

High Country

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The Paper for People who Care about the West

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Glenn Oakley

Major quake reshapes Idaho

by Glenn Oakley

When the earth moved in Idaho at 8:06 A.M. on October 28, hunters John Turner and Don Hendricksen were driving a Ford Bronco toward a band of elk.

Hendricksen suddenly felt as if he were going to pass out, and then, as he said later, "All hell broke loose." That moment of dizziness, according to geologists, was the road beneath them rising. A deep rumbling like thunder resounded as the initial shock waves reverberated the surface of the ground like a giant drum. Then came the shear waves and the road before them fell. The surges of shock waves lifted the jeep off the ground and caused the two hunters inside to jerk like rag dolls. Small cracks in the ground opened up and then closed.

Across the basin near the Chilly Buttes, which rise like dinosaurs' backs from the valley floor, a farmer was plowing his field. The source of the earthquake was almost directly beneath him, probably less than 15

miles deep, and the shock waves bounced the entire tractor and plow off the ground.

Out of the northeast side of one of the Chilly Buttes, water burst forth and cascaded down in a flow of rocks and mud. Near where the flow cut across the gravel road, giant spouts of sand and water erupted and rose fifteen feet into the air.

On a ridge below Idaho's tallest peak, Mount Borah (12,665 feet), shock waves rippled up the slopes and crested. That amplified energy blasted trees out of the ground. The warm springs which irrigated the Ingram Warm Springs Ranch stopped flowing. Other springs doubled in volume. At Birch Springs, ground already saturated with groundwater liquified during the violent shaking and swooshed downslope, taking out a grove of aspen and leaving a ten-foot-high escarpment. For 23 miles along the base of the Lost River Range, the ground parted.

In the town of Challis, 20 miles to the north, two children on their way to school paused beneath a stone

archway and were killed when it collapsed. One woman stepped out of her car moments before falling bricks crushed the roof. Up and down the valley buildings swayed, cracked and crumbled. Fifty miles to the southeast, nuclear reactors at the Idaho National Engineering Laboratory were shut down. Small cracks appeared in two buildings.

One hundred twenty miles to the west in Boise, office workers fled high-rise buildings which swayed in the air. After a beam shifted at Boise City hall, the building was evacuated. Even as far away as Dickinson, North Dakota, people felt tremors which radiated through the ground from beneath the Chilly Buttes.

At the Earthquake Information Center in Denver, there was high excitement as the biggest United States earthquake in 24 years etched a wide column on the smoked seismograph paper.

Two weeks after the October 28 earthquake, Mackay, Idaho resembles an occupied town. Large camouflaged

National Guard trucks grind in procession down the few streets, rubble from collapsed building fronts is piled here and there, and shattered glass glints on the sidewalk where the ILL cafe used to stand. Government trucks filled with geologists come and go.

While the earthquake may prove lethal to businesses unable to finance reconstruction in this small cow-town, most of the other merchants are busy. The National Guard has occupied the White Knob Motel on the outskirts of town and a Boise State University geology team is holed up in the Gentry Motel, with a length of 2x4 braced up against a wall to keep the brick shell from falling. A University of Utah geology team has taken the Wagon Wheel Motel, and the United States Geological Survey has set up headquarters at the Lazy A in Arco, 30 miles southeast of Mackay.

In the mornings the geologists emerge from their rooms, warm up their trucks and drive north on Highway 93. The highway runs down

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Dear friends,



High Country News

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Although *High Country News* is a newspaper, it is also something of a school. Judging by our alumni this week, it's a school that turns out pretty good graduates.

Bruce Hamilton, who came to the paper in 1973 and left in 1976 to become the Sierra Club's Northern Great Plains Regional Representative, has just been promoted. In December, he becomes the organization's National Director of Conservation Field Services in charge of ten regional offices from Knoxville, Tennessee to Anchorage, Alaska.

The job should involve some travel, but Bruce says: "I doubt it will be any more than now." He is responsible presently for Wyoming, Montana, the Dakotas and Nebraska. For the last six years he has covered that far-flung region out of Lander, Wyoming, but starting in December he will be at Sierra Club headquarters in San Francisco.

In addition to overseeing ten offices, he will also have some of the responsibility for setting non-legislative national policy for the organization. The Sierra Club's policies mean something. It has 350,000 members and an annual budget of \$22 million. Bruce's field operation division consumes \$1 million of that budget.



Bruce Hamilton

Bruce is married to Joan Nice, another *HCN* alumnus, now working

as a freelance writer. The family will move to the West Coast in December. In the meantime, Bruce is looking for his replacement. If you're interested in representing the Sierra Club in the five Northern Great Plains states, contact him at 415/981-8634.

And if you're interested in saying goodbye to Bruce and Joan, there will be a farewell party in Lander on Sunday, December 4, 3 p.m., at the CWC Field Station.

