 2½ cords of wood, which he cut himself, to make it through last winter. His gas bill, including use of oven, stove and water heater, was \$109 for the year ending last April 1.

During the summer months, low overhangs shade the south-facing windows, and the greenhouse can be isolated from the main house by closing a connecting door. During winter, a ceiling fan forces heated air down to the lower living spaces. In summer, cool breezes enter the house through first-floor windows, while warmer air is vented out through the upstairs windows. □

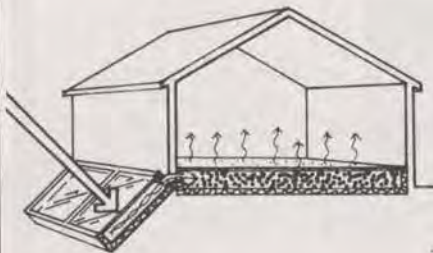
Three Kinds of Passive Solar Systems



Most passive solar heating systems fall into three general types according to whether the sun heats the interior space directly, indirectly or by a remote mechanism. In **direct-gain** systems, the sun passes through a window or skylight directly heating both the interior space and an interior mass—that absorbs heat while the sun shines, and radiates the heat back into the room after the sun has gone down. The mass could be a concrete or tile floor or wall, pillars filled with water or anything else that works.



In **indirect-gain** systems, the thermal mass comes between the sun and the interior. For example, the sun could strike a heavy concrete wall, heating the wall, and the heat would be radiated into the cooler interior. This kind of system causes fewer internal temperature fluctuations than direct-gain systems, but overall temperatures are a little lower.



Isolated-gain systems collect heat in one place, then move it to where it will either be used or stored. (Passive systems use no mechanical assistance collecting solar energy, although fans or pumps may be used to distribute the heat. But in collection, they take advantage of convection—the principle that heat rises and cold falls.) Isolated-gain systems collect the heat, then let the heated air (or water) rise to its storage area, where the heat is absorbed by some material, such as rocks. Then the cooled air (or water) falls back into the collector, where it begins another cycle. The stored heat rises to heat the space.

Illustrations by Mark Gorrell



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lishers, 8435 N. Stemmons Freeway, Suite 880, Dallas, Texas 75247; \$15 per year. Technically oriented but clearly written; monthly.

Bibliographies

Bibliography for the Solar Home Builder, Dr. Donald W. Aitken, for the Office of Appropriate Technology, 1600 Ninth Street, Sacramento, California 95814 (1979); free to California residents, \$1 for others. This is a thoroughly annotated bibliography of books, magazines and organizations arranged by interest area and degree of technicality.

The Energy and Environment Checklist, Betty Warren, Friends of the Earth, 124 Spear Street, San Francisco, California 94105 (1980); \$5.95. This is an annotated listing of more than 1600 sources of information on all major energy topics and some minor ones, too; the solar section is good and complete.

Books

More Other Homes and Garbage: Designs for Self-Sufficient Living, Jim Leckie, et al., Sierra Club Books, 530 Bush Street, San Francisco, California 94108 (1981). This is an up-to-the-minute revision of the 1975 hit; the solar chapter is now 60 pages longer. Covers many topics, including energy-conserving design, wind-electric power, aquaculture and waste handling. Solar expert Don Aitken said of the first edition, "Each chapter is just about the best introduction to its particular topic that can be found."

The Passive Solar Energy Book: A Complete Guide to Passive Solar Home, Greenhouse and Building Design, Edward Mazria, Rodale Press, Emmaus, Pennsylvania 18049 (1979). Read quickly through the boldface type for basic concepts, then go back through the whole book for detail. This book is as good as they come for clarity, simplicity and precision; it discusses passive solar only.

The Solar Home Book: Heating, Cooling and Designing with the Sun, Bruce Anderson, Brick House Publishing Company, Church Hill, Harrisville, New Hampshire 03450 (1976). This is the definitive introductory book in the field; its explanations of both concepts and technical terms are clear and its illustrations superior. It covers solar principles, active solar heating, passive heating and retrofits.

Sunset Homeowner's Guide to Solar Heating, Sunset Books, Lane Publishing Company, Menlo Park, California 94025 (1978). This is not a how-to-do-it book, but a thorough and clearly illustrated overview of solar principles. Exceptionally easy-to-understand introduction. □



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Getting Into Shape

LYNN THOMAS



Photographs by Lee Foster

EVER SINCE the advent of male dominance, of Hollywood and ladies' magazines, women have been getting two messages about their bodies. One, they should be shapely and cosmetically perfect. Two, they should be not very strong.

By holding to these messages since Victorian times, women have developed a negative orientation toward their bodies. They think of them not in terms of the miracles they perform, but in terms of how visually imperfect they are. Beyond that, many women disdain any exercise that might make them strong. When pressed on the subject many reply, almost defensively, how much energy goes into keeping the house clean and the family fed and clothed, or how hard they work at developing their careers. But, as sports-medicine specialist Dr. Evalyn Gendel recognizes, physical work is a far different animal from physical fitness.

Dr. Gendel has studied the value of physical fitness for women, both professionally and in her personal life. Her own fitness regime began at age three with ballet lessons. In high school she was a sprint and relay runner. She commuted to college and medical school by bike 25 miles a day. While maintaining a busy family practice in Kansas, she swam a mile a day. At night, while doing laundry for her five children, she worked out in the laundry room on her ballet *bierre*. Now, as a program director at the University of California Medical Center, she runs four miles a day, or she manages a few rounds on the office stairs—all seven flights of them. "If you ever have trouble finding me," she once told her secretary, "try the stairs."

Professionally, Dr. Gendel has conducted two separate studies to examine the effects of exercise on women. In one she discovered that the common denominator for women who had difficulty resuming normal functions after pregnancy was a lifetime of inactivity. In another, with 150 college freshmen as her sample, she learned that those women who suffered least from allergies, headaches or menstrual cramps were those who exercised most. Dr. Gendel subsequently concluded that it is a myth to consider housework physically beneficial. "Woman's work," that age-old exercise, has left women weak in arms and upper bodies, knees, ankles and cardiovascular systems. Legs, which statisticians claim carry us an average of 60,000 miles in our lifetime, are considered a woman's strongest attribute. Yet even they lack strength and tone.

From the book The Backpacking Woman, copyright 1980 by Lynn Thomas. Published by Doubleday & Company, Inc.

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Aerobic exercises, such as jogging, improve the cardiovascular system, which processes oxygen and blood. The rewards may be weight loss, improved physical tone and enhanced self-esteem.

Now, however, we are entering a more energetic age. Doctors tell us that regular daily exercise enhances not only our bodies, but also our brains. We are encouraged to grow strong, to undertake physical conditioning. Backpacking is a gentle way of doing both, but before backpacking some preliminary conditioning is advised.

The ideal conditioning program involves two forms of exercise: aerobics and weight training. Aerobic exercise conditions the cardiovascular system—the heart, lungs, arteries and capillaries—which processes oxygen and blood. Weight training increases muscle tone, strength and endurance without building muscles.

With aerobic exercise almost everyone has a natural preference—choosing either to swim, bicycle, jog, walk or dance. Because it takes only twenty minutes a day and the track is as near as my front door, I opt to jog. Important as jogging is in strengthening calves and thighs, other backpackers prefer to swim. "Swimmers are often better backpackers," Dr. Gendel says, "they have strengthened their arms and shoulders."

To become aerobically fit you should exercise at least four times a week, covering increasingly longer distances in relatively shorter times. Your age and condition when you start the program make a difference. To determine your present cardiovascular condition, administer the pulse test. Using a clock or watch with a second hand, begin by sitting quietly for five minutes. Locate your pulse at your wrist and measure it by count-

ing the number of beats for thirty seconds. Multiply by two to determine how many times your heart beats per minute. While many doctors consider a pulse rate between 72 and 80 normal, other doctors, advocates of physical conditioning, contend that "normal" and "fit" are two different states. To them a pulse over 60 indicates a lack of physical fitness.

The pulse can be lowered and the body can achieve fitness by systematic exercise, but it is no overnight affair. As Dr. Kenneth Cooper, America's leading expert on aerobics, says, "If it has taken you ten years to get out of shape, plan to spend ten months getting back into shape."

The key to success in any fitness program is starting slowly. The jog-walk test is an excellent way to begin. First, pick a flat route or athletic track, the mileage of which you know. Start by jogging at a pace that is comfortable for you. If that becomes difficult, slow to a walk until your body feels ready to jog again. If in twelve minutes you cover more than a mile and a half, you are in excellent condition; if a mile and a quarter, your condition is good; if a mile or less, you are in poor shape.

Once you have determined your current condition you will find carefully diagrammed, age-coded conditioning programs for all forms of aerobic exercises in Dr. Kenneth Cooper's *The New Aerobics* and *Aerobics for Women* by Mildred Cooper.

Aerobic exercise is long on rewards—including weight loss, physical toning, bowel regularity, improved sex lives, clear complexions and enhanced self-esteem. There also is intrinsic pleasure in watching your body realize its potential, in gradually developing the strength and stamina to travel four miles in the time it once took to travel two miles.

Weight training, the second form of recommended exercise, has a notoriously bad name among women. Many confuse it with weight *lifting*, a competitive sport, or body building, an esthetic exercise. Having no desire to resemble Arnold Schwarzenegger (of *Pumping Iron* fame), I, for one, dodged it for years. Then I met Jane Dickerson.

Jane was a typical physical lightweight until she fell in love with mountain climbing. Within two years, with guided instruction, she climbed Washington's Mount Rainier twice, plus Mount Orizaba in Mexico. We met while she was training for a six-week traverse of Alaska's Mount McKinley. In a group of thirteen she was to be the only woman. Her goal on climbs is "not necessarily to be first, but certainly not to be last." To sustain that, Jane has practiced weight train-

ing for two years. She could have fooled me.

The woman answering the door had the look of a delicately wrought figurine. She was dressed simply, in a long-sleeved peasant blouse, slacks and strap sandals. Chestnut hair, casually barretted back, fell to her waist. There wasn't a muscle in sight, yet she was strong. When asked how much her strength had increased by weight training, she demonstrated by getting down on the living room carpet and completing fifteen full push-ups—the type that men do. "Two years ago," she beamed, "I couldn't have managed more than one of those." She isn't the only one. Kathryn Lance, prime advocate of weight training for women, maintains that if you can complete even one full push-up, you are stronger than most American women.

Clearly, Jane achieved all the bonuses of weight training with none of the bulges. Here is why. Because of the effects of female hormones, there is a limit to the size a woman's muscles can grow. This is proven by medical studies. In a ten-week weight training program one exercise physiologist discovered that when men and women of the same size followed the same program, the percentage of increased strength was the same for both sexes, but women generally developed only one-tenth the muscle mass.

Weight training is accomplished selectively and gradually, beginning with the muscles you use most. In backpacking this includes arms and upper body, lower back, legs and knees. A weight training program is managed best either by joining a local gym, as Jane did, or by following the tailored-to-backpacking guidelines that follow.

There is one other way to condition, and that is to backpack. Such conditioning can begin long before the journey. One seasoned hiker starts four months early by carrying groceries home from the store, or stuffing her pack with books and taking day hikes. Or, for the exceptionally busy woman, it can begin at the outset of the trip. But this latter approach is acceptable only if you are 30 or under, if the terrain is easy and the trip short, or if, on a longer trip, you start slowly and travel no farther than six miles a day for the first week. If this is not feasible, you will be courting discomfort and potential injury from the unaccustomed strain the pack imposes.

Teddi Boston, a 49-year-old mother of four who solo-hiked the 2600-mile Pacific Crest Trail, conditions with a backpack. Months before her epic journey, she hiked 25 miles each weekend under the weight of a fully loaded pack. Teddi acknowledges that the speed at which conditioning occurs relates directly to age. "Every year it takes me one day longer on the trail to get in condi-

tion," she says. She advises women to expect to spend one day on the trail conditioning for every year they are over 30. Given this formula, the 38-year-old should not push to perform at her peak level until after the eighth day of the trip.

Too few of us have such luxury of time on the trail. Therefore, some form of preconditioning is essential.

Because both aerobics and weight training place mild stress on the heart and lungs, physicians recommend that women over 30 have a checkup within the three months prior to the start of a conditioning program, including an electrocardiogram (EKG) taken at rest. If you are over 40, the EKG should be taken while you are exercising. Women over 60 should be examined immediately before embarking on any exercise program.

GUIDE TO GETTING FIT

To strengthen the areas backpacking stresses most, when preparing for any trip longer or more physically demanding than a relaxed weekend outing, the following preconditioning exercises are recommended.

Overall Conditioning—Jogging, Swimming

• While each aerobic exercise is beneficial, those that serve the backpacker best are jogging and swimming. With jogging, as the cardiovascular system is being conditioned, the thighs, calves and lower back are being strengthened. The ideal conditioning program would include jogging two miles a day for one month before the trip. If you prefer swimming, which develops strength in the arms and shoulders as well as in the legs, plan to cover one-half to one mile a day four times a week for one month before the trip.

Abdomen, Lower Back—Sit-Ups

• If your abdominal muscles are weak, start with a half sit-up. Lie flat on the floor with knees bent and arms at your side. Slowly raise your head, shoulders and chest off the floor, keeping your lower back flat. Return slowly to starting position. This is a half sit-up. When abdominal muscles have developed, advance to the full sit-up. In this, hands should be clasped behind your head and you should raise all the way up. To develop abdominal strength, do ten bent-legged sit-ups each day for one month before the trip.



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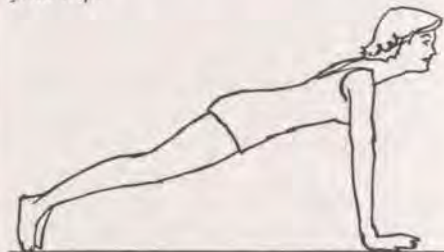
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Arms, Shoulders, Upper Body—Push-Ups

• If you are to lift a heavy pack without straining yourself, your upper body muscles must be developed. The push-up is considered the best overall strengthening exercise for the upper body. Because few women can perform a full push-up, begin the conditioning process with the negative push-up. Begin in the upper position of the standard push-up—palms under shoulders, arms straight, trunk and legs straight. Slowly lower yourself to the floor while keeping your trunk straight. Relax. Start with 5 negative push-ups; build to 20. Once arms develop, graduate to the full push-up, in which you both lower and raise your body with the strength of your arms. Work up to 10 full push-ups each day for one month before your trip.



Upper Back—Shoulder Shrug

• To avoid cramping in upper back muscles from the unaccustomed weight of the pack, you should strengthen the trapezius muscles, those triangular-shaped muscles covering your upper back. The best exercise for this is the shoulder shrug. Holding one five-pound weight in each hand (books, bricks or two filled paint cans will do), slowly raise your shoulders to your ears, if you can, then lower them slowly, rolling your shoulders backward. Start with two sets of six shoulder shrugs. When you can manage this with ease, increase the number of shrugs to eight, ten and eventually twelve. Next increase weights to eight pounds, and return to two



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sets of six shoulder shrugs, building eventually to twelve. The shoulder-shrug series should be performed once a day for at least one month before the trip.

Knees, Ankles—Knee and Ankle Lifts

Knees and ankles generate the highest incidence of injuries among women backpackers. To avoid such problems, incorporate two exercises into your preconditioning program.



● Sit on a surface high enough to keep your feet from touching the floor. Suspend a three- to five-pound weight from your foot—a small sandbag, say, or a paint can filled with sand. Slowly raise your lower leg until it is parallel to the floor. Hold for three seconds, then lower slowly. Perform this exercise twelve times with each leg. As thighs strengthen, gradually increase the number of knee lifts, eventually working up to 25 with each leg.

● Remain seated on the same surface as for the above exercise. Drape the three- to five-pound weight across the toes. Slowly elevate the foot from the ankle. Hold for three to five seconds, then lower. Do this with each foot. Begin with twelve lifts. As your ankles adjust to the weight and exercise, gradually increase the number of lifts you perform. Your goal should be 25 with each foot.

For one who has never tried it, conditioning may seem more struggle than fun, but the long-term benefits make it worthwhile. When, if, incentive begins to wane, simply remember this: the stronger you feel before you go, the better you'll feel as you go. That applies not just to backpacking, but to all areas of your life. □

Lynn Thomas is a freelance writer from Corte Madera, California, who has extensive backpacking experience.



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Early Images:

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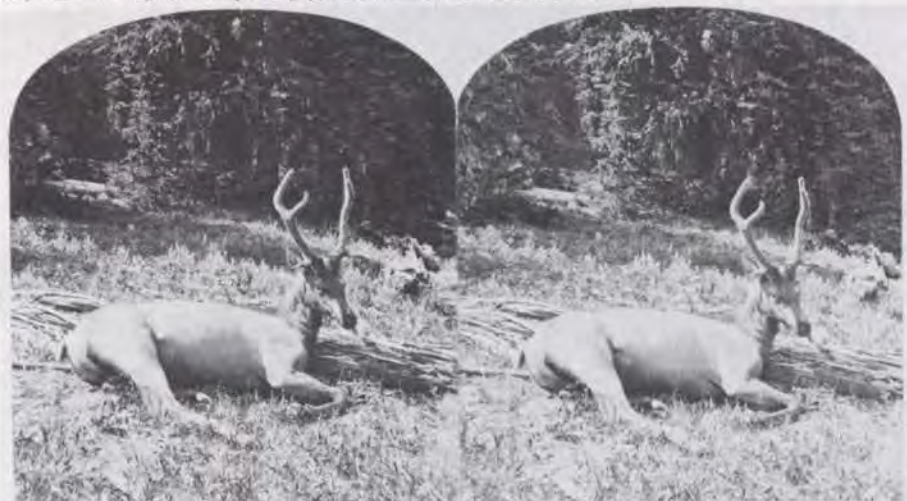


Collection of Timothy E. Wood



California Historical Society, San Francisco

Mary and Weston Naef Collection of Stereographs, Metropolitan Museum of Art, New York



Carleton Watkins photographed the sea lions (upper left) as well as the gulls, shags and murrets (upper right) at the Farallon Islands 35 miles off San Francisco's shore in the 1870s. The islands are now a marine sanctuary, although the Interior Department may allow oil and gas exploration in the

waters inside the boundaries of the sanctuary.

William Henry Jackson photographed the elk (above) in 1871 for the stereograph devices popular then; they provided a slightly different perspective for the right eye than for the left. There has been debate about whether the elk was alive at the time.

AMERICA WAS COMMITTED to moving west by the middle of the nineteenth century. The first half of the 1800s was devoted to a quick harvest of western furs and minerals and to the accompanying explorations. The second half of the century brought ranches and railroads, towns and telegraph lines, as well as a deeper yearning to understand the natural history of the great and varied land that stretched from the Rocky Mountains to the Pacific Slope.