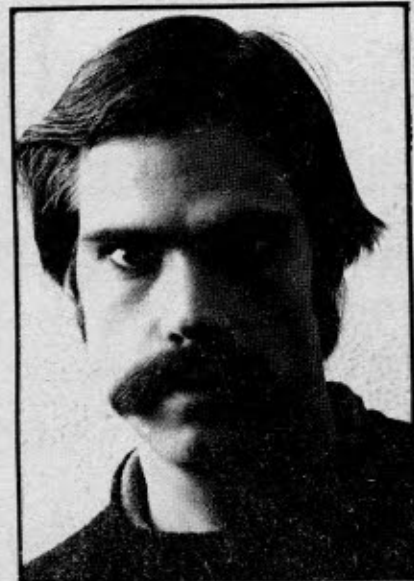
Bruce is only leaving the region for San Francisco. A more recent *HCN* graduate, Michael Moss, has just returned from close to the roof of the world. He was the Cox Newspaper Corporation's reporter on a recent climb of Mount Everest.

He sent back stories to the Cox newspapers which described not only the expedition, but also the social, physical and cultural landscape through which that expedition moved. It was not very different reportage from what he did for *HCN*. Under editors Joan Nice and Geoff O'Gara, Michael would travel the Rockies, returning every other week to write about life at the grassroots. He is now back at the Grand Junction *Daily Sentinel*, a Cox newspaper.

Our third alumni note is about Mike McClure, who was official staff photographer for *HCN* until recently. He is now a photographer with the *Casper Star-Tribune*. And he is having a show in Evanston, Wyoming on Sunday, December 4, from 4 to 6 pm at the Pioneer Bank.

The show is being put on by the Evanston Urban Renewal Authority to major feature is thirteen photos of Evanston and its surroundings taken by McClure.

Those thirteen photographs will be on display and for sale, as will McClure's photographs which didn't get into the calendar. Evanston is an old railroad town whose downtown is now enveloped in new construction built as a result of the recent oil and gas boom in the Overthrust Belt. The Evanston Urban Renewal Authority hopes to preserve and redevelop some



Glenn Oakley

of the old downtown. The calendar is a way to raise money for the project and to show people how the town and its surroundings appear to a skilled and critical eye.

The obvious question after a column on alumni is: what have you done for us lately? Who's in the pipeline?

That question is best answered by reading our page 1 story. It's on the Idaho earthquake and it's tailor-made for photographer-writer Glenn Oakley. Glenn published his first *HCN* article in 1976 when he was a college student at Missoula, Montana majoring in geology and journalism.

Since then he's written a slew of articles for *HCN*, and also finds time to write and photograph for *Canoe*, *Garden*, the *Idaho Statesman*, and others.

The accompanying photo of Glenn is a self-portrait. It came with a note that read in part:

"I became a writer partly because I couldn't figure out college algebra. I became a photographer partly because that's what my first newspaper employer needed. But I have been pleased with these non-decisions. I get to run around learning interesting things and meeting all sorts of people."

The *HCN* Research Fund is off and running...

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WESTERN ROUNDUP

Compound 1080 is back on the range

The Environmental Protection Agency intends to put 1080 back on the range. The toxic compound was developed in Germany in the 1940s and used to poison coyotes until banned during the Nixon Administration.

The poison will be available to certified state and federal applicators as either toxic collars for sheep or drop baits which deliver a single lethal dose. EPA administrator Lee Thomas said there will be restrictions on use, including government review of 1080 manufacturing and sales, a limit on quantities for use, and regular monitoring of field application. Large bait stations -- leaving a 1080-injected carcass on the range -- are still prohibited.

The limited use of 1080 is based on earlier findings by EPA administrative law judge Spencer Nissen. He said that the use of 1080 in collars and drop baits had not been examined during the proceedings that led to the 1972 ban on 1080. The ban was based largely on the report of the Cain Committee, an independent commission of scientists who studied use of the poison. Several studies questioned the poison's role in reducing predation. In general, data on the effectiveness of 1080 is incomplete (HCN, 5/14/82).

According to the proposed EPA regulations, 1080 will be reserved for areas with demonstrated predator problems. In the past, the poison was sometimes used to reduce coyote populations.

Toxic collars, which release 1080 during a coyote attack on any "sacrificial lamb" wearing them, have been of some effectiveness in areas where sheep are confined in fenced pastures. But critics of 1080 say the poison is of little use in large open-range grazing which is practised in much of the West.

Drop baits, which are balls of meat or fat, once were dosed with strychnine and "broadcast" over western ranges in winter. The 1080 baits will be limited to specific stations. However, doubts about the effectiveness of the poison at low temperatures have already caused problems with dosages and application methods. Earlier this year the EPA cancelled a Fish and Wildlife experimental permit because of unauthorized increases in doses and expansion of study areas beyond the permitted boundaries.



Wily coyote

Meanwhile, many sheep ranchers in the West have hailed the limited use of 1080. Wyoming Senator Malcolm Wallop reflected that sentiment when he said recently, "I don't think the EPA decision goes far enough, but it's a great deal better than we anticipated."

Wallop added, "Environmental groups say we can't use it, the woolgrowers say it isn't enough... it's my hope that the woolgrowers hold sway."

Who holds sway will be decided in federal court. On October 31, the day

of EPA's 1080 decision, a coalition of 11 environmental groups and a conservative foundation appealed EPA's decision in two separate Circuit Courts of Appeals.

The Sierra Club and others argued that re-registering the compound 1080 as a pesticide threatened wildlife; the Pacific Legal Foundation argued that the EPA had not been liberal enough in allowing 1080 for use in controlling coyotes. The court battle could end up in the U.S. Supreme Court.

--C.L. Rawlins

EPA backs stricter water standards

EPA Administrator William Ruckelshaus recently promised to approve regulations that would reinstate the spirit of the 1972 Clean Water Act and reverse last year's proposals to drastically weaken it.

In October of 1982, Ann Burford's EPA proposed reforms in regulations that guide the states in setting water quality standards (HCN, 10/29/82). The proposal would have allowed states to base decisions on crude cost-benefit analyses and to permit degradation of high-quality lakes and rivers.

EPA's new regulations will require states to incorporate toxic limits into their water quality standards and to allow only limited degradation of waters when necessary for "important

economic or social development." But some problems still exist. Limited degradation will be allowed in national parks and wildlife refuges. Inadequate state water-quality standards will be allowed to remain in effect until the state revises them or EPA issues new standards to replace them.

Ruckelshaus' recent action followed a year of public outcry and Congressional scrutiny. In the Senate, the Environment and Public Works Committee has reported amendments to the Clean Water Act that would mandate regulations as they existed before last year's proposed changes. The House Public Works and Transportation Committee has been conducting hearings on the Water Quality Renewal Act that would

reauthorize and strengthen the Clean Water Act.

Conservation groups have applauded EPA's recent move, but they also urge Congress to continue work towards a strong national clean water program. Dan Weiss of the Izaak Walton League of America said that the House's proposed Water Quality Renewal Act would protect EPA's new regulations "from future attempts at 'regulatory reform,' while retaining the current program's flexibility."

The House Act places stronger limits on water degradation than EPA's new regulations. It would prohibit degradation in national parks and wildlife refuges.

-- Mary Moran

HOTLINE

AMAX is stirring

The nationally reviving economy has affected Colorado's hardrock mining industry, with the announcement by AMAX that it will recall 770 laid off molybdenum miners to its Henderson mine. That's something of a drop in the bucket -- in 1980 its Henderson and (still-closed) Climax mines employed 5000 people at the two continental divide operations. But it's a welcome drop to small communities near Henderson such as Empire and Idaho Springs.

It also raises hope for Leadville, whose residents depended on the 3000-miner Climax operation until it shut down last year. Leadville had 38 percent unemployment last year, and the threat of rocketing property taxes because Climax molybdenum production represented \$150 million out of Lake County's \$242 million in assessed valuation. Climax is a much older mine than Henderson, with slightly lower ore richness. But AMAX spokesmen said the firm also hopes to resume production there in 1984. Predictions are that the two mines will never achieve their old employment levels. Molybdenum is a steel-hardening element.

NRDC hits Forest plans

The Washington, D.C.-based Natural Resources Defense Council is busily preparing two briefs of some 200 pages each justifying their administrative appeals of two Western Colorado Forest Management Plans. The forests are the Grand Mesa-Gunnison-Uncompahgre and the San Juan. Both appeals are based on the Forest Service's timber-cutting policies; in particular, public subsidies and their economic rationale. NRDC attorney Kaid Benfield says the appeals are grounded in the 1976 Federal Land Management Policy Act. Briefs are due December 5.

Rep. Waxman is tough

The *Wall Street Journal* for November 10 had bad news for Westerners opposed to a national electricity tax to pay for the clean-up of midwestern power plants. The prime mover behind this one mill per kilowatt-hour tax to reduce acid rain is Representative Henry Waxman (D-CA). The *Journal* article described Waxman as an extremely effective House member who had stopped the Reagan Administration's and Representative John Dingell's (D-MI) efforts to weaken the Clean Air Act. Now, the *Journal* says, Waxman and Dingell are allies on the question of acid rain clean-up.

Lift from the sun

Solar-powered pumps may someday irrigate farmland in remote areas lacking electricity.

The Bureau of Reclamation recently awarded a \$131,110 contract in southern Colorado's San Luis Valley to test a solar-powered pumping plant as part of a ground-water recovery project. The contract went to Intersol Power Corporation of Lakewood, Colorado. The company uses a Fresnel lens to concentrate sunlight onto an array of photovoltaic cells; silicon chips within the cells generate up to 10 horsepower of electricity. That's enough to pump 425 gallons of water per minute from a depth of about 38 feet, said Intersol president John Sanders.