The federal government set up massive surveys to find out more about what the land contained in the way of natural wealth. The geologists, geographers, naturalists and military men who led these surveys soon realized that documenting their explorations with photographs would help them get more funds from Congress as well as provide accurate and interesting supplements to their reports. That's how wildlife photography in western North America began.

Some of these photographers, from Carleton E. Watkins in the mid-1800s to Ed N. Harrison in the early and middle 1900s, achieved breakthroughs in wildlife photography. A few of the most notable people are Carleton Watkins, William Henry Jackson, L. A. Huffman, A. G. Wallihan and his wife, George Shiras III, Frank Michler Chapman, Joseph S. Dixon, Ed Harrison, and the team



of William L. Finley and Herman T. Bohlman.

The earliest photographers were rugged sorts. Carleton Watkins was already photographing the wonders of Yosemite in 1864 when he met Josiah D. Whitney and his California State Geological Survey in the valley. Whitney hired Watkins. Considering the equipment the photographer had at hand—a large and cumbersome camera, mammoth glass negatives 18 by 21 inches, slow shutter speeds and a heavy tripod—it is no surprise that his early images were of stationary western landscapes rather than swift-moving wildlife.

Watkins traveled continually up and down the Pacific Coast, producing images as he went. When wildlife subjects presented themselves and came within the limitations of his equipment, he did not overlook them. His photographs of sea lions and sea birds, taken in the 1870s on the Farallon Islands off the California coast, are true classics that received the same attention to composition and design as his noted landscape work.

William Henry Jackson, the well-known photographer of the Rocky Mountains, joined the F. V. Hayden Survey of the Territories in 1870. He worked for eight years with scientists studying the geology, flora and fauna of the Yellowstone and outlying areas. Jackson, like Watkins, was driven by a



In 1880 L. A. Huffman, "the frontier photographer," found buffalo grazing in the area he called "The Big Open" (top) before the mass slaughters of 1880-1883. Documenting the bison was one of Huffman's most important achievements.

In 1903 Herman Bohlman (above), who worked

with William Finley, climbed on Three Arch Rocks off the Oregon coast to photograph a guillemot's nest. Cameras then were bulky and fragile, and photographers sometimes needed nerves of steel to get the shot they wanted.



desire to record all aspects of the land where his survey team was traveling. His 1871 photograph of a reclining elk has been pondered by many curators of historical photographs—was it a live animal or one that was shot and placed in position for the photographer? Here, the answer is not as important as the fact that Jackson included wildlife in his survey portfolio along with the dramatic land forms. His photograph "Beaver's Work" taken in 1870 shows the limitations of the era's equipment, which required more-stationary subjects. But the appeal for Jackson of animals and their ways indicated a growing interest in photography as art.

L. A. Huffman photographed in Montana and is best remembered for his images of cattlemen, Indians and early life on the range. Often called "the frontier photographer," he got his start in 1878 as the post photographer at Fort Keogh, Montana Territory. Perhaps most important of all of Huffman's work, as far as the history of wildlife photography is concerned, was his documentation of the bison in their native and relatively undisturbed habitat before the great slaughter of the northern herds between 1880 and 1883. Huffman's images of bison grazing in the prairie and badlands between the Yellowstone and Missouri rivers, a huge area he referred to as "The Big Open," are masterpieces of early western wildlife photography.

As the nineteenth century was coming to a close, the Rocky Mountains were being crisscrossed by the determined family of A. G. Wallihan. Wallihan and his wife pursued and photographed wildlife as no one had before. They did not take pictures of wild animals occasionally when the opportunity presented itself, but systematically tracked and photographed their subjects. Mule deer, elk, antelope, mountain sheep, bobcats and mountain lions all were captured by their lenses. The Wallihans' work was brought together in 1901 as a book, *Camera Shots at Big Game*.

During the 1890s George Shiras III, a lawyer, spent a considerable part of his time photographing birds and mammals and developing the use of the flash for nighttime photography. Though he did his early work in Michigan and Canada, for which he was awarded a Gold Medal at the 1900 Paris World Exhibition (a milestone in wildlife photography), he traveled west to put his

One of Finley and Bohlman's striking accomplishments was to find a California condor's nest and photograph the bird's development from egg to maturity. Shown here are the adults alone (top) and with a chick (middle). Although they did not sign photographs individually, it's safe to assume Bohlman was the one who took the photograph (bottom) of Finley with pelicans.



talents to work in the Yellowstone, in the Kaibab Plateau of Arizona and in Alaska. Shiras studied and photographed western wildlife with a drive and enthusiasm that produced outstanding and lasting pictures. His two-volume set of *Hunting Wildlife with Camera and Flashlight*, published in 1935 by the National Geographic Society, is an enduring tribute to his early wildlife photography.

Another easterner, Frank Chapman of the American Museum of Natural History, traveled in the West making field studies and stiffs for a series of "habitat groups" of North American birds for his museum. Chapman's goal was to exhibit mounted specimens in facsimiles of their natural surroundings. He was a man of precise detail and accuracy and relied on his wildlife photography to achieve his end. From 1901 to 1908 he worked on this revolutionary project, producing strong wildlife images from Arizona, Wyoming, California and Oregon, as well as from western Canada. He also edited a journal called *Bird-Lore*, the forerunner of *Audubon* magazine. He saw the merit of "critter" photography in education and used good wildlife photographs in his magazine to promote an understanding of animals.

When early western wildlife photography is discussed, the names of William Finley and Herman Bohlman always come up.



In Yosemite National Park, Joseph Dixon got a remarkably clear picture of tule elk beating the heat (top). Dixon was noted for his photos' clarity, vitality and composition as well as for his willingness to help other photographers learn.

Finley and Bohlman, who took the picture of terns with open mouths (above), humorously ti-

tled the photograph "The Swearing Scene."

Ed Harrison's condors (opposite) offer a tempting target for anthropomorphic captions as they roost on their Southern California cliffs in the late 1930s or early 1940s. Today there are an estimated 30 California condors in existence.



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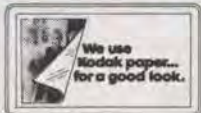
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These two lifelong friends tramped the fields, forests, mountains, deserts, coasts and islands of California and Oregon as no one else had done. Their work holds up today as some of the strongest in its field.

During the summers of 1901 and 1903, Finley and Bohlman studied and photographed bird life on Three Arch Rocks off the Oregon coast. They spent the summer of 1905 photographing and studying the birds at Lower Klamath Lake and Tule Lake, hoping to publicize and thereby stop the killing of grebes and herons for the millinery trade and the slaughter of ducks and geese by market hunters. They made a similar study at Malheur Lake during the summer of 1908. They presented a report and the results of their studies, complete with photographs, to President Theodore Roosevelt. Shortly thereafter the President issued a special executive proclamation setting aside Three Arch Rocks and Lower Klamath and Malheur lakes as bird refuges or sanctuaries. These areas are recognized today as three of the greatest federal bird reservations in the western United States.

During this same period, the spring and summer of 1906, Finley and Bohlman discovered an active nest site of the California condor and photographed our nation's largest and rarest bird from egg to maturity.

Finley continued his efforts to conserve all forms of wildlife, becoming the first state game warden of Oregon. Later he was hired as the Oregon state biologist and served for 20 years as field naturalist for the National Association of Audubon Societies. With his wife as coauthor, he published three books and wrote for popular journals such as *Bird-Lore* and *National Geographic*. He always used wildlife photographs as his ultimate weapon in educating the public about the need to protect our native flora and fauna.

Of the tribe of talented men and women who fanned out over the West in the early 1900s from the Museum of Vertebrate Zoology in Berkeley, California, under the guidance of noted biologist and naturalist Joseph Grinnell, none tooted the camera and applied its craft so well as Joseph Dixon. Dixon exemplified the true blend of scientist and artist. His excitement at capturing wild animals on film was transmitted in the vitality of his images.

His work illustrated such University of California publications as *The Fur-Bearing Mammals of California* and *Vertebrate Natural History of Lassen Peak*. He also collaborated with the National Park Service on a detailed survey (1926-1932) of the birds and mammals of Mount McKinley National Park, publishing a full account in 1938 as "Fauna of the National Parks, No. 3." Thumbing through this report, one can see

photographs of birds, animals, plants and habitats that are so striking in composition, clarity and feeling that it seems impossible to improve upon them.

It is a long road that Ed Harrison has traveled from a ranch outside Cody, Wyoming, to the president's office of the Western Foundation of Vertebrate Zoology in Los Angeles. The road has always led in the direction of preserving and photographing wildlife. His concern for the outdoors was stimulated by his association with the Denver Museum of Natural History in the early 1930s. During 1935 and 1936 he worked with William Finley and Stanley G. Jewett collecting and photographing wildlife in Oregon and Washington. This apprenticeship under Finley benefited both Harrison and the art of wildlife photography, because the craft passed from one generation to another. In 1938, Harrison teamed up with eminent wildlife biologist Carl Koford to document Koford's work on the California condor. After being interrupted by World War II, the two men put onto film and into field notes some of the condor's behavior that had never before been recorded.

In 1941, Harrison accompanied an expedition to the desert islands of Mexico that was sponsored by the Colorado Museum of Natural History and the National Geographic Society. His photographs, which appeared in that September's *National Geographic*, showed not only evidence of his association with Finley, but also that he was developing a style of his own. The National Geographic Society gave his work from the expedition an award for being the most outstanding wildlife photography of that decade. Today, Harrison continues his work in wildlife photography; some of his recent images come from the Galapagos Islands.

Nearly all the photographers mentioned here created and built their own cameras or other pieces of equipment to satisfy their special needs. But in looking back over this summary of their accomplishments, it seems amazing that they were able to come up with decent photographs at all, considering how crude and heavy their cameras were, how slow their shutter speeds were, and that they lacked any telephoto lenses.

Today the wildlife photographer has light motor-driven cameras, fast film and excellent long lenses that would turn the old-timers green with envy. Still, there is another side. The early photographers may have had technically inferior equipment, but they had a much better arena to work in, in terms of numbers of animals and acres of undisturbed wildlife habitat. □

Tupper Ansel Blake is a photographer, writer and naturalist specializing in birds and mammals of North America.



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Global 2000— And Then Some

NICHOLAS A. ROBINSON



The authors of the Global 2000 Report to the President said the report "presents a picture that can be painted only in broad strokes and with a brush still in need of additional bristles. It is, however, the most complete and consistent such picture ever painted by the U.S. government. Many rapid and undesirable developments are foreseen if public policies concerning population stabilization, resource conservation and environmental protection remain unchanged over the coming decades. Vigorous and determined new initiatives are needed around the world. These initiatives need to be taken soon while the picture is yet fluid and nations are still preparing to enter the twenty-first century."

CONCLUDING A three-year study of world problems in January 1980, former German Chancellor Willy Brandt and seventeen other world leaders such as former British Prime Minister Edward Heath made this blunt assessment: "The strain on the global environment derives mainly from the growth of the industrial economies, but also from that of the world's population. It threatens the survival and development opportunities of future generations. All nations have to cooperate more urgently in international management of the atmosphere and other global commons, and in the prevention of irreversible ecological damage."

Finally, policymakers internationally have announced their perceptions of the fundamental problems. What to do about them is the next question.

The finding of the Brandt Commission anticipated by half a year similar conclusions by the staffs of fourteen United States federal agencies, led by the Council on Environmental Quality and the State Department. *The Global 2000 Report to the President* projected the results if present trends continue without change to the end of the century. The world in the year 2000 may face these tough conditions:

- Trends show inadequate clean water, sanitation, basic housing, jobs, education and health services for the additional billion inhabitants to be born over the next 20 years.
- Loss of prime agricultural land to development, erosion and desertification will mean the world creates only 4% more farmland than it has now, although high-technology farming will increase yield so that world food production doubles.
- Food distribution patterns indicate North Americans will be able to increase their food consumption by 30%, but Africans must decrease their consumption and Asians keep theirs roughly the same.
- Fuel consumption patterns show prices escalating continuously as demand exceeds availability, with inflationary implications

throughout the world; firewood demand will exceed supply by 25%, and the energy needed by the new billion inhabitants will be hard to provide.

- Forests will continue to be destroyed at the rate of 18 million to 20 million hectares a year; every two years the world will lose forest cover the size of California; 40% of all forests in poorer nations will have been cut.
- As we lose forests and crowd out other species, we will cause the extinction of 500,000 to 2 million of them—as many as one fifth of the world's species.
- In the absence of effective pollution controls and land-use programs, water and air quality will deteriorate; the impacts of increasing carbon dioxide in the biosphere, decreasing ozone in the stratosphere and increasing pollution in the seas are too obscure to project, although damaging effects can be envisioned.

These trends tell only the statistical story. The quality of life is also important, and the picture looks bleak for that, too. Most of the new billion people will live in overcrowded city areas, where pollution will be concentrated. Will the new areas be shantytowns and slums with few schools, clinics and playgrounds?

Competition for scarce resources or pollution of shared river basins will lead to local conflict, as in the current Iran-Iraq battle. Security pressures will "justify" continued commitment of large sums to military capacity, although the 40,000 nuclear warheads already in the arsenals of a handful of nations are the equivalent of three tons of TNT for each person now alive.

Easing the tensions may be difficult. The world today lacks the trained personnel to manage land-use planning, undertake pollution control, provide environmental impact assessment and maintain parks and open space. In Canada and the United States we perceive this shortcoming; in most poor countries there is no understanding yet of the very need for these services.

These projections should be neither new

nor startling to readers of *Sierra*. The Club of Rome made similar predictions in 1972, described in *The Limits to Growth*. The Worldwatch Institute has also synthesized UN statistics to make much the same estimates. What is remarkable about both Willy Brandt's conclusion and *The Global 2000 Report* is that political leaders and government officers are finally joining scientists and environmentalists in finally acknowledging the problems.

International Action

What is to be done beyond sharing the perception of impending environmental harm with increasing numbers of people?

Achievable goals to arrest or reverse these trends can be identified, and, when they are, they need the backing of politicians, financiers and the public. One thing the Sierra Club has done is to create a network of cooperating citizens' environmental groups that share information worldwide through the Club's EARTHCARE Center at the United Nations. In this way, the center helps create transnational backing for new courses of action.

Environmental groups also work together with some governments through the International Union for the Conservation of Nature. IUCN has prepared a World Conservation Strategy designed to establish a common policy framework to maintain natural life-support systems, preserve genetic diversity, advance managerial and legislative programs, train personnel, advance research and expand education and public participation. The strategy needs urgent support and backing.

One important action to take as soon as possible is to seek to establish environmental impact analysis by more governments than the 30-some states and provinces and eight nations that have followed the pattern set by the U.S.'s National Environmental Policy Act. Senator Claiborne Pell has called for an international treaty on environmental impact analysis; this proposition deserves strong support from Congress and the State Department.

The stakes are high, as one example illustrates. Colombia currently wants to complete the Pan American Highway to Panama and must cross the Darien Gap, a 50-mile tract of tropical swamp and rain forest. In the early 1970s, the Sierra Club and the Cattlemen's Association successfully sued to prevent the United States from giving aid to this project without first completing an environmental impact assessment. The great danger in this case, the court agreed, was that if the aftosa ("foot-and-mouth" disease) rampant in Colombia travelled up the completed

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highway, the situation "could result in the destruction of up to 25% of North American livestock and an economic loss of \$10 billion as well as the extinction of such endangered species as the American bison."

A joint Colombian-United States project to control aftosa is now under way, as is U.S. design assistance to the road builders. But no such project as this road should proceed without a thorough regional environmental review. What steps will be taken to assure that aftosa controls are maintained? Panama and all of Central and North America would suffer greatly if controls were ineffective. It is exactly this sort of development that can boomerang us into realizing the trends identified in *Global 2000*.

In addition to sharing environmental protection techniques with developing countries, the advanced nations should share their advanced management skills with appropriate multilateral agencies such as the United Nations University or the U.N. Environment Programme (UNEP). The rich nations make UNICEF and the World Bank work successfully, but they have largely abandoned UNEP to ineffectual management and low budgets. Realizing a self-fulfilling prophecy, they now accuse UNEP of failure. This is a sad performance considering the extraordinary success of the UN's Stockholm Conference on the Human Environment in 1972.

Domestic Action

In addition to acting internationally, the United States must work at home to improve conditions. After *Global 2000* was released, President Carter requested a six-month study of recommendations for federal action to reverse the deleterious trends identified. Representatives of the Council on Environmental Quality and the Department of State prepared the recommendations and released them on January 14. They are admittedly tentative, "presented in the spirit not of a fixed or final program, but as a body of good ideas for the first round of an effective response to the immensely challenging problems before us."

The recommendations fall into three groups:

1) Since *Global 2000* documented the present inability of federal agencies to anticipate and evaluate global problems, some centralized authority should gather and assess information and foster development of an integrated U.S. strategy on resources, environment and population.

2) Specific remedial policies are sketched out that would cope with population growth, food production, renewable energy resources, tropical forests, maintenance of biological diversity, coastal and marine re-

source protection, water and air quality and nuclear and other hazardous wastes.

3) Finally, institutional recommendations are made to assure that the policies can be implemented.

But the report has weaknesses. Many of the recommendations require legislative action, and they would implicitly remake the United States' procedures for arriving at its foreign policies and its views on international environmental law.

The inventory of proposals is also uneven. For example, although there is nothing mentioned on the critical environmental protection issues of the draft Law of the Sea Treaty, there are two recommendations on Antarctica. One is, "The United States should ratify the Convention on the Conservation of Antarctic Marine Living Resources and should play a leading role in implementing it . . . to carry out the treaty's concepts of ecosystem management." The other is, "Before any development activities are permitted, there must be sufficient scientific information to allow an informed decision on whether the activities should take place at all and, if the answer is affirmative, where activities may occur and under what conditions and safeguards."

These positions are of limited value. Why not preserve the polar continent exclusively for scientific study, as was once the global view? Why encourage staking out oil and gas claims? What kind of international control ought to exist? The other specific recommendations are of mixed merit, some good and some so preliminary as to be of only minimal value.

The institutional changes are conservative and echo the reforms of the National Environmental Policy Act. They create a center to gather information, issue reports, advance integrated policy, oversee "action-forcing devices" and raise awareness of global problems. But the recommendations do a disservice, first by not acknowledging that NEPA now requires federal agencies to do environmental impact statements for actions abroad, and also by not advancing earlier proposals such as creating an international treaty on environmental impact review or creating new bilateral institutions such as the Panama-United States Joint Environment Commission.