HOTLINE

First BLM wilderness

The Bear Trap Canyon area in southwestern Montana is the first BLM land in the nation to be officially designated as wilderness. President Reagan signed legislation October 31 making the area part of the newly-created Lee Metcalf Wilderness Area. The BLM will manage the 6,000 acre Bear Trap portion of the wilderness, located about 29 miles southwest of Bozeman in the Madison Range.

Designated as a primitive area in 1972, and chosen for priority wilderness review in the 1976 Federal Land Policy and Management Act, the area lies along the Madison River. The river is a "blue ribbon" trout stream and noted white-water river-run. Wildlife includes river otter, coyotes, mountain goats, eagles, osprey and grouse.

Early next year, BLM's Dillon Resource Area Office will work with local citizens and groups to draw up a wilderness management plan for the Bear Trap Canyon area.

Wall Street is all talk

Wall Street can't get its act together on WPPSS. When the power supply system defaulted, it was widely predicted that the marketplace would punish the state of Washington generally and the 88 participating utilities specifically by charging them extra-high interest rates or by denying them capital. That theory was tested and found wanting in mid-November by WPPSS's largest member -- Snohomish County Public Utility District No. 1. It easily sold \$243 million in bonds to complete a hydroelectric project.

**Bald eagles soar**

After years of decline, the bald eagle is showing signs of recovery, reports the National Wildlife Federation. This year's survey, taken from January 2-17, counted 12,098 bald eagles in 46 states. In 1979, the year of the Federation's first survey, 9,815 eagles were counted. The bald eagle is officially endangered in 43 states and threatened in five others, and only in Alaska is the bald eagle plentiful. Biologists with the Federation say that after a drastic decline in the 1960s caused by pesticides and dwindling habitat, bald eagles began to make a comeback. The largest population counted this year was in Washington state, with 1,158 birds; next largest was Utah with 1,042; following were Florida, 684; and Idaho, 644. The Federation offers \$500 for information leading to the conviction of anyone who illegally kills a bald eagle.

Wild sheep butt heads with oil

The latest skirmish in the conflict between minerals development and wildlife is being fought on the Shoshone National Forest in northern Wyoming.

The forest is the nation's oldest and contains 1.2 million acres of wilderness bordering Yellowstone Park. It is home to the largest Bighorn sheep population in North America as well as to a threatened species, the grizzly bear. It is also an economic boon for Wyoming communities such as Dubois and Cody, which depend on recreation and wildlife for part of their livelihood.

But oil and gas underlie the forest. The search for them by seismic exploration companies is done under Forest Service permit, using a technique that's been steadily refined since the 1930s. Crews generate sound waves by setting off dynamite or by using "thumper" trucks, and the returning waves are collected by instruments and interpreted by geologists seeking oil-bearing formations.

This October, the seismograph companies came into conflict with a wildlife preservation group, The Foundation for North American Wild Sheep. Now the forest's new supervisor, Steve Mealey, has intervened to find some kind of balance. A wildlife biologist, Mealey's background is unusual for a forest supervisor. He was one of the first members of the Inter-agency Grizzly Bear Study Team which brought together U.S. Fish and Wildlife, Park Service and Forest Service biologists to pioneer research in the habits of grizzly bears.

Just about two weeks after he came to work at the Shoshone Forest office in Cody, Mealey suspended ongoing and new seismic testing. Mealey's predecessor, Ray Hall, had allowed testing under a 1981 Environmental Analysis. But this August, after three or four unsuccessful meetings with the Shoshone Forest staff, the sheep foundation filed a lawsuit contending that the EA was insufficient because it failed to protect critical wildlife habitat. Cumulative impacts from repeated seismic testing were also not addressed, they said.

On October 18, Mealey and government officials agreed. As of



Bighorn sheep lamb at Shoshone National Forest

that date, no testing is allowed until forest analysts can again look at impacts, particularly on wildlife. The sheep foundation is now pressing for a full Environmental Impact Statement, which could take a year to complete.

The oil and seismic industries joined the battle early in November. The International Association of Geophysical Contractors, headquartered in Denver, formally appealed Mealey's decision to Regional Forester Craig Rupp. The organization charges that the order deprives communities near the forest of income from highly-paid seismograph crews, and that it withholds fees charged for seismograph lines (\$150 a mile and \$35 a hole) from the U.S. Treasury, and from local school and hospital districts. The geophysical contractors also say that a hunter armed with a rifle is "far more devastating" to a Bighorn sheep than a seismic crew.

Mealey's staff has 30 days to prepare a "responsive statement" for Rupp to look at before issuing his decision.

In the meantime, supervisor Mealey said he hopes to bring some "new magic" to the problem of balancing sometimes conflicting uses. One method he proposes would measure the "non-consumptive values" of wildlife. He explained that

since a Bighorn sheep has no market value, a surrogate value must be devised.

Another approach, he said, is termed "willingness to pay." It attempts to estimate how much a public-lands user would pay to see a grizzly bear walking unmolested through a mountain meadow. A third approach is to question tourists about how much they've spent to reach a certain spot in the forest where wildlife is visible. All methods try to assign a value to wildlife so that it can be compared with minerals, oil and gas, timber, and rangeland -- all of which have marketplace values.

But, Mealey added, "People have to get used to thinking a gas well on the forest is just as legitimate a use of the forest as a cow, a grizzly bear, an elk herd, or a person leading a pack string."

"We face some tough decisions," he said. "The law asks bureaucrats to do things we don't know how to do sometimes. But that doesn't take us off the hook."

--K.T. Roes

K.T. Roes lives in Cody, Wyoming and is county editor of the *Powell Tribune*. This article was made possible by the *High Country News* Research Fund.

Agency to save WPPSS-3 by delaying it

The Bonneville Power Administration has completed a study that calls for resuming construction on the unfinished Washington Public Power Supply System plant #3 at a reduced pace in July, 1985, and bringing the nuclear plant on line in June, 1990.

BPA administrator Peter Johnson said, "Results of the study confirm... the wisdom of the recommendation to put WNP-3 in a state of preservation for up to three years."

But opponents of the plant charge that the study ignores alternatives for meeting the demand for electricity, and that it also reads more like a defense against a lawsuit brought by four private-utility participants in the WPPSS default. The lawsuit asks for an immediate restart of construction on WPPSS #3.

WPPSS 3 is about 75 percent complete and approximately \$1.8 billion has been spent on the plant so far. The study shows that, under both base case and high-load growth assumptions, a gradual restart of the

plant in July 1985 and completion five years later would save \$87 million over the option of restarting it immediately and finishing it in 1988. The savings would come primarily from an assumed reduction in interest rates. Current interest rates are about 13 percent for electric utility bonds.

Jim Lazar, research director for the Olympia, Washington-based public interest group, Fair Electric Rates Now, said BPA's scenario underestimates a number of factors that weigh against restarting the plant at all.

Lazar said his group's projections foresee about 13,000 additional megawatts of power available to the region in the future without WPPSS 3. That represents 80 percent of all the power the region now uses. He said appliance efficiency, industrial conservation, fluidized-bed combustion from coal and other sources will decrease demand for electricity. "If only 25 percent of that potential actually becomes available, there is no

need for WPPSS 3. The increased demand can be met from other sources."

The private participants suing the Bonneville Power Administration are Pacific Power and Light, Portland Gas and Electric, Puget Power and Washington Water Power. Their suit in federal district court calling for immediate construction is answered in part by the BPA study. It concluded that, because of the legal and financial maze WPPSS is now in, there is little hope of raising the money for a restart of nuclear plant #3.

The interest rate assumption in the BPA study, however, could be a Catch-22 for the utility. "If you wait a few years and interest rates drop, say, four percent," said Jim Lazar, "the system will save \$2.4 billion over the 30-year life of the loans in interest. If you wait a few years and the interest rates don't go down, economic development is unlikely -- and there won't be need for the power anyway."

--Dan Whipple

SFC will act on oil shale grants...maybe

After months of behind-the-scenes negotiations and several delays, the U.S. Synthetic Fuels Corporation signals it is now ready to pass judgment on proposed oil shale projects in Colorado and Utah. At stake is \$4.8 billion in loan guarantees and price subsidies the SFC has pledged to shale.

Any predictions about SFC actions should be hedged. Historically, it has been hard to predict which way the SFC will jump. It is funded with \$15 billion in federal money, but it operates as a private corporation and does not go through the open bureaucratic procedures public agencies must follow.

Word from the SFC on the future of western oil shale projects has been mixed. One official has said the board hopes to reach agreement at its December 1 meeting on all the shale proposals. Another has said a decision will be made only on "one or more" of the proposals.

The water is further muddled by published reports which indicate a dispute among members of the board over whether the entire \$4.8 billion -- out of the \$15 billion total -- should go to western shale.

Reacting to those reports, representatives of local governments near the proposed projects flew to Phoenix in October to meet with top SFC strategists. They returned home assured that the agency is committed to the full \$4.8 billion allocation. "We can dispel any fears of a raid on shale funds," said Garfield County, Colorado manager Stan Broome.

In addition to local political

pressure, the SFC takes a lot of political heat nationally. There are several bills stalled in the Congress that would strip the SFC of its \$15 billion. From the other direction, Idaho Senator James McClure and Texas Representative Jim Wright push the SFC to start the money flowing. The Reagan administration is more or less neutral.

The front-runner for a share of the \$4.8 billion in shale money is Cathedral Bluffs, a joint Colorado project of Occidental and Tenneco. It has signed a non-binding letter of intent with the SFC for a \$2.2 billion contract to back a 14,000 barrel a day facility.