In cumulative effect, the many small insults to natural systems globally are approaching the threshold of irreversible damage to the biosphere. It will take many small but important remedial or preventive measures to avert permanent harm. Each person, village, state and nation must act to maintain the natural world, and every new child over the next 20 years must be educated for this stewardship. □

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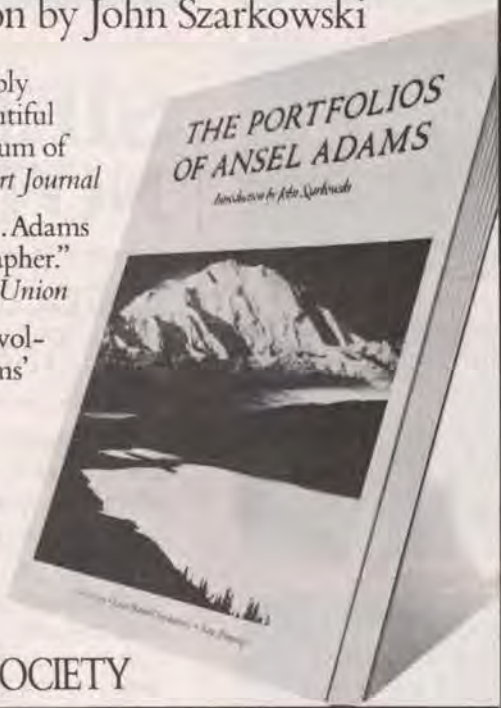
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North Canyon, Colorado River

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SIERRA CLUB OUTINGS

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A large number of Sierra Club 1981 outings are filled, with waiting lists for some, but many outings are still available. If you act promptly, you can probably find space on any of the trips listed below. Please refer to pages 49 and 95 of the 1981 Outing Catalog for application form, reservation instructions and deposit/cancellation/refund policy information, and page 56 of this issue of SIERRA for an outings information order coupon. Look for a special Outings section describing next year's Foreign trips in the July/August SIERRA and a listing of 1982 Spring trips in the November/December issue.

Trip Number	E = Educational outing * = Leader approval required	Date	Trip Rating	Trip fee (Incl. Deposit)	Deposit	Leader
Alaska Trips (See Raft Trips for other Alaska outings.)						
60	•Marcus Baker Ski Traverse, Chugach Mountains	July 6-25		735	70*	Beverly Belanger & Les Wilson
61	•Kenai Peninsula Highlight <i>*Per person deposit</i>	July 3-15		630	70*	Serge Puchert
Backpack Trips (See Foreign, Hawaii and Service Trips for other backpack trips.) <i>Rating—L = Leisurely, M = Moderate, S = Strenuous</i>						
143	•Old Trails of the Inyos, California	June 14-20	M-S	125	35	Laurie Williams
146	•Relief Valley Leisure, Emigrant Wild Basin, Sierra	June 23-30	L	145	35	Bob Berges
148	•Forgotten Canyon Leisure Loop, Golden Trout Wilderness/Sequoia Park, Sierra	June 29-July 10	L	195	35	Virgene & Charles Engberg
150	•Diamond Thielsen Wilderness, Cascade Range, Oregon	July 1-10	M-S	200	35	Jim Gifford
151	•Chapel Lake, Kings Canyon Park, Sierra	July 3-11	M-S	160	35	Sandy Merriam
152	•Rim of Coffee Creek, Trinity Alps, California	July 4-11	L	135	35	Laurie Williams
155	•Deep Creek Mountains, Utah	July 12-18	L-M	165	35	Eric Stroud
156E	•Southern Yosemite Leisure Photography Trip, Sierra	July 30-Aug. 7	L	195	35	Wes Reynolds
157	•Lake of the Fallen Moon, Kings Canyon Park, Sierra	July 13-21	M	155	35	Cal French
158	•Grizzly Lake, Trinity Forest, California	July 18-25	M-S	135	35	Grace Adams
159	•Strawberry Mountain Wilderness, Oregon	July 19-25	M	145	35	Bill Gifford
164	•Uintas Primitive Area, Utah	July 22-30	M	190	35	Bill Bankston
167	•Ruby Dome, Humboldt Forest, Nevada	July 26-Aug. 2	M-S	145	35	Ellen Howard
168	•Mt. Ritter/Lyell Loop, Yosemite Park, Sierra	July 28-Aug. 5	M-S	155	35	Serge Puchert
170	•Beartooth Mountains Vegetarian Trip, Montana	Aug. 1-8	M-S	185	35	Bill Neuman
172	•Red Fish Lake, Sawtooth Wilderness, Idaho	Aug. 2-8	M	170	35	Hal Covey
173	•Lake of the Lone Indian, John Muir Wilderness, Sierra	Aug. 2-9	M-S	140	35	Jim Watters
175	•Monarch Divide, Kings Canyon Park, Sierra	Aug. 6-15	M	190	35	Tom Landis
176	•Palisades Circuit, Sierra	Aug. 7-16	S	165	35	Carl Heller
178	•Black Hills Leisure, South Dakota	Aug. 9-15	L	175	35	Faye Sitzman
181	•Emigrant Meadow, Emigrant Basin, Sierra	Aug. 15-23	L	160	35	Helen & Ed Bodington
183	•Sawtooth Wilderness, Boise Forest, Idaho	Aug. 16-22	L-M	145	35	Veda Scherer
184	•Coppermine Pass, Kings Canyon and Sequoia Parks, Sierra	Aug. 16-23	M-S	150	35	Don Donaldson
186	•King Spur, Kings Canyon Park, Sierra	Aug. 22-30	M-S	155	35	Mad & Jim Waiters, Jr.
187	•Le Conte Divide, John Muir Wilderness/Kings Canyon Park, Sierra	Aug. 23-31	M-S	150	35	Joe Russell
198	•Triple Divide Peak, Yosemite Park, Sierra	Sept. 6-15	M	160	35	Ken Maas
199	•Mahoosuc Range, White Mountains, New Hampshire	Sept. 12-18	S	210	35	Craig Caldwell
201	•Kern Basin, Sequoia/Kings Canyon Parks, Sierra	Sept. 12-20	M-S	160	35	David Reneau
202	•Mineral King in the Fall, Sequoia Forest, Sierra	Sept. 13-20	M	135	35	Paul Von Normann
204	•Calf Creek-Harris Wash, Escalante River, Utah	Sept. 27-Oct. 3	L-M	150	35	Peter Curia
206	•North Rim, Grand Canyon, Arizona	Oct. 4-10	S	155	35	c/o John Ricker
208	•Cherokee Homelands, North Carolina, Tennessee	Sept. 26-Oct. 3	L	205	35	Dave Bennie
209	•Grand Canyon, Arizona	Dec. 27-Jan. 2	M-S	165	35	Lester Olin
Junior Backpack Trips						
214	•Ionian Basin, Kings Canyon Park, Sierra	June 29-July 8	S	180	35	David Neumann
216	•Gilbert Peak, Painter Basin, Uintas	July 22-30	M	165	35	Andy Johnson
217	•Little Five Lakes, Sequoia Park, Sierra	July 26-Aug. 2	M-S	145	35	Jim Absber

Trip Number	E = Educational outing * = Leader approval required	Date	Trip Rating	Trip fee (Incl. Deposit)	Deposit	Leader
218	•Cathedral Range, Yosemite Park, Sierra	Aug. 1-9	M-S	160	35	Ed Shearin
219	•Try Again For Hutching Creek, Sierra	Aug. 9-16	M	145	35	Lynne McClellan-Loots

Base Camp Trips (See Hawaii, Ski and Wilderness Threshold for other Base Camp outings.)

34	Spring in Canada's Coast Range, Tweedsmuir Park, British Columbia	May 11-17		240	35	Katie Hayhurst & Dennis Kuch
35E	Natural History of Mono Basin, California	June 13-20		190	35	Ray Des Camp
66	Devils Bathub Base Camp, John Muir Wilderness, Sierra	July 5-12		*195	35	Perry Harris
68	Rush Creek Alpine Camp, Minarets Wilderness, Sierra	July 12-24		295	35	Sy Ossotsky
69	Midnight Lake Mountaineering Camp, John Muir Wilderness, Sierra	July 18-Aug. 1		295	35	Brent Miller
70	Seven Gables Back Country Camp, John Muir Wilderness, Sierra	July 25-Aug. 8		400	35	Ray Des Camp
71	Baboon Lake Base Camp, John Muir Wilderness, Sierra	July 26-Aug. 7		295	35	Ed Miller
72	Rangeley Lakes, Rangeley, Maine	Aug. 9-15		230	35	Russ Calkins
73	Hooper Lake Alpine Camp, John Muir Wilderness, Sierra	Aug. 9-21		295	35	John Swanson
75	Iron Mountain Alpine Camp, Minarets Wilderness, Sierra	Aug. 16-28		295	35	Norm Kindig
78E	•Appalachian Mountains Photography Trip, North Carolina	Oct. 12-17		195	35	Lincoln Roberts
80	Cabeza Prieta, Arizona	Nov. 22-28		165	35	John Ricker
81	Death Valley Christmas Camp, Death Valley Monument, California	Dec. 20-29		235	35	c/o Ray Des Camp
82	St. John, The Virgin Islands	Dec. 27-Jan. 3		165	35	Shirley Proctor

*Children under 12, \$175

Family Trips (See Base Camps and River Raft for other trips with family rates)

Wilderness Threshold

Trip Number	Trip	Date	Parents and one child	Each addl. child	Deposit	Leader
104E	•Navajoland Cultural Experience, Canyon de Chelly, Arizona	Aug. 16-25	905	235	35	Dolph Amster

Bicycle Trips (See Hawaii and 1981 Foreign Trips for other Bicycle outings.)

31	•Oregon Coast to Cascades Tour, Oregon	May 16-23		165	35	Bill Bankston
87	•Mt. Desert Island, Acadia Forest, Maine	June 21-27		185	35	Kevin Cresci
88	•Lake Louise Bike and Hike, Canadian Rockies, Alberta	Aug. 8-15		255	35	Sharon & Bob Hartman



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Trip Number	E = Educational outing * = Leader approval required	Date	Trip fee (Incl. Deposit)	Deposit	Leader
89	•Around Delaware Bay, Pennsylvania, Delaware, New Jersey	Oct. 4-10	155	35	Herb Schwartz
Foreign Trips (Trip prices are subject to change prior to trip and do not include airfare. All deposits are per person.)					
740	•Wales	June 5-22	1640	100	Lori & Chris Loosley
745	Hike and Bike in Ireland	June 24-July 7	1185	100	Frances & Patrick Colgan, c/o Phil Gowing
755	Lakes and Savannas of Kenya, Africa	July 3-25	2140	100	Al Schmitz
760	•Tour du Mont Blanc, France	June 28-July 11	1290	100	Pat Hopson & Richard Williams
770	•Yugoslavia: Kamnik and Julian Alps	July 12-25	950	100	Fred Gooding
775	•East Africa Wildlife Safari, Kenya and Zambia	Aug. 10-28	2465	100	Pete Nelson
805	•Manaslu Circle Trek, Nepal	Nov. 3-Dec. 4	1600	100	Wayne Woodruff
900	Baja Driving and Hiking Adventure	Dec. 28-Jan. 8, 1982	TBA	100	c/o Betty Osborn
905	Tanzania Game and Natural History Safari	February 1982	TBA	100	Betty Osborn
910	•Trekking in Nepal	April 1982	TBA	100	Ginger Harmon
915	•Langtang Trek, Nepal	March 15-April 7, 1982	795	100	Peter Owens
Hawaii Trips (Trip prices do not include airfare.)					
120	•Hawaii's Remote Coastlines Backpack	June 13-24	455	35	George Winsley
121	•Bicycle Tour of Maui	July 30-Aug. 13	475	35	Phil Coleman
122	•Kauai Bicycle Trip	Aug. 17-31	475	35	Thelma Rubin
123	Christmas and New Year's on Hawaii	Dec. 23-Jan. 1, 1982	505	70*	Wheaton Smith
*Per person deposit					
Highlight Trips (See Alaska for another Highlight Trip.)					
125	Wilmore/Mt. Robson Parks, British Columbia	July 14-23	540	70*	Al Combs
126	Big Five Lakes, Sequoia Park, Sierra	July 26-Aug. 4	455	35	Len Lewis
129	Evolution Meadow, Kings Canyon Park, Sierra	July 28-Aug. 7	425	35	Al Fritz
133	Anza-Borrego Desert Park, California	Dec. 27-Jan. 2, 1982	265	35	Judy & Pete Nelson
*Per person deposit					
Service Trips					
Trail Maintenance Projects					
220	•Monument Lake, Marble Mountains Wilderness, Klamath Forest, California	July 1-11	75	35	Roy Bergstrom

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Trip Number	E = Educational outing • = Leader approval required	Date	Trip fee		Leader
			Incl. Deposit	Deposit	
221	•Targhee Tetons, Targhee Forest, Idaho	July 10-20	75	35	Bruce Horn
222	•Davis Lake, Inyo Forest, Sierra	July 11-19	75	35	Dave Bachman
223	•Cyclone Gap, Klamath Forest, Siskiyou Mountains	July 13-23	75	35	Marc Lacrampe
226	•George Lake, John Muir Wilderness, Sierra	July 26-Aug. 5	75	35	Bryan Wilson
227	•Elk Lake, Bighorn Forest, Wyoming	July 29-Aug. 8	75	35	Bill Orr
229	•Guanella Pass, Colorado Front Range	Aug. 9-19	75	35	Jim Bock
230	•McGee Pass, Inyo Forest, Sierra	Aug. 10-20	75	35	Dave Simon
232	•Rock Creek, Sequoia/Kings Canyon Parks, Sierra	Aug. 19-29	75	35	Susan Liddle
233	•Lost Keys Lakes, John Muir Wilderness, Sierra	Aug. 25-Sept. 4	75	35	Keith Proctor

Special Projects

237	•Lakes Basin Revegetation, Eagle Cap Wilderness, Oregon	Aug. 26-Sept. 5	75	35	Brook Milligan
238	•New Denver Glacier, Valhalla Range, British Columbia	Sept. 4-14	75	35	Ann Kitchen & Dave Wallace
239	Grand Canyon Tapeats Creek Trail Maintenance Project	Oct. 10-14	100	35	Teresa Balboni

Ski Trips (See Alaska Trips for another Ski outing.)

288	Maine Back Country Ski/Snowshoe Tour	January 1982	+	35	Fred Anders
289	•Adirondack Ski Touring, New York	January 1982	+	35	Walter Blank
290	Boundary Waters Cross-country Ski and Snowshoe, Minnesota/Ontario	March 1982	+	35	Stu Duncanson

†1982 Ski Trip prices available Summer, 1981

Water Trips

Raft Trips

245	Green River Dory Trip, Utah	June 21-26	+520	+70*	Wheaton Smith
246	Grand Canyon Oar Trip, Arizona	July 2-13	1015	70*	Grace Hansen
247	Main Salmon River, Idaho	July 5-10	675	70*	Mary O'Connor
248	Rogue River Paddle Trip, Oregon	July 6-10	390	35	Rollin Rose
250	Kobuk River, Brooks Range, Alaska	July 28-Aug. 7	1195	70*	Victor Monke
251	Grand Canyon Oar Trip, Arizona	Aug. 1-12	1015	70*	John Garcia
255	Rogue River, Oregon	Aug. 3-7	390	35	Frankie Strathairn
256E	Copper River Natural History Expedition, Wrangell-St. Elias Monument, Alaska	Aug. 5-18	1420	70*	Gary Larson
258	Grand Canyon Oar Trip, Arizona	Aug. 16-27	1015	70*	Bruce MacPherson
259	Grand Canyon Oar Trip, Arizona	Sept. 30-Oct. 11	1015	70*	Mary Miles
260	Rogue River, Oregon	Aug. 31-Sept. 4	390	35	Lynn Dyche

†\$40/\$35 for children under 12

Sportyak Trip

261	San Juan River, Utah	June 30-July 5	570	70*	Jeanne Watkins
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Canoe Trips

266E	•John Day River, Oregon	June 30-July 7	285	35	Pat Dell'era
267	•Yukon River, Yukon Territory, Canada	July 5-19	520	70*	Peter Bengston
268	•The Wide Missouri, Montana	July 25-Aug. 1	295	35	Chuck Schultz
270	•Upper Mississippi Wildlife and Fish Refuge, Wisconsin, Montana, Iowa	Aug. 9-16	225	35	Jim Kirk
272	•Kipawa Reserve, Ontario	Aug. 23-Sept. 2	260	35	Richard Weiss
273	•Blue Mountain Lake, Adirondack Mountains, New York	Sept. 12-19	180	35	Fred Anders
274	•Lower Canyons, Rio Grande, Texas	Oct. 10-17	195	35	Steve Hanson

*Per person deposit

NEW SERVICE TRIP!!

(239) Grand Canyon Tapeats Creek Trail Maintenance Project—October 10-24, 1981. Leader: Teresa Balboni, Box 1305, Grand Canyon, AZ 86023.

From high in the North Rim of Grand Canyon, the Thunder River pours forth in a waterfall from the redwall sandstone to begin its descent to the Colorado. Several miles of trail between Thunder River Spring and the Colorado along Tapeats Creek are in need of repair. This moderate-to-strenuous outing is scheduled for the cooler season and is longer than the usual service trip. On free days, hikes to Deer Creek, Surprise Canyon and nearby Indian ruins will beckon.