The other projects haven't reached the letter of intent stage. They are Union, which hopes to win funds to expand the 10,000 barrel a day project it is just completing in Western Colorado, and Paraho-Ute, White River and Seep Ridge, all in eastern Utah. \$4.8 billion is a lot of money, but it won't stretch to cover all five projects. Cathedral Bluffs by itself could take almost half of the funds.

C-B appears to be gaining momentum. It recently received a crucial air pollution permit from the EPA. However, the project is yet to settle its socioeconomic impact differences with Rio Blanco County officials, who earlier balked at company plans for an 850-person "man camp" near the remote project site.

C-B is now looking at Battlement Mesa, the built-from-scratch town Exxon left unfinished and largely vacant when it halted its \$5 billion



Cathedral Bluffs Oil Shale

Colony project in 1982. As many as 2,000 apartments and trailers might be available to C-B, but the workers would face a daily commute of three hours or more.

The experience of several other major oil companies with long range interests in shale shows how important SFC funds are. In 1982, Mobil Oil chairman Rawleigh Warner, saying cost-sharing efforts are necessary if shale is to be viable, proposed a consortium to fund one or more pioneer projects with the federal government.

Even though some of the biggest of Big Oil met with Mobil in 1982 and early 1983 -- names like Chevron, Phillips, Standard of Indiana, Sohio and Texaco -- the venture has died unceremoniously.

--Gary Schmitz

Salt Lake's gain is Tooele County's loss

Salt Lake County is about to get rid of an unwanted mountain of tailings left over from the processing of 1.7 million tons of uranium from 1951 to 1964. The radioactive material will be shipped 85 miles west of the Salt Lake City site to a desert site in Tooele County.

The Salt Lake City area is ecstatic. The region's political and economic leadership sees the tailings as a threat to the city's image and economic growth.

But sparsely populated Tooele County is not happy. Its board of county commissioners said they were "extremely disappointed" by the proposed move. "We are concerned regarding the economic impact on our area once the stigma of becoming a dumping ground is placed upon the county."

Salt Lake County hopes to ease the Tooele pain by sharing the economic benefits of the cleanup. The tailings are on a 125-acre former Vitro Corporation of America mill site which is now a regional sewage treatment facility in need of expansion. Salt Lake County Commissioner Bart Barker pledged to continue working on a plan to share the increased taxes Salt Lake County will receive from the future development of the Vitro site and its surroundings once the tailings are removed.

Local health officials are relieved by the planned move. They were concerned that radioactive material might seep into ground water. The effects of radon emissions appeared to be a lesser concern. The Environmental Protection Agency had estimated that the emissions would produce less than one extra death among residents within six miles of the site.

The Salt Lake tailings situation is just one of many across the West. In almost all cases, the controversy concerns whether the grey radioactive material should be stabilized in place or moved. The U.S. Department of Energy usually pushes for stabilization in place. The Salt Lake tailings could have stabilized for \$25 million. The move by truck or slurry to Tooele County will cost \$60 million.

Utah's Congressional delegation is not often perceived as overly worried about environmental threats. But in this case, they were. Salt Lake's Republican Congressman Dan Marriott was instrumental in getting the Congress in 1978 to pass the Uranium Mill Tailings Radiation Control Act, which authorized the federal government to pay 90 percent and the state 10 percent of the clean up costs.

Utah was so eager to see the tailings moved that Democratic Governor Scott Matheson has offered to pay more than the state's 10 percent share if the Department of Energy would move rather than stabilize them.

The Utah delegation's possible discomfort over its environmentalism may have been the reason why

Republican Senator Jake Garn reacted angrily to a question about the need to move the tailings given no firm evidence of a health threat. Garn said:

"We don't want the damn tailings in the middle of Salt Lake County. How much more simple can it be? We've got 750,000 people in the middle of that valley. I'm not a doctor. I'm not a technical expert, and I don't know who is. But the people think it's a significant health hazard to them, and that's good enough for us."

Although Tooele County may not be happy with the move, there's not much it can do. Although it sprawls over much of northwestern Utah, it has only 26,000 people, a fraction of the 616,000 in Salt Lake County in 1980.

There's a lot of empty space in Tooele County. It has 3.5 residents per square mile compared with Salt Lake County's 788 residents per square mile. Before one-man, one-vote, its 7,000 empty square miles would have counted for something against Salt Lake's 764 square miles. But today it is totally out-gunned in the State Legislature, which must appropriate money to pay the state's share of the cleanup.

--Ed Marston



LETTERS

FIGHTING THE PENTAGON

Dear HCN,

Your article about the citizens of Reserve, New Mexico, fighting the U.S. Air Force (HCN, 11/14/83) over sonic booms made me want to weep, laugh, pop a valium, or write a letter re my protests eight years ago.

Condon, Montana was (and is) being similarly blasted by frequent booms, so I called the FAA office in Missoula to complain. They knew nothing about such "overflights" but suggested I contact several likely air bases (Malmstrom, Lubbock, Texas, and one in California whose name I forget).