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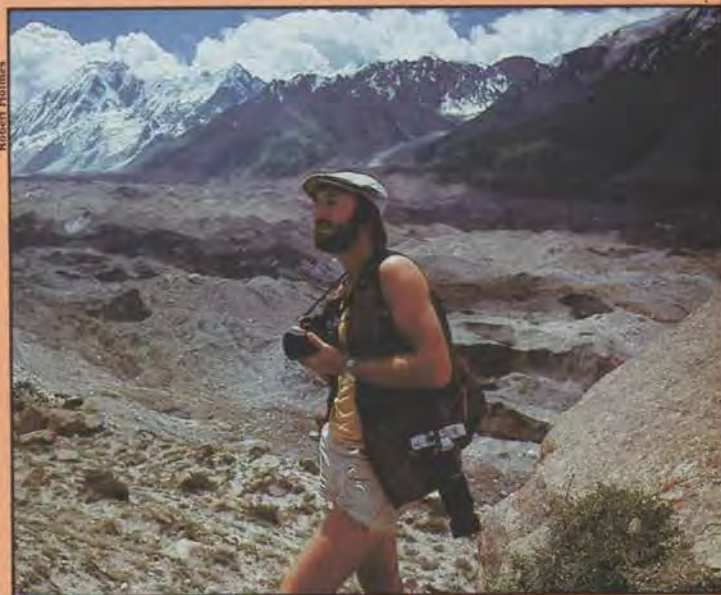
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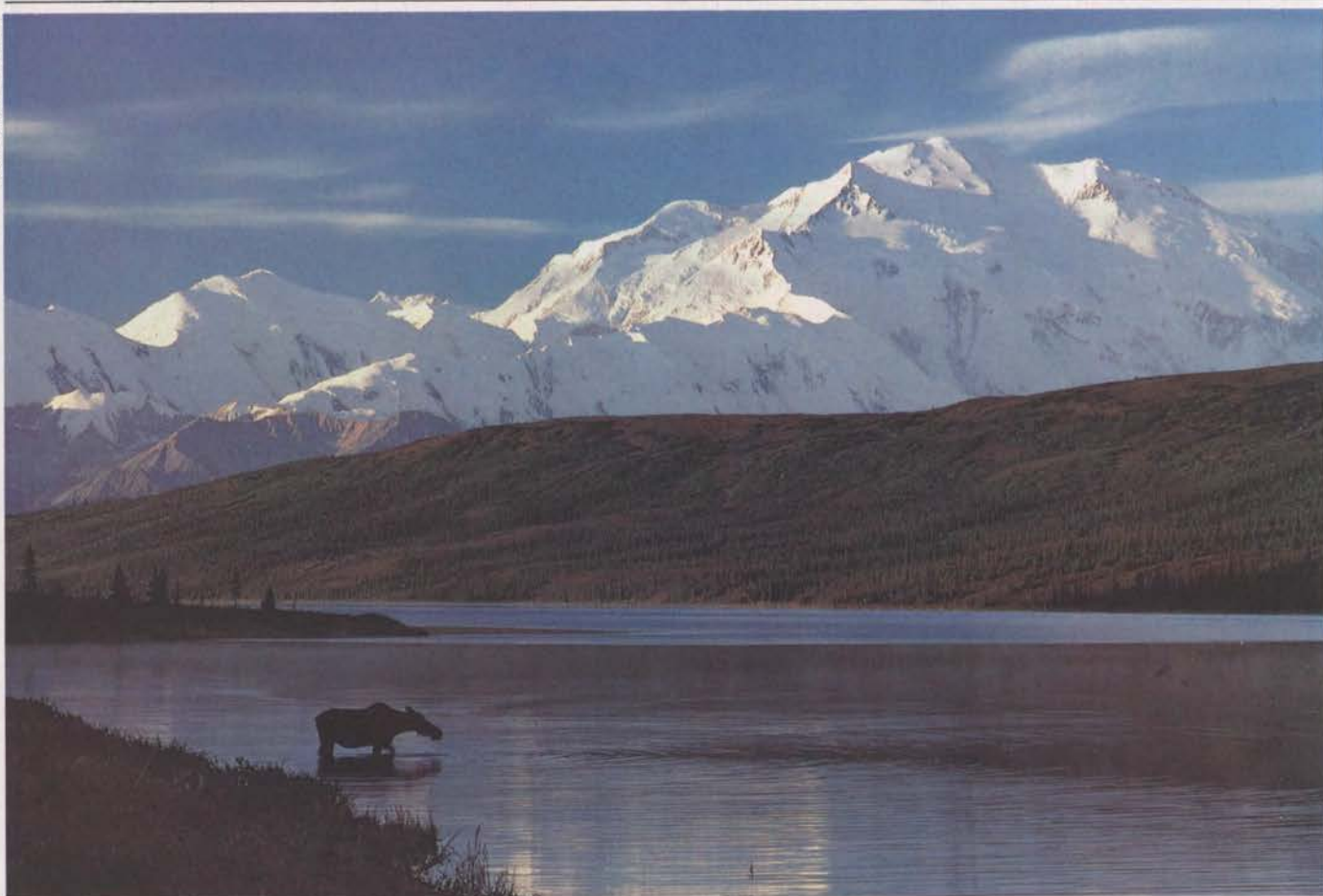
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ALL QUIET ON THE ALASKA FRONT?

EDGAR WAYBURN

*"The tumult and the shouting dies,
The captains and the kings depart . . ."*

—RUDYARD KIPLING

THE GREAT VICTORY WAS WON with the signing of the Alaska National Interest Lands Conservation Act by President Carter in December 1980—or you might say the inevitable compromises were made. At any rate, the loyal and dedicated band of conservationists who had built enthusiasm to a peak and sustained a four-year effort sighed with relief that the task was accomplished. The hard-driving workers of the Alaska Coalition returned to their organizations or left Washington for vacation or education. For the vast majority of conservation activists there were many other problems to solve, and much other work to do.

Meanwhile, events continued to move apace. Before he left office, Secretary of the Interior Cecil Andrus published in the *Federal Register* interim management regulations for the conservation units established by the Lands Act and offered them to the public for comment. Now Secretary of the Interior James Watt has the comments under review. Later this year, the Watt team may propose final comprehensive regulations for the new national park, national wildlife refuge and wild and scenic river units.

Some omens of the present administration's policy are found in the secretary's announcement that "the President proposes to refocus substantially the department's conservation and preservation programs. This will be accomplished through moratoriums on federal land purchases and elimination of funding for three major state grant programs and by significantly increasing the resources available for existing National Park Service areas."

At the same time, the administration is curtailing the 1982 budgets of the National Park Service and the Fish and Wildlife Service for planning and management in Alaska. Special studies required by the act that would cost \$1.4 million were carved from the Fish and Wildlife Service's budget, as well as more than \$1 million for fish and wildlife management. The Bureau of Land Management, responsible for wild and scenic rivers, would have no planning funds for designated rivers nor funds for analyzing the study rivers listed in the act.

On March 12 Secretary Watt issued a sweeping series of orders on Alaska to his assistant secretaries. He decided that no further wilderness inventory, review, study or consideration by the Bureau of Land Management was to be undertaken in Alaska, except in the one area mandated in legislation. He announced that the administration would cancel the Carter Administration's negotiations with Canada for a treaty designed to protect the caribou herds that range across the border of the two countries.

Oil and gas leasing of federal Alaska land and waters is being speeded up at the expense of land-use planning, wildlife studies and wilderness reviews. The U.S. Geological Survey has been designated as the lead agency in preparing a required report to Congress on oil and gas potential and wildlife resources of the Arctic National Wildlife Refuge, although the Fish and Wildlife Service, which manages the refuge, had previously been so designated by former Secretary Andrus. In addition, Secretary Watt has ordered the FWS to complete its fish and wildlife study by the end of 1981, whereas Congress specified a "continuing" five-year effort. Under the act, seismic exploration can begin after December 1982, with a congressional decision on possible development due no earlier than December 1985.

The secretary has also ordered the BLM and the Fish and Wildlife Service to expedite oil and gas development on their lands. On the refuges, this speed-up will take precedence over the act's comprehensive plans and wilderness reviews.

In the National Petroleum Reserve—Alaska, the secretary is expediting the congressionally set schedule. Six million acres, an area about the size of Vermont, have been selected by the Bureau of Land Management for further government and industry assessment. This will lead to the largest onshore competitive oil and gas leasing sale offering in U.S. history. Up to 2 million acres could be sold by December 1981. The areas involved include the Western Arctic Caribou Herd's calving area, the Teshepuk Lake waterfowl area and critically important peregrine falcon nesting areas, as well as a portion of the Brooks Range, not previously thought by the USGS to contain significant amounts of oil and gas, adjoining the Gates

of the Arctic National Park and the Noatak National Preserve.

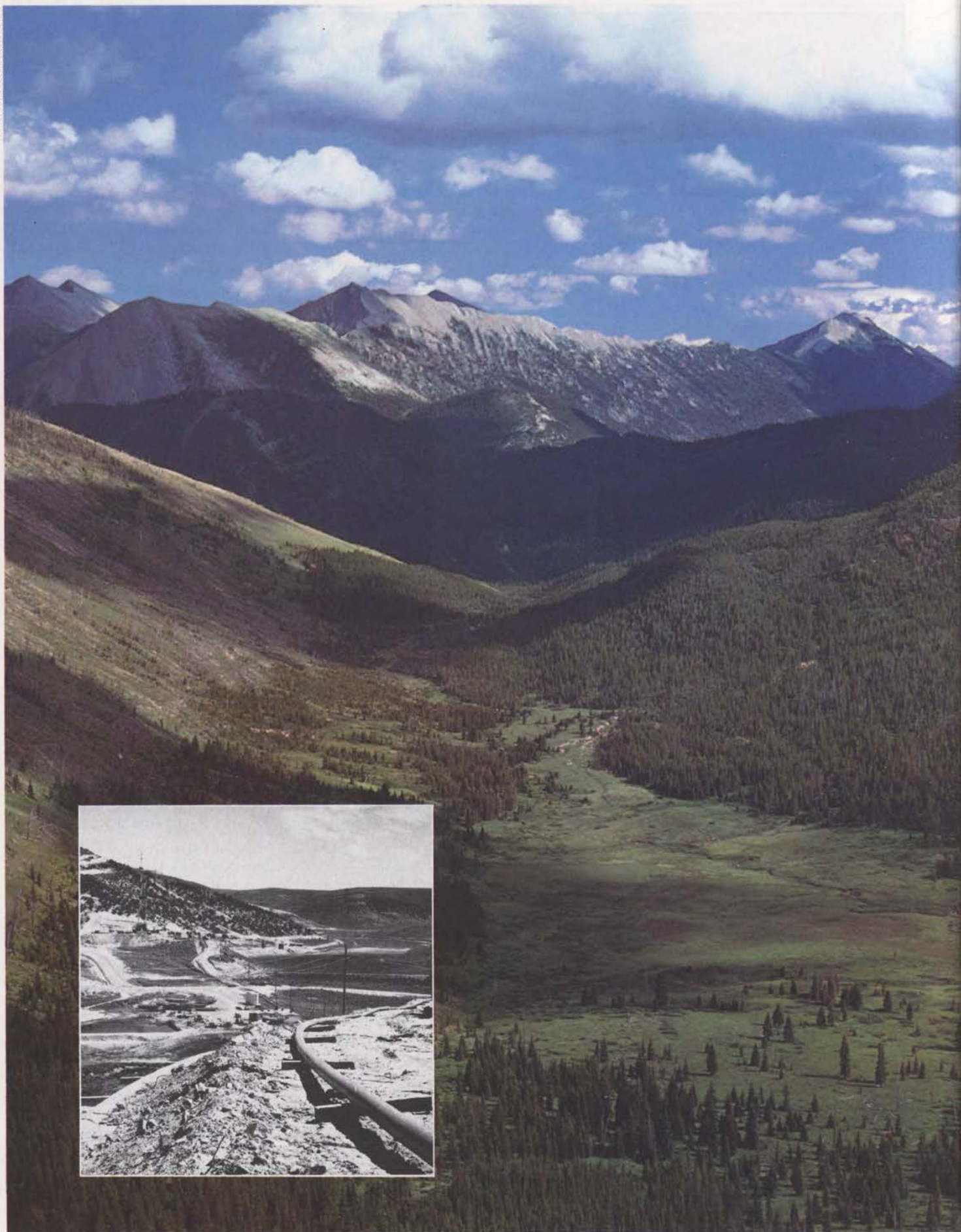
Lower Bristol Bay (the Aleutian Shelf) is the target of a 1983 lease sale, although it is the home of the world's largest red (sockeye) salmon fishery, and the state of Alaska has joined fishermen and conservationists in opposing the sale.

Mining and lumber interests have been very active, especially in Southeast Alaska. U.S. Borax is moving swiftly with plans for its molybdenum mine in the heart of the new Misty Fjords National Monument. Intense controversy surrounds the company's proposed access road and its plans to dump mill tailings in one of the monument's fjords. Local fishermen believe their salmon fisheries will be irreparably damaged, and conservationists fear the impending damage to the surrounding national monument. Noranda Mining Company leads a multinational group that is approaching the development stage in the northern part of the Admiralty Island National Monument, where the damage from mill-tailings disposal could be similar to that at Misty Fjords.

Elsewhere, in the Tongass National Forest the proposed wilderness areas not included in the lands Act are seriously threatened by the act's mandate that the U.S. Forest Service sell 450 million board feet of timber a year for ten years. The Forest Service may offer 520 million board feet a year in order to sell 450 million.

What has been recounted above concerns federal lands and waters in Alaska. This is only part of the total picture. The state's oil and gas drilling programs, its mandated land disposal program of 100,000 acres every year, its opening to public use of the trans-Alaska Pipeline Haul Road north of the Yukon River and its funding of multiple hydroelectric schemes highlight a host of problems in the state that are less obvious to people outside.

At this moment the conservation movement's efforts to protect Alaska are at a lower ebb than at any time since the big push for the Lands Act was begun. In the overall struggle, the act proved to be phase one. The battle is now in phase two. If, indeed, the captains and the kings—and particularly the troops—continue to depart, the tumult of the passage of the act could have been in vain. □



Wildcatting in the Wilderness

BRUCE HAMILTON

THE MILLION-ACRE Bob Marshall Wilderness in Montana is the "flagship of the wilderness fleet," according to R. Max Peterson, chief of the U.S. Forest Service. But it may soon become a casualty in the struggle between wilderness preservationists and the oil and gas companies.

Throughout the country, wherever sedimentary rocks that could contain oil and gas underlie wildland preserves, battle lines are being drawn.

"I have some strong personal feelings for the Bob Marshall," Peterson told a press conference in Missoula, Montana, last June. "But I can't let those feelings enter into my decision-making as chief of the Forest Service. Emotions wouldn't hold up too well in court." Peterson will decide whether to open the Bob to oil drilling and road and pipeline construction; the regional forester will decide on seismic blasting.

Peterson would "like to see us look for oil and gas opportunities elsewhere first." But he also recognizes that "there are only a few small areas in the world where all the minerals were deposited." That's why the Forest Service "cannot simply shut off that land.

"It would be one thing to put rigs on the outer fringes—and quite another to crisscross the area with wells," he mused. "You know we could end up having exploratory wells all over the wilderness and find nothing. Or we could find another Prudhoe Bay. There's no way to tell."

The chances of finding another Prudhoe Bay-sized oil field are nearly impossible in the geologically jumbled Montana Overthrust Belt, but the exploratory work itself would degrade or perhaps destroy the wilderness character of the land. "Drilling in mountainous country differs dramatically from drilling on the flatlands, and the environmental impacts can seriously detract from wildland values," says Ed Madej, a Montana Sierra Club member and a leader of the Bob Marshall Alliance. "Until now, the rugged geography of the Bob Marshall country has been its best defense against intrusions of industrial development. Road

builders face two options—sticking to the stream bottoms, with problems of flooding and erosion, or challenging the steep mountainsides, which are notoriously unstable and prone to landslides."

Oil company representatives and some Forest Service officials believe wilderness and oil exploration don't have to be mutually exclusive. In the case of the Bob some of these people think that, with careful timing and placement, they can detonate 270,000 pounds of dynamite along 200 miles of seismic lines without disturbing grizzly bears, bald eagles, elk, mountain goats and other wilderness inhabitants.

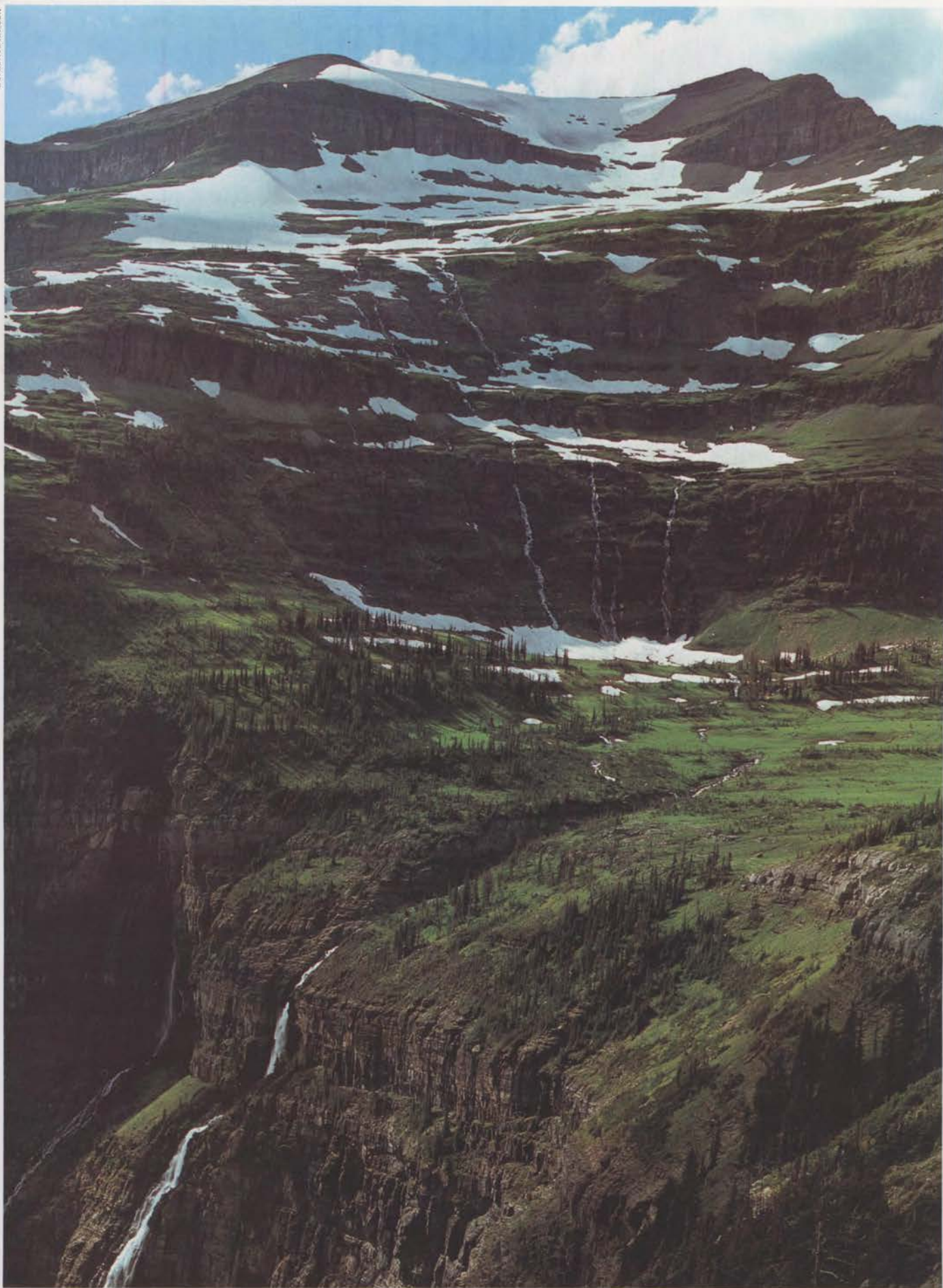
But Elizabeth Smith, a spokeswoman for the Bob Marshall Alliance, dismisses plans for stipulations and mitigations as "velvety talk." Oil and gas exploration in the Bob, whatever the restraints, "is like slashing the face of the Mona Lisa," she says. "Whether the painting is attacked with a cleaver or a razor blade, the essential crime is the same."

She asks, "Why is it that destroying man's greatest creations, such as works of art, is considered criminal, while destroying nature's greatest creations is considered objective, or balanced or practical?"

Other wilderness areas are also threatened; the William O. Douglas Wildlife Range on Alaska's North Slope—home of the renowned Porcupine caribou herd—tops industry's shopping list. The Teton Wilderness in Wyoming, the West Elk Wilderness in Colorado and Glen Canyon National Recreation Area in Utah are all under assault. California condor habitat in California, grizzly bear habitat in Montana, bald eagle habitat in Idaho and black-footed ferret habitat in North Dakota are all in jeopardy.

No land seems too precious to disturb in this search for black gold. Even the national parks are dodging the derricks, although it would take an act of Congress to allow wildcatting within park boundaries. Rigs already ring Theodore Roosevelt National Park in North Dakota and suck oil from beneath it, and pressure is growing to allow drilling within the park. Last year an article titled "National Parks Could Be Freed for Exploration" appeared in the *Western Oil Reporter*. It announced an ongoing campaign to "unlock" Glacier National Park in Montana, Dinosaur National Monument in Col-

Big River Meadow (left), in the Bob Marshall Wilderness. The inset shows what happened when development followed successful exploration at Painter Reservoir, Wyoming.



orado and Utah. Fossil Butte National Monument in Wyoming and other federally protected areas.

Wilderness areas do not have the congressional protection that national park status affords. Instead, conservationists must rely on the discretionary power of federal land managers. To date, the Forest Service has deferred action on lease applications in wilderness, but that policy is changing. Last December the agency released proposed guidelines on how to process leases in designated wilderness, administration-endorsed wilderness and congressionally approved wilderness study areas.

The Wilderness Act includes a loophole that some people feel is big enough to allow dynamite and derricks, mud pits and pipelines. Under the act, new leasing, exploration, drilling and production are allowed until midnight December 31, 1983. Companies that establish rights before then can continue operations after the cutoff date.

As the midnight hour approaches, oil companies' efforts have intensified. In January, speculators and energy companies filed suit in federal court in Wyoming demanding the issuance of leases in the Teton Wilderness between Yellowstone and Grand Teton national parks. The Sierra Club has intervened in this case to protect the wilderness. Energy companies are also mounting a campaign to extend or eliminate the Wilderness Act's cutoff date.

This looming deadline may be creating an artificial pressure to establish legal footholds

in the wilderness while ignoring more promising and more accessible acreages already under lease. Nationwide, nearly 500 million acres are already leased for oil and gas, according to a survey by the Newhouse News Service.

In the East, 85% of West Virginia, 62% of Louisiana and 58% of Ohio and Pennsylvania are already leased. In the West, 60% of Wyoming, 53% of Utah and Colorado, 37% of New Mexico and Montana, 34% of Oklahoma and 29% of Texas are in the hands of oil companies and speculators, according to the Newhouse survey. Smaller percentages of the other states are also leased.

James Posewitz, a Montana conservationist and state Fish and Game Department official, points out that there are vast expanses of non-wilderness land already leased or available for leasing, but only 3% of the lower 48 states could ever be designated wilderness. He asks, "If our industrial and economic system cannot be sustained by our traditional terrain of exploitation, how can America's tiny remnants of wilderness come to the rescue?"

Why, then, do the oil companies want to lease more land? The answer is not necessarily to drill for oil immediately. The oil industry is exploring only a small percentage of the land it already controls. Oil companies consider the leased land safely in their hands and continue their efforts to secure the remaining unleased acreage that has been "locked up." They have convinced President Reagan and his advisors that, if these re-

maining lands were opened up to development, there would be no energy shortage in this country.

In sharp contrast, former Interior Secretary Cecil Andrus told Senator Henry Jackson, after a thorough review of the leasing situation last year, "My conclusion is that more leasing for its own sake or simply more land for development will not in themselves increase the development of energy resources. Our central challenge is to get more development from existing and pending leases. . . . Of the leases issued, 75% to 80% expire without drilling proposals."

Andrus told the *Wall Street Journal*, "It is evident that federal lands are being withheld from exploration and development by the industry itself." It is the oil and gas industry that is "locking up" public lands.

But the oil industry's alarmist cries were heeded throughout the Carter years. During RARE II (the Forest Service's second wilderness inventory), as a direct result of the industry's claim that oil and gas *might* exist beneath roadless areas in the Northern Rocky Mountain Overthrust Belt, more than 90% of the acreage was excluded from recommendations for wilderness. In addition, the final environmental impact statement on RARE II included a provision mandating oil and gas exploration in areas recommended for further planning.

During the Bureau of Land Management's wilderness review, a special accelerated schedule was set up for roadless areas in and around the Overthrust Belt from Cana-



Tom & Pat Leeson

The Hole in the Wall Basin (left) in Glacier National Park is an area oil and gas interests want to exploit. Many of the areas currently at stake are prime habitat for the endangered grizzly bear (above).

What You Can Do

We *can* protect important natural areas from being sacrificed to exploiters, despite their campaign to "get it all." It will take hard work—and skill. Here's what you can do:

Learn the process. Once a lease is issued, it's hard to stop seismic blasting, road-building and drilling. But the Forest Service and the Bureau of Land Management *do not have to* issue leases. Find out what the leasing status is on areas you care about and what the agencies' plans are. Make sure management plans include specifics on leasing policy. Ask questions.

Monitor development plans. Where oil exploration does take place, its impacts on wildlife can be reduced. Timing of seismic blasts and drilling operations should be adjusted to avoid sensitive seasons of the year. All roads should be

obliterated and the land reclaimed after drilling tests are complete.

Spread the word. Oil, gas and James Watt are hot news. Tell your local newspapers and broadcasters about leasing or drilling threats to natural areas.

Contact the leasing committee. Sierra Club President Fontaine has appointed a committee to coordinate Club actions protecting public wildlands from being sacrificed on the energy altar. If you need advice or can offer help, please contact us. Forest Service and BLM procedures used to manage leasing and exploration around the country are inconsistent, so we need to hear about specific cases and actions you are monitoring.

Contact: Phil Hocker, Box 458, Wilson, Wyoming 83014, (307) 733-6116; or Bruce Hamilton, Box 1078, Lander, Wyoming 82520, (307) 332-9824.

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da to Mexico. The study released 87% of the land—nearly 10 million acres—from further wilderness consideration. Only 1.5 million acres are still being studied for possible wilderness recommendations. Under the BLM's lenient interim management guidelines for wilderness study areas, many of these areas are already being leased, roaded and drilled.

We are down to a few remaining, small, isolated, wild islands in a sea of leases. And the islands are eroding at an alarming rate. All signs point to an accelerated pace during the Reagan administration.

The fate of these remaining areas now lies in the hands of the Reagan administration. James Watt, Reagan's Secretary of the Interior, established quite a record on this issue as president and chief legal officer of Mountain States Legal Foundation:

- During RARE II, Watt urged Andrus to dismiss an appeal by the Sierra Club designed to bring leasing in roadless areas in compliance with the law.

- Following RARE II, Watt's firm sued Andrus demanding immediate processing of lease applications in three areas that were prime wilderness candidates—the Deep Creek and Reservoir North further-planning areas adjacent to the Bob Marshall Wilderness in Montana and the Palisades further-planning area on the Idaho-Wyoming border.

- When the regional forester attempted to block seismic exploration in the Bob Marshall, Great Bear and Scapegoat wilderness complex, Watt's firm intervened with an appeal requesting the chief of the Forest Service to reverse the decision.

- When the Sierra Club filed an appeal to reform proposed leasing in the Palisades area to guarantee that its wilderness qualities would be preserved during exploration, Watt's firm intervened to block the reform.

The pattern is all too clear. Federal land with even the slightest potential of producing oil and gas must immediately be opened to leasing as prelude to exploration, development and road access—no matter what the competing surface values might be.

Late in 1980, then-Representative David Stockman, now head of the Office of Management and Budget, told the *Wall Street Journal*, "We need to strike fast, within six to nine months after the new Congress convenes, to eliminate impediments to expanded oil and gas exploration and development."

Already Watt has begun to accelerate oil leasing and to disregard environmental concerns. As one of his first actions in office, he moved to lease fragile areas off the coast of California. He has also announced plans to accelerate the release of lands being studied

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for wilderness and has opposed any new wilderness designations where mineral-development conflicts occur. "As minerals manager of the public's lands, I will oppose single-use designation of those lands if there is evidence that their withdrawal means a significant loss of fuel or non-fuel mineral resources," he said in February at a Senate science subcommittee hearing.

Similarly, President Reagan's budget message to Congress in February called for accelerated onshore leasing, including stepped up exploration on Alaska's North Slope. To a President who thinks energy conservation means being "too hot in the summer and too cold in the winter," increased production is the only way out of our present predicament.

"We want more production. More, more, more," Michael Halbouty told the *Wall Street Journal*. Halbouty is an independent oil man who headed Reagan's energy advisory panel during the campaign.

Just how much production is possible from our wildernesses and national parks? Oil company projections refer to millions of barrels of oil and millions of cubic feet of natural gas. Self-promoters that they are, they put their most optimistic projections in the forefront.

In reality, the chances are slim that anyone can find enough oil or gas to warrant production in a remote, rugged wilderness such as the Bob Marshall. One would need to locate a "major" or "giant" field to justify the cost of production. Besides, at our current rate of consumption, even a "giant" field would supply our country's oil demand for only about six days.

At best we get six days of oil. More likely we will be left with a legacy of abandoned roads and dry-hole markers. The public often hears about the millions of dollars oil companies invest to battle the odds in their search for oil. In this newest round of exploration, the added cost may be lost wilderness.

"Of course," quips Chief Peterson, "it's been said that there are only two places that we don't want to look for oil: onshore and offshore. The easy-to-reach areas . . . have already been developed. Now we have to look in the tougher places."

More than a half-century ago, another Forest Service official pondered opening up wilderness areas. "There is just one hope of repulsing the tyrannical ambition of civilization to conquer every niche on earth," wrote Bob Marshall. "That hope is the organization of spirited people who will fight for the freedom of the wilderness." □

Bruce Hamilton lives in Wyoming and is the Sierra Club's Northern Great Plains regional representative.

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Walking with Carl

ELIZABETH S. O'NEILL

IT'S AN UNFORGETTABLE DAY. We have left Tioga Pass at the high eastern entrance of Yosemite National Park, crossed a frosty mountain meadow touched by morning sun and scrambled up a rocky slope beyond the last dwarfed white-bark pine. Now we are on Dana Plateau, a moonscape of broken boulders 12,000 feet in the sky. We marvel at the pygmy daisies dappling this alpine desert with purple and gold. "Try not to step on them," says Carl.

Carl Sharsmith was already a legend long before I met him. He's the man who knows more about the alpine botany of the Yosemite Sierra than anyone does, or has, or probably ever will. The beloved teacher of generations of college students—and generations, too, of hikers and lovers of the high places. The professor laden with honors, and the ranger leading the way.

Big cumulus clouds balloon over the horizon, grow, swell and combine. By lunchtime we are perched on a rocky promontory with several thousand feet of space falling away sheer below us. We can see storms in every direction, above the great Sierran sea of peaks and east over Mono Lake, a salt-rimmed mirror in the high desert.

The air rings with electricity. When we move, we snap and crackle. Phil poses on a rock cantilevered out over space, and everyone takes his picture with his hair standing eerily straight up.

Carl munches his bread and cheese and then smokes a pipe. After a while he suggests mildly that we come away from the edge where there is the most electricity. A kestrel vaults across the face of the storm.

"We're terribly exposed. It isn't safe," someone says. A few chime in, "Let's go down."

But Carl smiles and replies, "It's grand up here. You wouldn't want to miss the storm!" Looking back the way we have come, we know we could never get down to treeline, let alone camp, before it hits.

Then the storm is upon us, and Carl leads us to shelter under an enormous balanced boulder as big as a room. There we huddle, swapping stories while lightning flashes, thunder rolls and huge angled hailstones as big as fish eyes bounce on the rocks outside.

"They aren't really hailstones," Carl explains. "They're called *graupel*, frozen pellets of snow." We are all a little bit scared.

Then it slackens. A shaft of sun breaks through. Carl shoulders his pack. He doesn't say a word, just heads up through the lowering clouds and the still-falling graupel. A few hesitate. "Carl, we're cold. Let's turn back."

Carl looks at them, and his face is almost transfixed. "You know what John Muir would say? 'You can sleep an eternity in your grave. You're only up here a little while.'"

Elizabeth S. O'Neill



Carl Sharsmith (middle) and friends look up the name of one of the small miracles of the universe.

Then he turns and heads up again, and we all follow. The stiff climbing rapidly warms us.

The ground is covered with white several inches deep. Purple daisies, green and gold ivesia and rosy buckwheat are encased in the icy mantle. We are walking on a white carpet woven with Persian blossoms. The sky is dark and light like an El Greco painting, the rocks are gleaming wet, and we know it is perhaps the most wonderful day we have ever known.

Then another cliff edge. We look down more than a thousand feet to Dana Glacier, and the sun comes out to dry us. Carl stares downward. "There's a little sunflower I've found nowhere else in the park but on that black moraine," he is saying, and our minds leap the dizzying space below, sunflowerward.

At the end of the day when we return, Ferdinand, the park ranger who is unofficial king of Tioga Pass, hails us. "We were thinking of you in that storm, but we weren't worried. We knew that Marmot Sharsmith would find a hole to crawl into."

"It was a fine day," says Carl, "the finest I've ever had up there."

Kim speaks for all of us: "Yes it was! There'll never be another day like it!"

Unless we go walking again with Carl.

For years I had seen Carl's slight figure out on the trail, surrounded by attentive youngsters and oldsters. Twice my husband had climbed with him on a ranger hike to the top of Mt. Lyell, Yosemite's highest peak, and come back glowing with enthusiasm. Then it was my turn. I signed up for a five-day alpine



D. C. Lowe

Gaylor Lakes, in the high country north of Tioga Pass in Yosemite Park, have been familiar to Carl for years.

botany seminar in the Yosemite high country.

We were a diverse crew. There was David, the ornithologist working his heart out to save Mono Lake from being dried up by the diversion of its feeder streams into the Los Angeles water system. There was Heather, fresh out of Stanford, who would work for the Sierra Club the rest of the summer. Several were students, some were teachers. Nobi was an engineer and Jeff a fanatical hiker and sometime geologist. We had a metal sculptor, a contractor, a chemist, a psychologist. And there I was: writer, grandmother and long-time Sierra Club backpacker.

That first morning we sat in a circle in a flowery alpine meadow and listened to Carl. (Our first instruction was to call him Carl.)

Belding's ground squirrels popped up from their holes to watch us, and one rufous hummingbird stopped in midair to inspect a red bandana, then whirred away. Carl spoke slowly, fervently, with a slight smile. He told of the advance and retreat of the glaciers as though they were his children, and of the mountain flowers as though he were a troubadour singing of his lady. We felt, all of us, that we had come not for a college course, but on a pilgrimage.

By the end of the week the pilgrimage had become a great adventure, one that changed our lives.

As we picked our way after Carl into a mountain cirque, he hardly suggested a knight errant. When on duty as a ranger, he wears the ranger uniform. But on this trip (sponsored by the Yosemite Natural History

Association), he was dressed in nondescript khaki pants and a faded shirt. What had once been a tweed jacket settled about his figure like mountain snows fitting the contours of the slope they fall upon. It was darned here and there, patched at the elbows, and of a comfortable mottled gray like the rocks themselves. On his back was a not-so-old rucksack given him by a student the year before to replace the one he had darned and patched for twenty years, "after my son tried to throw it away."

Long before Schumacher came up with *Small Is Beautiful*, Carl had perfected his simple, low-impact way of life, which suits his frugal Swiss upbringing. To him, old is beautiful; the most striking part of his apparel is his Stetson hat, bought for ten dollars in 1924, which today no self-respecting moth would even consider.

"A fine hat," he says. "They don't make hats like that anymore." It still has its jaunty flat brim, but every seam of the crown has been restitched by hand, and the crown restitched to the brim. There is no hat like Sharsmith's hat, monument to a lifetime of wind and sun and storm.

His car is a 1936 Ford roadster that would qualify for Harrah's Reno museum. Like the hat, it is well cared for, with almost 300,000 miles on the original engine. But Carl doesn't overtax it. He keeps it under canvas most of the time and usually accepts rides with other people.

His frugality is legendary—his 50-year-old flashlight, his diet of beans. But he is never frugal with enthusiasm, kindness, strength or endurance. He gives himself to the mountains and to people like the wildest of spendthrifts. We are all richer for it.

So, following Carl, for five days we walk the high places, the alpine fell-fields. We see marmot and pika and the rosy finch that plunges off the peaks and eats insects congealed in the snow. Carl shows us a rare saxifrage, left over from a colder period, that can only survive deep under shaded rocks with its feet in the cold snow-seep. He shows us which flowers must stand in running water, which can only survive on an unstable slope, and which must espalier themselves to boulders to take advantage of thin envelopes of warmth in order to grow.

Carl talks of the grasses that girdle the boreal regions of the globe. He talks of the Coppermine River, the Aleutians, Greenland and Siberia, and they flicker before our eyes until we, too, are walking the tundra in our minds. Our boots sink into the mud as we squint through magnifying glasses at blossoms of sedge and rush, discovering new and strange beauty.

One day he runs his hand through the

mosses under the overhanging edge of a tiny meandering stream and comes out with his eyes gleaming and a tiny piece of earth speckled with blue-green dots. "This is a Siberian liverwort," he announces. "You can always tell it by the peculiar color."

What is Carl's magic? We feel that these small dots are a great treasure that has been revealed to us—and so they are.

One morning as we hop the boulders rimming a high mountain lake, we come upon Newberry's pentstemon, the brilliant pink flower called *Pride of the Mountain*. "It was named for old Professor Newberry," Carl muses. "But he's gone now." He names another half-dozen well-known botanists, and his eyes wander out over the ranges. "They're all gone." We look at each other silently; my mind repeats Ishmael's words: "And I alone am returned to tell thee."

Lunchtime. A Clark's nutcracker flaps by croaking about pine-nuts, and Carl talks about his past. After a boyhood in Switzerland, he went with his parents first to England, then came to the United States. When he ended up a seventh grader in Texas and found he had to fight all the time, he quit going to school.

"I came up to the mountains and got work, sometimes as a miner, but mostly as a logger. At sixteen, I could cut off a limb as big as your arm in one clean cut." He smiles and pulls at his pipe. "They were good people, the loggers. Many of them were real woodsmen, and I learned a lot from them. Then I got interested in climbing mountains. In 1920 when I was seventeen, I climbed the north side of Mt. Shasta, alone."

"But Carl," Mary asks, "how did you get to be Dr. Sharsmith?"

"Well, I always wanted to study botany and geology. So when I was 21 I went back to the ninth grade, and stayed in school (supporting myself all the time) through high school and college and graduate school, until I got my Ph.D. at Berkeley."

Carl taught at Washington State and at the University of Minnesota. "But I always wanted to come back to California. So in 1950 I came to San Jose State and stayed until I retired in 1972, when I was 70."