None of these, through their P-R officers, was able to identify the sonic boomers. Thus, after compiling a four-week list of each boom, I wrote my then Senator, Mike Mansfield, telling him of the community's outrage at the frightening noises. Mike went to work on the Pentagon and I soon got letters from two different apologists from the D.O.D. -- likely from the "Dept. of Silencing Troublemakers" and the "Dept. of We Know What's Best for You."

One letter impugned my loyalty and identified the booms as "sounds of freedom." The other, from a General, stated that it was vital that these missions be conducted "over simulant enemy territory." He seemed to be sincere. I wrote back asking why, if he was serious, they didn't select Washington, D.C. as a simulant Moscow and boom it while Congress was in town. No reply.

Well anyway, after eight months of back and forth correspondence and genuine effort by Senator Mansfield, he finally wrote that he had done all he could and felt very frustrated about dealing with the Pentagon about the problem. In closing, he suggested that it might be worth while for me to contact the FAA about the booms!

Luckily my sense of humor prevailed and, instead of having a stroke, I was able to laugh at the futility of protest when dealing with Big Brother.

I wish the folks in Reserve success -- but I sure wouldn't bet on it.

Sincerely,
David Bernera
Condon, Mt.

DISAGREES ON CLARK

Dear HCN,

I disagree with your opinion regarding the appointment of Bill Clark to replace James Watt as Interior Secretary, which appeared in the November 14th issue. Seems to me that Cabinet officials should have some background experience and knowledge concerning the activities and responsibilities of the Departments they administer. Mr. Clark has no qualifications for the Interior post. How can you support his selection?

Being concerned about his potential positions on the environment, the Sierra Club analyzed his record as California State Supreme Court judge. Clark's opinions reflect, it seems to me, staunch support for the individual, irrespective of the public good. He is a good bureaucrat who will rubber-stamp Reagan's continuing disastrous policies with respect to Interior. I don't want this type of fellow as Secretary.

Martin P. Schweizer
Summit Park, Utah

LETTERS

A MALIGNANT
LEADING INDICATOR

Dear HCN,

I've been dilatory about sending you a subscription renewal, and want to continue receiving your *excellent* newspaper. I wish there were an equivalent for New England.

Could you send me another copy with the article about the "sharp rise in cancer incidence in the Denver area." My husband -- retired from a long career in cancer research -- is very interested in any statistics relative to increased cancer (especially leukemias, which arise early, and are a warning signal for the slower-to-appear other forms of malignancy). We have a nuclear plant (Maine Yankee) ten miles away, and he has found a definite increase in leukemia cases. But of course there are other factors, and it is impossible to prove cause and effect at this point.

Elga Hauschka
Damariscotta, Maine

BEST WISHES

Dear HCN,

The report concerning Tom Bell was like a fresh breath of air! He is a great one... my warmest best wishes to him, always, and in all ways.

Fred L. Schneider
Marysville, Ohio

BARBS

If you can't trust this company...

The Celestial Seasonings Herb Tea Company has simultaneously yanked a tea and a multi-million-dollar stock offering off the market. The tea is comfrey, which is tainted by the toxic, hallucinogenic herb atropine. Apparently also tainted was the firm's stock offering, which was pulled off the market, perhaps because of the atropine incident.

We had heard relations were bad within the Congress, but...

The *Wall Street Journal* reports: "Chemical weapons would continue to be banned under an accord reached between House and Senate conferees."

Let's all move to Ground Zero.

The Air Force's \$5 million, 600-page draft EIS on the MX missile deployment says:

"The effects of (nuclear) war are speculative and lie beyond the scope of Peacekeeper deployment and peacetime operations. They are therefore not dealt with in this document."

As a result, the Air Force EIS looks at the environmental details of putting the missiles in place, but not at what would happen if the missile sites and the rest of the nation were hit with nuclear weapons.

The Casper, Wyoming *Star-Tribune* commented on this look-at-the-details approach in a Sunday editorial:

"... to the Air Force, Ground Zero is not a place where wars are fought or nuclear accidents happen. Ground Zero is never, never a target."

"The Air Force may be tough enough to fight a nuclear war. It is not tough enough to say in print what it means to be the target."

Congress delays alunite decision one year

A decision on whether Earth Sciences of Golden, Colorado should be permitted to strip-mine alunite from the top of Red Mountain in Western Colorado has been taken out of BLM's hands for one year.

When the Congress passed its Appropriations Act for the Interior Department on November 4, it also prohibited the Bureau of Land Management from issuing any Preference Right Leases within Wilderness Study Areas. Because what Earth Sciences geologists call "the richest alunite deposit in the world" (HCN, 9/5/83) is within the Redcloud Peak Wilderness Study Area, the alunite project has been put on hold until October 1984.