Heather brings him a tiny white mountain-crest, and he squints through the hand lens as though seeing it for the first time. His face lights up. "Ah, now I see them. Tiny hairs with their ends turned out like stars." He looks up earnestly. "The drabas are evolving very rapidly," he tells us. "Each of these mountains has a different species, but you can tell them apart by the hairs." He hands the flower and glass back to Heather.

She stares intently, and he waits for the slow smile of recognition. "See the stars?" he asks. "This one is Brewer's draba."



Newberry's pentstemon, "Pride of the Mountain."

Another day he continues, "I studied and later taught in the winters, but I came to the mountains every chance I could get. In time I heard about the Yosemite Field School and was accepted as a student for the summer of 1930." (The National Park Service's Yosemite Field School of Natural History, which no longer operates, trained many people in two-month sessions during summers; some students later went on to become rangers or naturalists.)

"About halfway through the session, I was very pleased when they asked me if I would like to go into uniform the next season as a summer ranger. I was the only one asked. So I started in 1931, and I've done it most summers ever since. I guess I've probably got the most years of service of any ranger-naturalist in the whole National Park Service by now."

When he became the first ranger-naturalist in Yosemite's Tuolumne Meadows, Carl had joined the ranks of a great company of Sierrans. This meadow in the sky is where John Muir had come as a young man to herd sheep. It was partly out of this experience that the Sierra Club was born.

By 1931 there was a road to the Meadows, but it was narrow, steep and difficult. "We let the people camp anywhere, not herded together like nowadays. Every morning I used to get on my horse and ride all up and down the river seeing who was there. Sometimes they'd invite me for a cup of coffee, or

even fresh biscuits and blackberry jam."

Carl never throws anything away, not a flashlight, not a letter, not a memory. He's still savoring the biscuits and blackberry jam of 40 years ago.

It was in those early days that he started leading hikes and climbs up all the major peaks. He also gave campfire programs and does it still. A spellbinding storyteller, he may sing Indian songs, even do Indian dances.

He's popular as a campfire entertainer, and people learn a lot from him. But none of this is so fine as walking the high passes with him. Nothing is finer than walking with Carl.

Among the purplish rocks on windswept Tioga Crest, I find an unfamiliar blossom, a brush of feathery leaves and seed heads like pale unripe strawberries. "What's this one, Carl?" I ask.

"Oh, that's something special, a Drummond's anemone! Come here, everyone! Oh, my darling," he addresses the flower. "Where have you been, my lovely? I haven't seen you up here for 20 years." Days later he is still talking about the anemone.

One thing Carl *doesn't* talk about is the honors that have come his way. We students honor him, and others in higher places have done it, too. Someone tried to name a mountain for him—but for that a person has to be dead, and Carl's very much alive. The Secretary of the Interior gave him an award for meritorious service. Scholars with bigger names because they publish thick books have deferred to him because he knows more than they do about the mountain flowers. We sense all this, but on these glorious rambles, we really don't care. What we care about is being here and having him with us as our guide. Like many a great teacher before him, his gift to the student remains oral and evanescent.

A few years ago, Carl went back to Switzerland for the first time. "My mother and father had always spoken Swiss dialect to each other. So when I went back and heard that dialect, it was like finding my parents again, like going home."

Around one of our campfires, Carl fingers his accordion and plays a little. "My mother taught me all the old Swiss songs," he recounts. "One day when I was back in Switzerland, I was up on the Faulhorn above Grindelwald. The sun was setting on the Jungfrau. It was so beautiful, I started to sing one of those old Swiss tunes. A Swiss couple there wondered about this American singing Swiss dialect. They were so delighted they invited me to visit their farm, and I did."

In the Yosemite Sierra we don't have the Jungfrau, but we do have Lyell and Dana. We have our sunsets too, and our hulsea of sunset-gold that shares the mountaintops



Carl Sharsmith is never short of smiles. Here, without a hat for a change, he relaxes with a pipeful of his favorite tobacco.

with sky pilot's fragrant clusters of heavenly blue. For five days we have walked with Carl in this magical mountain landscape. And now, too soon, it's ending. We have our last campfire.

When Carl does the ranger talk for the whole campground, he builds a big fire, as rangers do. But with us, his little seminar, his happy disciples, he builds *his* kind of fire: very small. It's warm if you sit very close, thrifty of wood, and hardly any trouble to the universe.

Last night Mary, Heather, Ed and the other "youngsters" had a party in the campground. They ended up a bit tearful because it had been so beautiful, and it was almost over. But this evening it is really over, and we are sobered by the thought. We try to tell Carl what it has meant to us; we can't get it out quite right, and even after the tiny fire burns out, we linger before saying our good-nights.

Don almost makes a speech. "I've learned a lot, I've met many new species and some higher primates who may become lifelong friends. But the most thrilling experience was being enveloped in the aura of Carl Sharsmith. Thanks to all of you for being part of one of the best weeks of my life."

Mary is silent, but I know what she's

thinking. This afternoon as we walked back from Slate Creek in the rain, she had told me about a dilemma just solved, a commitment newly made. "I've been pulled in one direction and another in my college life," she confessed. "But now I know I want to give my life to studying botany."

For most of us, though, this trip has been an interlude, time snatched from our ordinary pursuits to walk in Carl's extraordinary universe. We will go back richer for having made certain small important commitments of our own. We will walk more softly and see more deeply into the nature of things.

This was two years ago. The other day I saw Carl again. He told me he'd soon be backpacking up Clouds' Rest to look for a rare eriophyllum that hasn't been seen since the 1880s. May he find it! But before he left he added, "You know, I'm having the time of my life this summer. It gets more beautiful every year. You see more."

In a way, it doesn't matter about the eriophyllum. Whatever Carl's been searching for, he's found it. □

Elizabeth S. O'Neill is a retired teacher turned freelance writer who has backpacked in the Sierra since the 1950s.

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RODERICK NASH

Mountains Without Handrails: Reflections on the National Parks, by Joseph L. Sax. University of Michigan Press, Ann Arbor, 1980. Paper, \$5.95.

THEY USED TO FEED BEARS with hotel garbage—in the national parks. They built golf courses and ski lifts and swimming pools and tennis courts. From 1872 until 1969, every evening during the big tourist season, they pushed a bonfire off a 3000-foot cliff into Yosemite Valley. And “they” were not members of the chamber of commerce or insensitive park concessioners, but park rangers and superintendents.

Professor Joseph L. Sax of the University of Michigan School of Law does not approve of these practices. The gist of his argument in *Mountains Without Handrails* is that mountains, at least those in national parks, should not have them. The parks, he argues, should dare to be different. They should give the public an experience that contrasts with the kind available so widely elsewhere in civilized America. If this means danger and dirt and discomfort—so be it, says Sax. The value of national parks, in his view, is precisely this unstructured, unprotected confrontation with the natural world.

Consider handrails. They have a clear purpose. On overlooks such as the one at Glacier Point, from which the fire used to fall into Yosemite, a rail separates the public from the edge of the sheer cliff. Protected in this way, visitors lean against the barrier and pose for pictures. The problem, Sax argues, is that the presence of the handrail prevents the public from having a certain kind of experience. The railing eliminates the risk and the challenge. Sax feels that modern, coddled people are desperately in need of environments where challenges still exist. Why? His answer is that there is value in rising to challenges. Without handrails, the public learns to be prudent and comes away from Glacier Point with a different, indeed a higher, quality of experience. Similarly, a

Nature on Whose Terms?

view of a bear in the wild is worth much more than the grandstand perspective. There are zoos and amusement parks for people who do not care to take nature on its own terms.

A professor of law and persuasive writer, Sax adroitly considers, then dismisses the arguments that have in the past been employed against his conception of national parks. Numbers of visitors, for example. Early national park leaders were obsessed with visitor statistics. They knew that appropriations for the parks, even their ex-

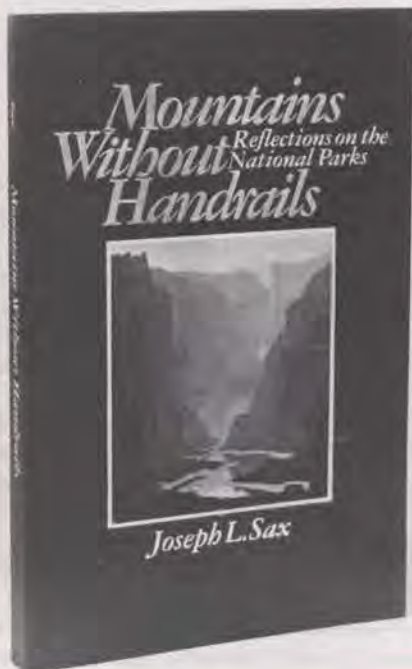
realizes that 1981 is not 1913. The parks are now indisputably popular, maybe too much so. The wilderness movement has definitely come of age.

The National Park Service, he contends, should have the courage to specialize—to say to the public that the national parks offer a certain kind of experience. Take it, or leave it and visit what Sax calls “the plastic alligators of the amusement park.” If such a policy means fewer visitors, Sax is agreeable. He observes that legalized gambling would bring many more people into Yosemite; the reason the National Park Service refrains is that such activities are considered inappropriate for a national park.

Sax also grapples with the perennial argument that the parks should give the people what they want. If bear feeding and firefalls are in demand, what is the justification for the parks’ offering pine trees and plain cliffs? Aren’t the parks democratic institutions? Isn’t public pleasure their reason for being? Yes, Sax responds, but a particular kind of pleasure is involved. He maintains that the National Park Service must lead in defining that pleasure. His logic is persuasive. Most third graders would, given their heads, devote the entire school day to recess. Teachers “make” them read and write and are thus undemocratic on the grounds that a higher ideal is served.

Sax’s conception of national parks is really not new. Frederick Law Olmsted, who emerges as a hero in this book, stated the mountains-without-handrails philosophy in his 1865 report on the management of Yosemite Valley, then a state park. The mainstream of the American wilderness preservation movement has adopted similar concepts. The result was apparent in the abolition of the bear feedings and firefalls and the present beginnings of a policy discouraging a convention atmosphere in Yosemite. Sax puts such changes in historical perspective and dissects the philosophy behind them.

While ostensibly a scholarly analysis, Sax’s book is actually a careful argument. He



istence, depended on convincing Congress of their popularity. In 1913 even John Muir beat the drums for more visitors to Yosemite and for the admission of private automobiles. He knew Hetch Hetchy Valley had been excised from Yosemite National Park (and given to San Francisco for a municipal water storage reservoir) because few people went there. Sax understands this, but he also

wants mountains without handrails in the national parks. A critique of his ideas might begin by asking, "Why not both kinds of mountains?" What is wrong with a situation such as the one that exists at Glacier Point, where there are railings, but a few yards away there is an abundance of railless cliffs, exposure, challenge, risk and all the rest? Visitors who want to avoid the rails only

have to walk a short distance to find their kind of national park experience. The present policy keeps the options open.

What Sax appears to be saying is that people who prefer the rails do not really know what is good for them. They should be encouraged (by national park planners) to take the risks, be self-reliant and gain self-confidence. Just like the third graders, they

should allow those who know what is best for them to call the shots.

At this point, in the eyes of the reviewer, Sax's otherwise praiseworthy argument falls victim to its own excess. Leadership, idealism, purism and high park purposes can exist with a few handrails. What is needed (I think) is a ranger stationed at the railed overlook who encourages visitors to walk

From *Mountains Without Handrails*

In urging that the national parks be devoted to affirming the symbolic meaning he attaches to them, the preservationist makes a very important assumption, routinely indulged but hardly ever explicit. The assumption is that the values he imputes to the parks (independence, self-reliance, self-restraint) are extremely widely shared by the American public. Though he knows that he is a member of a minority, he believes he speaks for values that are majoritarian. He is, in fact, a prophet for a kind of secular religion. You would like to emulate the pioneer explorers, he says to the public; you would like independently to raft down the wild Colorado as John Wesley Powell did a century ago. You would like to go it alone in the mountain wilderness as John Muir did. Indeed that is why you are stirred by the images of the great national parks and why you support the establishment of public wilderness. But you are vulnerable; you allow entrepreneurs to coddle you and manage you. And you are fearful; you are afraid to get out of your recreational vehicle or your car and plunge into the woods on your own. Moreover you want to deceive yourself; you would like to believe that you are striking out into the wilderness, but you insist that the wilderness be tamed before you enter it. So, says the secular prophet, follow me and I will show you how to become the sort of person you really want to be. Put aside for a while the plastic alligators of the amusement park, and I will show you that nature, taken on its own terms, has something to say that you will be glad to hear. This is the essence of the preservationist message.

Olmsted saw the average citizen as a victim of aristocratic condescension, and the contemporary park symbolist-preservationist sees him as a victim of industrial alienation. Of course there is a

condescension of its own kind in all this, though it must have been perceived quite differently a century ago. The nineteenth-century citizen was told he was being helped to throw off the shackles imposed by a contemptuous upper class. The contemporary citizen—far more committed to a belief in his own autonomy—sees himself characterized by preservationist rhetoric as the prisoner of his own ignorance. Certainly the average park visitor today does not think of himself either as a manipulated puppet or as an externally determined victim. And he does not take kindly to suggestions that his choice of leisure-time activity is unworthy. The inability of the preservationist to win a sympathetic majority for his pleas rests on an unwillingness to come to terms with the full implications of his viewpoint.

The concern that has been expressed for the elderly and the infirm in debate over parkland developments must be taken with a measure of skepticism. People who were active when they were young ordinarily continue to be as active as they can when they get older, and those who are reluctant to leave their cars range widely across age groups. Neither the elderly nor the infirm, if they were active at other times, are in the forefront of those advocating intense development of parklands. Rather, those who urge development have put the elderly and the handicapped on their front line. . . .

Management committed to contemplative recreation should be just that, whether for the young and hardy or the old and infirm. One does not provide such an opportunity for older people or inexperienced visitors by building a highway to the top of a mountain. Rather we can assure that the places that are accessible to them are not so deprived of their natural qualities as to put such an experi-

ence beyond their reach. If it were necessary to go into the rugged backcountry before finding a relatively undisturbed ecosystem, the lesson would be that we had too ruthlessly developed the more accessible places, not that still more places should be deprived of their complexity.

The distinction between recreation that draws on intensiveness of experience and that which draws on intensiveness of impact is analogous to that between serious literature and commercial mass entertainment. In the former case there is never a shortage of material; a reader cannot in a lifetime begin to exhaust the available resources precisely because the material's capacity to engage us turns on the intensity of experience it demands. In contrast, commercial entertainment is chronically short of materials. It uses up writers and stories at a furious rate, and it finds itself drawn to material of ever-increasing impact—more violence, more sex, more shocking situations—to maintain the viewer's attention. It is feeding an appetite that, based on external stimulation, grows more the more it is fed. It generates its own scarcity.

The parks themselves, however they are used, will never constitute more than a small fraction of all our recreational resources. And ideal forms of recreation will never account for more than a tiny fraction of anyone's leisure activity. But the underlying idea—substituting intensiveness of experience for intensiveness of consumption—can radiate out into a much wider area of both private and public recreation and can speak broadly to the problems of scarcity and conflict that we see everywhere. Power-based recreation will continue to present limitless demands until we come to terms with the implications of power as a recreational motif.

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the few yards (or backpack in for a few weeks) for the wilder experience. This is not at all to say that firefalls and plastic alligators are appropriate in national parks. But it is to recognize that within the range of appropriate uses of national parks there is enough room for people who enjoy a natural view more from behind a rail.

It is surprising that Sax, the lawyer, does not address a legal problem directly related to mountains without handrails. The courts have a long history of awarding large settlements to people who are not adequately forewarned of potential danger. A recent decision went so far as to award damages to the family of a winter backpacker killed in an avalanche in a distant corner of Yosemite National Park. It was said that the National Park Service did not warn the skier that avalanches were a problem in that area.

Now this seems to me entirely inappropriate. I would agree with Sax that anyone who ventures into the Sierra backcountry in winter must take the risks involved. Negligence is not, after all, a factor in the occurrence of an avalanche. But note that the courts found for the plaintiff in this case. Such judgments as this have intimidated land-managing agencies.

If existing legal trends continue, the National Park Service may not be able to afford mountains without handrails. Alaska will surely be a new frontier in this respect. As visitors increase, so will the frequency of attacks by grizzlies. People will be killed. The courts will be asked for opinions. It would be interesting for law professor Sax to explore this liability of less-structured national parks in a sequel to his excellent and provocative book. □

Roderick Nash is Professor of History and Environmental Studies at the University of California, Santa Barbara.

On Mountains And Peoples

BRUCE COLMAN

Many people come, looking, looking, by Galen Rowell. The Mountaineers, Seattle, Washington, 1980. Cloth, \$30.00.

ONE MIGHT ARGUE that Galen Rowell has the highest profile of any photographer-writer on the current American adventure-writing scene. We have begun to look for-

ward to new Rowell books appearing on a regular schedule—and to watching his writing develop as it goes beyond the recounting of exploits to things that are deeper and richer.

Many people come is a complex book, one that attempts to do quite a few things. Part of it is a record of three expeditions in which Rowell took part in 1977.

The expeditions were to Nun Kun, to the Great Trango Tower, and around the Annapurna massif. These travels brought him to three very different regions of the Himalaya, in three separate countries. They also involved a variety of kinds of mountaineering experiences. On Nun Kun, Rowell led a group of paying customers up a 7000-meter mountain, the highest guided climb ever made by Americans. The Great Trango Tower climb was a classic alpine-style ascent, in which a small group of friends confronted a beautiful mountain with a few classic tools—and fulfilled Bill Tilman's prescription for what mountaineering ought to be. The Annapurna trek was another thing, less a mountaineering exploit than a backpacking trip through spectacular and interesting terrain, both geographic and cultural. What climbing Rowell and his friends did was in the style of Sierra Club high-trippers bagging a peak before lunch-stop.

Between narratives of the expeditions, Rowell has given us essays and photo-essays on the people and animals of the Himalaya and the ways that change and modernization have come to those mountains. An armchair mountaineer, this reviewer had hoped the Himalaya was immune to change. It seems such an elemental place with such hardy, simple folk.

Sadly, it isn't immune. It cannot be, in an age when, as Rowell points out, a tourist can get from New York to the Khumbu Valley faster than a monk can make a pilgrimage from Thyangboche to Lhasa.

The problems Rowell catalogs are depressingly familiar: inflation, traffic jams (though these are of hikers rather than of automobiles), deforestation, pollution, sharply rising fuel costs, attacks from within and without on traditional village cultures, threatened food shortages and vanishing wildlife. The Khumbu Valley and Sherpa people have been the hardest hit, so far, because the trek there is reasonably easy and the land has been open for 30 years now by government decree. Places like Pokhara, Skardu and Ladakh have some difficult times ahead.

Rowell leaves open the question of solutions; the future for the mountain people of Asia is full of darksome possibilities as well

as certain kinds of hope. The core of the Sherpa culture is intact, he points out, and from that may come creative solutions for Khumbu. But for the rest, who knows?

Rowell is firmer in his speculations on the future of Himalayan climbing. His knowledge of climbing history is detailed and prodigious, and from it he sees a trend in this generation of climbers to return to the roots of mountaineering. The big peaks have been climbed; the largest problems appear to have been solved. Many of those solutions were created by huge, heavyweight expeditions, the kind that involve hundreds of porters, oxygen, fixed ropes and camps. The challenge now is to climb interesting peaks and routes in great style, without all the baggage of siege-mountaineering. Reinhold Messner is the hero of this movement—and the Great Trango Tower climb is put forward as a prime example.

If the problems of the Himalaya are ones we have become too familiar with, the joys Rowell finds on the trails and mountain faces are familiar ones as well: tramping through wild country with a few close friends, coming face to face with things that are primordial, such as stone, the sky, snow, distance, weather and silence.

As always in Rowell's books, the text is accompanied by spectacular photographs in a variety of genres: action shots, landscapes, portraiture and wildlife. The book is nicely designed and the printing is very fine. □

Bruce Colman is manager of Friends of the Earth Books.

How to Save A River

DENNIS DRABELLE

The New River Controversy, by J. Schoenbaum, John F. Blair publisher, Winston-Salem, North Carolina, 1980. \$12.95.

SAVING RIVERS is no work for the impatient. It seldom takes a coalition less than a decade to eliminate the threat that a dam will throttle its favorite stream. And, at that, *eliminate* is generally too strong a word. For example, the voters of eastern Missouri rejected Meramec Dam by 2 to 1, but neither the state nor the federal government has given the river the legal protection it needs. And the St. John in Maine has become a deathhouse prisoner,

sentenced to damnation for a pittance of power but somehow managing to keep out of the bulldozer's way.

Happily, *The New River Controversy* recounts a battle whose outcome was unequivocal. Not only was the New River spared, it is also now ensconced in the National Wild and Scenic Rivers System. Thomas J. Schoenbaum, a professor of law at the University of North Carolina, was a member of the New's legal team during the later stages of the fray. His book is thorough to a fault. At the same time, despite its foregone conclusion, it is moving and suspenseful—something like those thrillers in which we know the assassin won't knock off DeGaulle or Churchill, but we don't know until the end how his elegant plan will come a cropper.

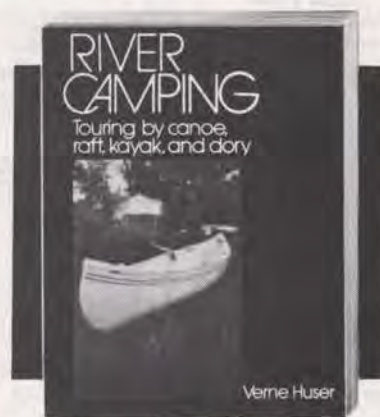
Schoenbaum begins his account by highlighting the anomaly of the New's name. "Whoever named the New River," he writes, "was apparently unfamiliar with its origins and history. Far from being 'new,' it is the oldest river in North America and one of the oldest rivers in the world. The New owes its longevity to its ability to maintain its channel through 100 million years of mountain building and erosion." (It will avert confusion also to mention here that the New runs north, originating in North Carolina and flowing across southwestern Virginia into West Virginia, where it unites with the Gauley to form the Kanawha.)

Then comes the needless thoroughness. Like a lawyer laying the foundation for the testimony of a star witness, Schoenbaum spends upwards of 50 pages detailing the region's geology, which is arcane, and its history, which is monochromatic. Suffice it to say that the New River Valley is a pleasant and prosperous farming area where nothing much happened until the early 1960s, when the Appalachian Power Company eyeballed it for hydroelectric purposes.

In high school I had a superannuated physics teacher who refused to believe in pumped-storage projects. None of his students could convince him that a rational—if not very conservation-minded—utility might want to expend more energy pumping water uphill to a storage reservoir than it could retrieve when it let the water run back down and turn the turbines. My teacher's obstinacy was frustrating because, not a hundred miles from where we sat, a real pumped-storage project was humming away in the Missouri Ozarks. (The reason such a project wins favor, of course, has to do with timing. The utility pumps the water up at slack times, such as the middle of the night, and taps a lesser but supplemental amount of



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electricity at times of peak consumption, such as mid-afternoon of a dog day.) Appalachian proposed building just such a project on the New, and I can imagine my teacher's consternation if we had tried to tell him some company was going to dam the country's oldest river so as to lose energy.

Not that Blue Ridge, as the project was called, lacked other claimed benefits. There was recreation, tourism, general economic growth and low-flow augmentation (squirt-water into a river to dissipate the waste and sewage that collect when the water level is too low). The hitch was that the project would drown a lovely stretch of river and some 40,000 acres of farmland on both sides of the North Carolina-Virginia border.

In part because Virginia favored the project and North Carolina vehemently opposed it, the efforts to save the New became byzantine. In 1975 the river's defenders hit upon their original contribution to the arsenal of stream-saving weapons. They set out to make use of a little-known provision of the Wild and Scenic Rivers Act, by which a state and the Department of the Interior can cooperate to insert an intrastate river segment into the national system without congressional approval. At the staff level, Interior was unusually encouraging because of the strong views of Douglas Wheeler, Deputy Assistant Secretary for Fish and Wildlife and Parks, who had lived in North Carolina for several years.

Mind you, dubbing the New a national scenic river would not in itself vitiate the Blue Ridge Project. The courts or the Congress would have to choose between the two conflicting visions of the river—hydroelectric reservoir or free-flowing stream. What the designation was designed to do was to gain time, in which the growing nationwide sympathy for the river and its riparian inhabitants could be harnessed and focused on the decisionmakers. (What? Dam a national scenic river?) As expected, the U.S. Court of Appeals held the Federal Power Commission's license for the dam in abeyance while North Carolina and Interior conducted the required study of the New's scenic quotient.

The man to watch was Thomas Kleppe, an obscure former representative who had wended his way through an improbable course of events to become Secretary of the Interior. For the New to go national, Kleppe had to consent. (The late Rogers Morton, while Secretary of the Interior, had reversed the department's pro-dam position, but there was no guarantee that Kleppe would feel bound by his predecessor's decision.) By the time Kleppe and the administration noticed a connection between the New Riv-

er controversy and the North Carolina primary election of March 23, 1976, it was too late. On February 14, Ronald Reagan preempted the administration by announcing that he favored saving the river. A few weeks later President Ford and Kleppe emitted a weak echo of this position. (Ford subsequently lost the North Carolina primary. In my view it speaks volumes about him that he let Ronald Reagan outshine him as an environmentalist.)

Kleppe duly signed the papers enshrining the New among national rivers, but in the meantime the court had issued a complex ruling that favored the FPC's vision. It was clear that Congress would have to untangle the New knot. A bill was drafted to ratify the New's national status and to void the FPC license. Championed by Senator Sam Ervin and Representative Roy Taylor, publicized by all three major television networks and supported even by the AFL-CIO (after a change of heart), the bill passed. On September 11, 1976, President Ford signed into law the bill preserving the New River.

A glorious victory—and probably a unique one. It seems unlikely that the FPC (now the Federal Energy Regulatory Commission, a part of the Department of Energy) or any other agency will again propose damming a river to furnish power out-of-state. Yet there is much to be learned from the New and other river campaigns.

Based upon my own involvement in some of the maneuvers, I offer a few rules for dam-thwarting:

1) Find the highest sympathetic official in any federal agency that has jurisdiction over an aspect of the dam project and get him or her working for you.

2) Concoct a memorable slogan ("The New River—Like It Is," "Meramec Dam—A Crime Against Mother Nature," "Meramec Dam—An Environmental Edsel").

3) Try to interest national writers and the TV networks in doing stories on the river. (For the New the writer was Ned Kenworthy of the *New York Times*; for the Meramec, Berton Roueché of *The New Yorker*; for the St. John, John McPhee, also of *The New Yorker*.)

4) Play for time. Ransack the laws looking for ways to keep the river flowing while you marshal support.

5) Master the facts. Organize and present them forcefully. To do this, read cost-benefit analyses and environmental impact statements as closely as treasure maps.

6) Have faith. □

Dennis Drabelle is a writer on environmental topics who lives near Washington, D.C.

Clean Air

Continued from page 20

oxides are being reduced by using three-way catalysts. The National Commission on Air Quality estimates current programs will result in a 73% reduction by 1987.

To date, the biggest problem with the Clean Air Act has been its emphasis on local air standards. "The major pollution control programs for existing sources were not designed to reduce the total atmospheric loading of pollutants and have not had that effect," writes Gregory Wetstone of the Environmental Law Institute.

Freeman Allen, chair of the Club's National Clean Air Committee, agrees. "The major problem is controlling multistate problems," he says. "Neither the state that causes the problem nor the state that absorbs the pollution wants to pay. We're at an impasse."

The Sierra Club advocates a 50% reduction in emissions from power plants by 1990. The estimated cost for sulfur dioxide alone, according to Wetstone, would be \$5 billion to \$7 billion per year in the United States.

In addition, Allen notes, there is need for a limit on emissions nationally and probably regionally as well. "It's another reason why we need improved inspection and maintenance programs for autos," he says.

The findings of the National Commission on Air Quality, released in March 1980, agree in large measure with these policies—though the commission's recommendations, dictated by political considerations,

do not. The commission found the key factor in controlling acid rain was "not pollution concentration but total pollution loading." The commission agreed that the Clean Air Act's current focus is local and that long-range transport is not considered.

The commission recommended that Congress consider requiring a significant reduction in sulfur dioxide emissions by 1990 in the eastern United States, and that an interim goal also be discussed for 1985. It recommended that actual targets for reduction wait for two studies due out this summer, one by the Environmental Protection Agency and one by the Department of Energy. It also recommended strengthening sections of the Clean Air Act that require states to reduce emissions affecting other states. It further suggested the need for a regional secondary-standard program and urged that, effective March 1, 1981, no state be allowed to relax sulfur dioxide limits established in state implementation plans, except under severe economic hardship.

"That is a fairly favorable set of recommendations," Blake Early notes. "It's difficult to identify the specific method of reduction, so it's not surprising that they refused to do so." Early noted that the commission did not consider the question of tall stacks, but concluded that may not make a difference. "The real problem is to try to get Congress to focus beyond today's inflation rate. It's very tough to do," he said. "It's definitely a problem with acid rain."

Is there any way out? Or has Hamlet's "most excellent canopy" indeed become "a

foul and pestilent congregation of vapours"?

There is a solution to the problems created jointly by carbon dioxide buildup and by acid rain, and it lies at the source of the problems—the combustion of fossil fuel. The solution is, of course, to reduce our use of fossil fuels, to turn toward increasing the efficiency of energy use, and to develop solar power and other sources of renewable energy.

The evidence of the past few years shows that the technologies for changing to renewable fuels are here, or nearly so. It is also clear, from the millions of individual decisions people all over the United States have made to save energy, that the individual will is there. Whether the national political will exists is another question. Nothing the Reagan administration has said or done to date suggests that it has any appreciation or awareness of the global problems facing our planet of limited resources. Neither is it aware of the need to support energy conservation and solar-energy development; those sectors of the energy mix are apparently perceived as threats to nuclear power and synthetic fuels, and therefore are to be left to the marketplace, not the government, for backing.

Even more serious, however, is the international challenge. It would be difficult to underestimate the chances of the world reaching an agreement on reducing fossil-fuel use. Efforts to solve the problems of nuclear weapons, to share the resources of the sea, even to deal with the problems caused by chlorofluorocarbons, have fallen far short of what is needed.

But if the question is not put on the international agenda soon by the United States and others, it will become more rather than less difficult to answer. As has been shown, if we wait to act on carbon dioxide, we will only have to act more drastically later. The longer we wait to treat acid rain, the more we will suffer as well. There are no known natural forces that can return an acidified lake to its original chemical and biological composition. Mitigation measures have undesirable side effects and short-term benefits.

Finally, because the developing countries are still in the early stages of establishing their domestic energy infrastructures, the rest of the planet has the opportunity to guide them in the right direction while weaning developed countries from their dependence on fossil fuel.

Limiting or halting the use of fossil fuels, although costly, is clearly less costly in the long run than not doing so. The opportunity is there to change things, if the planet is worth saving. □

Jeffrey Knight is conservation director of Friends of the Earth.

Air Pollution Facts

EVERY PERSON breathes about 17,000 times every day, passing through the lungs 35 pounds of air a day, or about a million pounds in a lifetime.

● Each year, U.S. power plants emit more than 25 million tons of sulfur dioxide into the air.

● People in vehicles in heavy traffic are subjected to sustained levels of 50 ppm (parts per million) of carbon monoxide in the air they breathe (at 30 ppm, vision and physical responses are affected).

● A 50% decrease in urban air pollution will decrease bronchitis cases in the U.S. by 25% to 50%, cancer by 15% and cardiovascular disease by 10%. Health-related costs would then decrease by \$2 billion.

● In Los Angeles, 750,000 people yearly endure illnesses directly related to air pollution.

● Mobile sources of pollution—cars and trucks—contributed 88% of total nation-

al lead emissions in 1978.

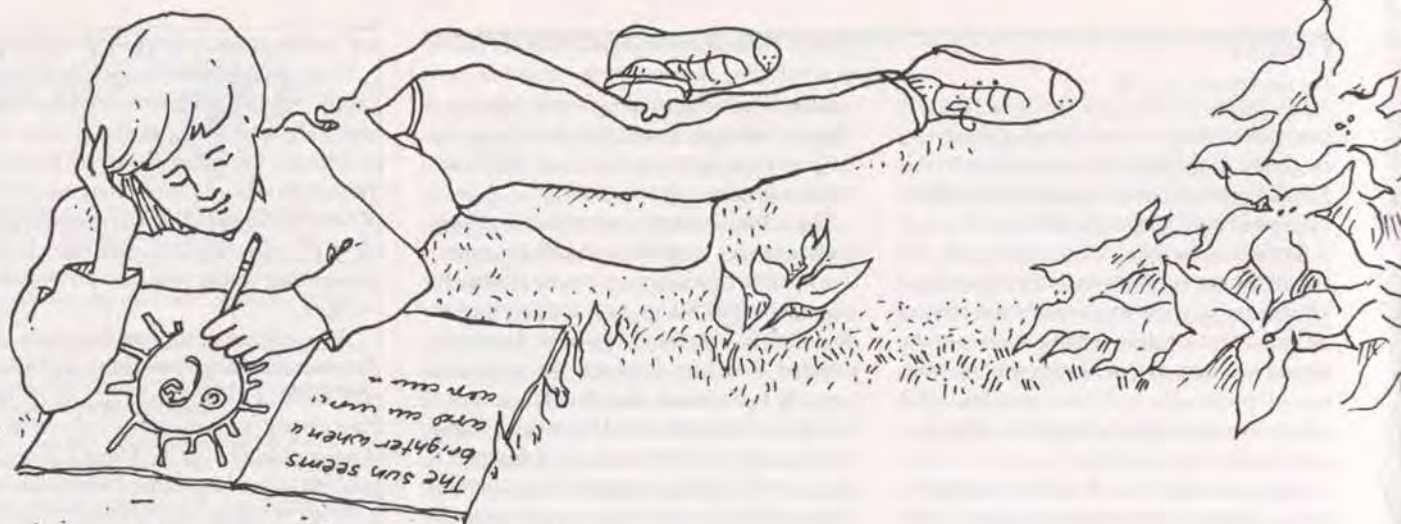
● In 1980 in the United States, 161 counties exceeded the health standard for carbon monoxide; 97 counties exceeded the standard for sulfur dioxide; 538 counties exceeded the standard for ozone, even though it was relaxed by more than half in 1979.

● More than 100 toxic chemicals that cause cancer and other fatal diseases have been found in the air, but in the past ten years the EPA has adopted regulations to control only four of them.

● More than 75% of the carbon monoxide emitted in this country comes from cars and trucks.

● Air pollution from coal-fired power plants may contribute to the deaths of up to 8,000 people per year in the Ohio Valley.

● Americans spend more than \$10 billion every year in medical costs because of problems caused by air pollution. □



FOR YOUNGER READERS

Journey with

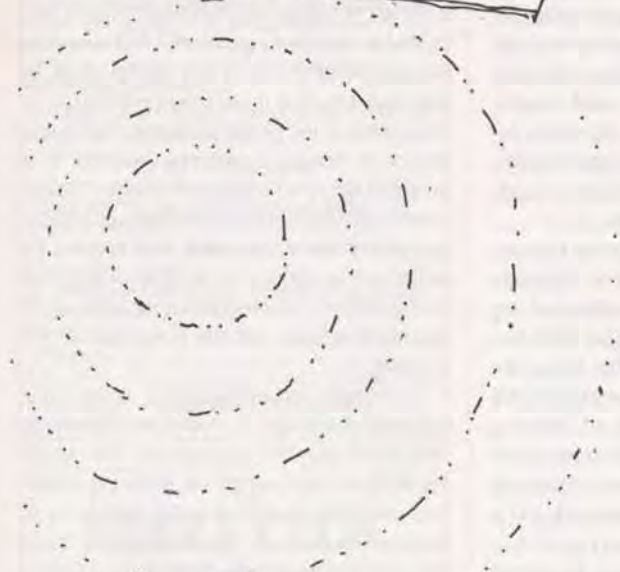
MERI MERTIG KUEHN

THE TIME FOR VACATION is almost upon us. When you're in that sunny mountain meadow or canoeing down a gentle, tree-lined river, you often find yourself wishing you could stay there forever. When the snowy winds blow at your front door next winter, those golden days seem like a dim dream. But there's something that can bring back the fragrances, the sounds and your emotions.

When you go on your next vacation, take along a notebook and pen. Every night at camp, or whenever the feeling hits you, take up your pen and make pictures with your words. Describe the smells of a hot, dusty day on the road. Compare them with the scents of a pine forest or a seashore. What does the noise of water tripping over rocks sound like? How about a coyote chorus, bird songs, or human laughter at a wilderness point?

Elaborate on the details; get specific. Remember, when it's bitter cold, you'll want to recall every little part of the scene. What color, exactly, is that rock? Look at the tiny red flowers, the chartreuse moss, the rusty lichens. Was that a blue jay? There, over there, I thought I saw a deer! When you become a journal keeper, like Thoreau and John Muir, the world is more intricate and exciting. You notice more and experience more fully.

Don't forget that your emotions are tied to the weather, the place and the smells. If it's raining and you sank over your boottop in a puddle, ripped your rain jacket on a briar, and the fuel for cooking ran out





a Journal

so you had to eat a cold supper—let the paper know your frustration.

Ah, but what about reaching the top of the mountain to see the sunrise, basking in a flowery meadow on the way down or thrusting hot feet into a perpetual snowdrift? The feel of cool water while swimming in a rock-rimmed water basin? Or maybe just the feeling of a drink of cool water after walking in the hot sun admiring canyonland or desert colors?

Record the little things like times and dates, too. Then you can always look back and say, “Gee, last month at this time we were just leaving that island” or “A year ago today we had to get up at 4:00 a.m. because a moose ran through camp.”

If you’re handy with drawing, sprinkle your writing with pictures of things you’ve seen (become another Audubon). Spice up your journal with poems. Splash the pages with your emotions and high-flung thoughts. Remember, nobody said they had to be publishable. They’re personal memories captured for yourself.

When vacation is over and you’re sitting around home with nothing to do, or perhaps with a lot to do, get out the pictures—and your journal to complement them. In your mind you can journey back to warm, blue-sky days in the mountains; torrid, windless hours on a plain; or sweet, honey-smelling days of an oak woods. A little bit of remembering can do a lot. □

Meri Mertig Kuehn is a freelance writer from Wisconsin. This article is reprinted with permission from The Muir View, the newsletter of the John Muir Chapter in Wisconsin.



ROBERT IRWIN

WHEN I CALLED HER that February morning shortly before eight, I was greeted with: "Just a moment, Bob, let me get my shirt on." It was only at the end of the interview a half-hour later that I realized I had interrupted her preparations to leave on an early-morning hike with a friend. Furthermore, I had made her late. That was typical of Anne Van Tyne. At 76, she refuses to think of slowing down, either on the trail or in her volunteer efforts for the Sierra Club. The telephone call was Club work; the hike could wait.

She has been that way all of her 19 years in the Sierra Club. It all started in early 1962 when she began going on the Los Padres Chapter's outings around Santa Barbara. By spring she had become a member; "I was hooked," she said. The following January she was appointed to the chapter outing committee. In her ten years on it, she helped develop a leaders' training program, and for five of those years taught the course. That was only one of the many Sierra Club hats she would wear.

During that first year, Anne also started helping out on the chapter newsletter, the *Condor Call*. It was something she could do, she explained. (During World War II she had edited a United Auto Workers union paper in Chicago.) A few months later she was editing the *Call* and kept on at that task until 1968, when she was elected chapter chair. But that wasn't all she did in that first year. In the spring of 1963, she was appointed the chapter's alternate delegate to the Sierra Club Council and began her long immersion in the Club's national activities. She hasn't missed a council meeting since May 1963.

It is not too unusual for a fired-up new member to leap into the flames immediately to help put out all of the environmental brushfires threatening the chapter's area. Unfortunately, however, far too many eager activists come down with an affliction common in volunteer organizations—burnout. Not Anne Van Tyne. Now in her twentieth year of service to the Club, she is busy in the following five posts:

The Sierra Club Keeps A Remarkable Woman Young

1) Chair of the chapter's forest land-use committee;

2) Vice-chair of the chapter's council;

3) Editor since 1969 of the *Sierra Club Forum*, formerly the *Council Newsletter* (editing, she says, is one of the things she has always enjoyed the most);

4) Member of the Santa Barbara Group's city and county land-use committee; and

5) Primary phone contact and information bureau for the Sierra Club in Santa Barbara.

Over the years she's done a wide variety of things. It's that variety, she says, and the new challenges that go along with it that have



Anne Van Tyne in an unusual pose—standing still.

kept her going, that keep her from burning out. She has served three times on the chapter's executive committee, twice as chair (1968 and 1980). Around 1966 she organized the chapter council, which concerns itself with all internal affairs such as membership, the newsletter, outings and the chapter's six regional groups. The council makes recommendations to the executive committee, which makes only final decisions on internal affairs and is thus freed to concentrate on conservation matters. She also served for several years in the early and mid-1970s on two of the Club's national committees, Internal Organization and Membership.

Anne credits her knack for organization to her wartime experience back in her native Chicago. After her Auto Workers editorship, she worked as an organizer for two other unions representing office workers and social workers. "The toughest jobs I've ever held," she says, "but an invaluable education in learning how to get myself and other people organized."

She disclosed her secrets of organizing effective committees of volunteers. The first step, she says, is to find interested people. Next, assign each person a specific responsibility, but don't overburden anyone. Under this system, she says, people will know that they are important to the committee and very few will drop out for lack of interest. Her ability to delegate responsibility keeps her from burning out in futile efforts to take on all the tasks herself. It also prevents the "fizzling out" of underused or ignored members of committees.

Another cause of burnout, or perhaps it is "fadeaway," can be a defeat in running for a Club office. Anne went through that experience once in 1972, when she was a candidate (a reluctant one, she says) for membership on the national board of directors. She didn't win. Neither did she lose any enthusiasm for the Sierra Club. On her ballot statement she had noted her occupation as "housewife—when time permits."

Chapter and Group Notes

Litigation or education? The Miami Group of the Florida Chapter has opted for education as a productive and long-lasting way of achieving environmental gains. Court battles can delay or punish environmental crimes; education can prevent them. In the Winter 1981 issue of Anne Van Tyne's *Sierra Club Forum*, Joe Banks and Pat Suiter tell how the group's education committee has developed seven slide-with-sound programs on endangered wildlife, plants and the fragile ecosystems of south Florida. The professional-quality, 15- to 20-minute programs are used continually in presentations given by the committee's corps of trained docents. Pat Suiter can provide details if you write her at 1205 Mariposa Avenue, Apt. 312, Coral Gables, Florida 33146.

Bed and breakfast in the Big Apple. That's what the Atlantic Chapter has asked its New York City members to make available to wayfaring Sierra Clubbers from upstate and the rest of the country. Its office at 800 Second Avenue, New York, NY 10017, serves as the clearing house. Most accommodators want at least a week's advance

notice, and some will be able to provide neither bed nor breakfast, only floor space for a sleeping bag. That may be hard on the back, but it sure beats \$100-plus per night at the Waldorf!

A shovel and mattock brigade of volunteers from the Many Rivers Group of the Oregon Chapter made some good trail-building progress last summer and fall. Before the winter rains and snows set in, they had laid out and flagged 2½ miles of their portion of the 75-mile Eugene-to-Pacific Crest Trail in the rugged, steeply pitched Oregon Cascades. This year the Forest Service will provide tools and other help, and the county (Lane) will muster a small army of forest-worker trainees to do the clearing. The state's Recreational Trails Program has set aside \$5000 to cover related costs.

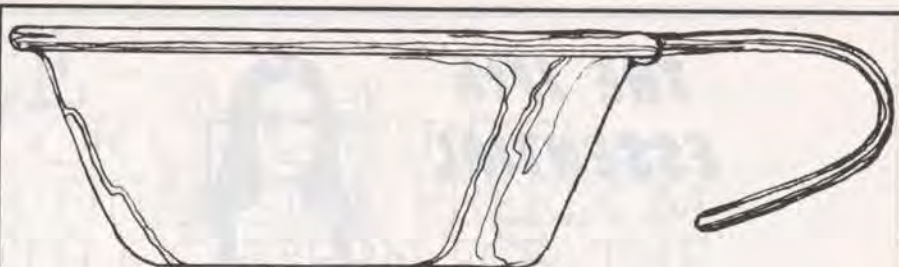
Singles and seniors—how two chapters serve them. An exchange of letters to the editor of *Palm and Pine*, newsletter of the San Geronio Chapter, illuminates a problem related to outings that could cause confusion within chapters.

The first writer asked whether married people were "clearly excluded" from singles section outings, which are mostly close-to-home campouts and short hikes—activities he and his wife preferred. The chapter's regular outings are mostly backpacks and car-camps far from home. In her reply, Editor Crystal Kane conceded the difference and asked readers to comment and offer solutions to "this rift in our chapter."

An unmarried newcomer responded in the next issue. First, he said, he was made to feel the outsider, isolated and alone, when he attended a chapter meeting. At the singles meetings, on the other hand, he was greeted warmly and invited to join the activities. Also, as a person with little outdoor gear or experience, he was reluctant—even a bit intimidated—to try a long backpack or stiff hike. Certainly not a mountaineering trip. He considered joining a leisurely paced car-camp, but the family-oriented and "old friend" tenor of the outing's writeup steered him away.

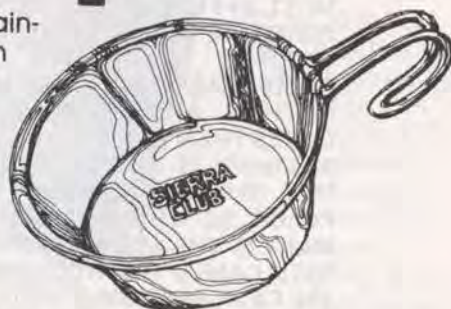
Editor Kane thanked him for his candid remarks and for the nice way he had jogged the chapter's leadership into a fuller awareness of the problem.

Meanwhile, the neighboring Angeles Chapter is trying to make it easier for some of its once-active senior members to participate in chapter affairs. Its newsletter, the *Southern Sierran*, described the situations of a few such members. One, Thurman Frick of Tujunga, is slowed down with arthritis and



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glaucoma, but he'd enjoy going along on an outing just to share in the cooking or car watching. Another long-time member and former national board director, Stanley Jones, is blind and confined to a wheelchair in a convalescent hospital in Glendale. His mind is active and keen, however, and he's eager to share his wealth of stories about the early days of the chapter. Ninety-year-old Miss Gertrude Tracy of Pomona joined the Club in 1926. Now, despite her limited vision and funds, she is still going strong—writing letters, voting, caring. The chapter is urging nearby members to get in touch with her and the other seniors.

A *brown-bag lecture series* cosponsored by the Loma Prieta Chapter has become an institution among Palo Altans. It is held every Wednesday at 12:30 p.m. at the Peninsula Conservation Center, one of the sponsors along with the local co-op store. Appreciative lunch munchers have heard speakers on "Packaging: Recycling vs. Waste" and "Wildlife Rescue and Animal Care" and have seen a new film on wind power.

The campaign for Alaska still goes on—not in Washington, but in Juneau, the state's capital. Major issues remain to be settled; chief among them is reform of the state's land-disposal program. Environmentalists are financing a lobbyist for the 1981 Alaska legislative session. Alaska Chapter Vice-Chair Roland Shanks was hired as lobbyist, with a \$14,000 budget to cover the six- to seven-month session. About 75% of the required funds have already been provided, with major amounts coming from the Alaska Center for the Environment and the Fairbanks Environmental Center and smaller ones from other groups, including Friends of the Earth-Alaska and our Alaska Chapter (which gave \$1000). But because of the urgent need for the entire \$14,000, the chapter has issued an appeal for funds to its 750 members. Maybe some of us in the lower 48 (and in Hawaii and Canada, too!) should pitch in and help as well. Checks made out to Alaska Chapter, Sierra Club, indicating they are for the lobbying program, should be mailed to the chapter at P. O. Box 2025, Anchorage, Alaska 99510.

A *hotline for Sierra Club alerts* from the Club's Washington, D.C., office is open on a 24-hour basis. A tape-recorded message is updated every two days to direct activists' work on issues requiring immediate action. The number to call is (202) 547-5551. Dial during the low-rate hours. If you want to reach a warm body, call (202) 547-1141. □

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SCB-1



"Replace Watt" Campaign Announced

In response to the Administration's long and steadily growing list of bad appointments, decisions and funding choices, the Sierra Club's leaders have decided to send a

message to the White House through the Congress—as the First Amendment to the Constitution allows—asking that James Watt and his policies be replaced by voices of reason.

On the opposite page is a petition to members of Congress asking them to seek Watt's dismissal. (This is also an excellent opportunity to get your friends to join the Sierra Club and help us counter the unprecedented attacks on our public lands and environmental laws.) Just pull out the page the petition is on, and ask your friends and neighbors to sign it. (There is also a space they can check if they want to join the Club.) When the petition is full, send it to "Replace Watt," Sierra Club, 530 Bush Street, San Francisco, California 94108.

The New Administration: From Bad to Worse

The Administration's first and second rounds of appointments and decisions have come and gone, and leaders of the environmental movement see little cause for optimism. Besides naming James Watt as Secretary of the Interior, President Reagan has added to his list of unsuitable appointments. It now includes: anti-wilderness timber industry spokesman John Crowell as Assistant Secretary of Agriculture for Conservation (in charge of the Forest Service); James Harris, an opponent of federal stripmining regulations, to head the Office of Surface Mining; Anne Gorsuch, a Colorado colleague of James Watt who has opposed many pollution-control efforts, to direct the Environmental Protection Agency; Robert Burford, a Colorado rancher and proponent of the Sagebrush Rebellion, to head the Bureau of Land Management; Ray Arnett, a strident opponent of wilderness, as Assistant Secretary of the Interior.

James Watt, the worst of these appointments, has moved quickly to dispel hopes for moderation, both as Secretary of the Interior and as head of a Cabinet-level coordinating committee on resources. So far, a partial list includes:

- Stated his intent to allow oil and gas production in wildlife refuges and wilderness areas;
- Advocated turning urban national recreation areas over to the states;
- Abolished the Heritage Recreation and Conservation Service;
- Applauded the administration's decision virtually to abolish the Land and Water Conservation Fund; this fund is now used to acquire lands for parks, but Mr. Watt opposes establishing new national parks and wants to redirect the fund into park management;
- Fired about 30 Interior Department attorneys who were doing work essential to protecting federal lands;

- Urged the administration to nullify hard-won international understandings that were to lead to a Law of the Sea treaty this year;
- Supported increased funding for unnecessary water projects in the West;
- Suspended efforts to enforce the acreage limits for beneficiaries of federal water projects;
- Told a group of park concessioners that if they had problems with the Park Service, he would get rid of the problem or the personality, whichever is quicker;
- Said he would change National Park Service policy regarding management of boating in the Grand Canyon, and in virtually the same breath said, "There is no way you could get me on an oar-powered raft";
- Opened offshore areas to oil and gas leasing that the Carter administration had excluded;
- Advocated cuts in funding for the Fish and Wildlife Service which, if adopted, would cripple the already weak Endangered Species Program;
- Ordered the Office of Endangered Species to withdraw some proposed listings; and
- Interfered with BLM's efforts to control overgrazing on the public lands, tried to take the congressional prerogative of deciding which of the BLM areas under consideration for wilderness should *not* be protected and weakened policy on protecting BLM areas under study for wilderness.

Hayakawa Introduces Anti-Wilderness Bill

Senator S. I. Hayakawa (R-California), joined by Senators James McClure (R-Idaho), Jesse Helms (R-North Carolina), Steven Symms (R-Idaho), and Howell Heflin (D-Alabama), has introduced this Congress' first anti-wilderness bill. "The RARE-II Review Act of 1981," S. 842, applies to all national forest lands and is the most radical timber industry initiative to date. It would designate no wilderness; mandate permanent non-wilderness management for all 36 million acres allocated to non-wilderness in RARE-II; distort the forest planning process by permanently prohibiting Forest Service planners from considering any areas for wilderness; prohibit any legal challenges to the results of RARE-II anywhere in the country; and put recommended wilderness areas and further planning areas on stringent deadlines for congressional consideration. If Congress failed to act by the deadline, the lands would receive permanent statutory non-wilderness management.

This bill ignores the fact that many lands designated by RARE-II as non-wilderness have already been opened to development, preventing any future wilderness designation. No environmentalists have filed suit over RARE-II, and language agreeable to both the timber industry and environmentalists was negotiated and added to legislation last Congress. (Since then, the timber industry has withdrawn its support for this agreement.) Moreover, Congress passed legislation last year that settled most of the wilderness controversy in several states, so the Hayakawa bill will further polarize the situation rather than help solve it. Concerned environmentalists should write to their two senators immediately, asking them to oppose the Hayakawa bill.

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Return petitions to: **"Replace Watt," Sierra Club, 530 Bush Street, San Francisco, CA 94108** — (415) 981-8634. You need not fill the petition for it to be valid; gather as many signatures as you can.

- Please send me _____ additional petitions.
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GUEST OPINION

A Tradition Worthy of Pride

SENATOR ROBERT T. STAFFORD



IF IT IS TRUE that nothing succeeds like success, then environmentalists might consider taking a page from Ronald Reagan's book.

There is broad consensus that one of the major reasons for President Reagan's election was his ability to articulate the pride that Americans feel for their country.

He reawakened the old visions of America as a generous and good country, proud of its freedoms. He rekindled old spirits. He was unabashedly positive about what this nation had once done, and about what could be done again.

In short, President Reagan was—and is—high on America and American values. That total rejection of any hint of defensiveness, that bold and enthusiastic pride could serve environmental groups well. The environmental organizations and many of their members seem to be lackluster and defensive—a combination guaranteed to lead to malaise. Somehow, somewhere, those who were once fiercely proud and protective of the environment have been deluded into believing that the dream has ended. They have allowed themselves to be lulled into believing the hollow claim that 1980 was the end of a "Decade of the Environment." Slogans and catchwords too often contain as many falsehoods as they do truths. The term "environmental decade" might be partially inaccurate in that it clearly understates the case.

The truth is that we have experienced an environmental half-century. It may go back even further than that.

The Clean Air Act was not first enacted in 1970, as so many believe. It became law in 1955. Dwight D. Eisenhower was President, and anyone asking "who speaks for the trees?" would have been greeted by blank stares and stifled laughter.

Even more to the point, the federal law followed two or three decades of attempts by state and local governments to cope with air pollution. The St. Louis that was famous for its "Black Mondays" was not the city of the 1970s, but of the 1940s. That its air is cleaner—if not necessarily pristine—today is due to outcries heard and controls imposed during the administration of Harry Truman, not of John Kennedy, Lyndon Johnson, Richard Nixon or Gerald Ford.

Much the same is true of water. Few remember that the most effective legal mechanism at the nation's disposal, through the first several years of the 1970s, was a law passed in 1899. The Refuse Act was an environmental law in the purest sense—in fact, it was much stricter and more effective than any we've passed since.

The fact is that environmentalists should no more be defensive about environmental laws than Americans should be defensive about America. Those laws protect the qualities of our nation that are most precious to its people—abundant plains, blue skies, clear rivers and, most important, the people themselves.

Those laws were forged of broad and formidable alliances. But, for some reason, the alliances have been allowed to dissolve in recent years. Too often these days the term "environmentalism" evokes images only of backpacks, corduroy jeans and beards.

The truth is that the environmental laws were written with the help of farmers, workers, public health nurses and doctors, people in small businesses and hundreds of other kinds of Americans with a vital interest in protecting our natural resources.

Those alliances once existed. Each group saw in the other an ally, for they had interests in common not just of principle, but interests that could be translated into cold, hard dollars.

If the surviving environmental groups expect to retain the successes of decades past, the old alliances must be reenergized. Environmentalists must once again speak with the pride that comes from a tradition of protecting people and protecting America.

That is a tradition worthy of pride, not of apology. □

Robert T. Stafford is a United States Senator from Vermont. A Republican, he chairs the Senate Committee on Environment and Public Works.

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