The BLM had been analyzing impacts and working toward a decision by this Thanksgiving, said Paul Arrasmith, BLM Manager for the Montrose District. When Earth Sciences obtained an exploration permit in 1975, it included a stipulation that BLM would identify "significant adverse impacts" before granting a Preference Right Lease to mine.

Residents of Lake City (pop. 400), whose economy depends on tourism, had hoped for an early decision, Arrasmith said. "This sits and nags at them." At public meetings this summer, Lake City residents turned out in force to oppose the 104-year

project, which proposed to strip-mine the top 2,000 feet from Red Mountain's 12,800-foot peak. The ore would then be processed into aluminum with potash as a by-product.

The company has said it would take ten years before production could start on the \$1.5 billion project because of the need for an Environmental Impact Statement and many permits. The company proposed to ship the ore 30 miles over the mountain in pneumatic tubes to a processing mill near Colona.

--the staff

Small hydro's prospects are not bright

The possibility that streams and canals throughout Colorado would be tapped during this decade to generate electricity is foundering, according to two speakers at a small-hydro conference held in early October.

The speakers blamed the situation on three factors: massive power plant overbuilding, regulatory indifference, and determined utility resistance to small power projects. As a result, they said, the promise held out by the 1978 federal Public Utility Regulatory Policy Act (PURPA) is not being fulfilled in Colorado.

The pessimistic view of the future was developed at a two-day Vail conference sponsored by Cal-Hydro, Inc., a newcomer to the Colorado hydropower scene. The conference attracted about 80 would-be developers, utility executives, government officials, and observers with \$275 to spend.

Most of the talks concerned the details of finding a site, getting a license from the Federal Energy Regulatory Commission (FERC), obtaining financing, and the like. But two of the speakers provided an overview: consultant David Marcus of Albuquerque and Berkeley, and attorney Jeff Pearson of Denver. Their analyses differed, but the bottom lines were the same: pessimism.

Marcus said utilities in Colorado, Nebraska, Kansas, Oklahoma, New Mexico, Arizona, Utah and Montana way overestimated their need for electricity in the 1980s. So they built or started building too many power plants. Some have been cancelled, but enough are already on line or in the construction pipeline to keep the region awash in electricity for the foreseeable future. Therefore, Marcus said, small hydropower and cogeneration producers must compete with massive coal-fired power plants in seeking markets in the West.

The surplus has also swept proposed power plants out of future capital budgets. As a result, it is difficult to implement the "avoided cost" methodology established by the Federal Energy Regulatory Commission under PURPA.

Marcus told the audience that utilities with no power plants on the drawing board claim there is no avoided capital cost for them in buying power from small hydro projects. Since they have no need for a new power plant, a small hydro project doesn't help them avoid the capital cost of building one. As a result, they offer small hydro producers only 3-4 cents per kilowatt-hour in the coal-plenty Rockies. By comparison,

the avoided cost would range up to 8 cents a kilowatt-hour.

The one clear buyer in the region, Marcus said, is Public Service Company of Colorado. It resisted the late 1970s race to build power plants because, given the regulatory atmosphere, it didn't see how it could build plants and make money for its shareholders. So now, despite the slow rate of growth, it needs to buy power and in theory should provide a market for small hydro producers.

But attorney Pearson, who has handled a substantial part of Colorado's small hydro litigation, said that Public Service is not providing a market for small hydro producers. Moreover, he said the company didn't provide a small hydro market even back when it thought it was a buyer in a tight power market. As evidence, Pearson cited the experience of Energenics, Inc., a hydropower developer and one of his clients.

"At the time Energenics went to Public Service, Public Service was saying it wouldn't build new plants despite expected demand because it couldn't get a fair return." Despite the need, "Public Service wouldn't embrace Energenics. Instead, it went out of state to buy coal-fired power at higher rates."

Public Service, Pearson continued, is the most obvious example of utility resistance to the small hydro producers. But Pearson said he believed most utilities share that attitude. He said they resist because "they don't want the competition. If qualifying facilities can come on line faster and cheaper, theoretically they can put utilities out of the power production business. That issue of economic competition is very important to utilities."

The potential for small hydro in Colorado is not enormous -- perhaps 200 megawatts. But the state has a huge potential for cogeneration. Oil shale, for example, if it ever gets going, will require a large amount of steam and a comparatively small amount of electricity.

During the last round of oil shale activity, some oil companies had planned to build cogeneration facilities, producing steam for themselves and selling excess electric power to Public Service Company and Colorado-Ute Electric Association, a regional REA. If oil shale had boomed, it is possible that neither Public Service, with 3000 megawatts of capacity, nor Colorado-Ute, with 1000 megawatts, would ever have had to build another power plant. Utilities

may fear the precedent small hydro projects would establish.

Pearson described how he thought Public Service Company's fear of competition had affected Energenics. The Washington, D.C.-based developer, with two small projects totalling about 4 megawatts, has been to the Colorado Public Utilities Commission, District Court and now an appeals court. It has a PUC-ordered contract, under which Public Service must pay it 5.9 cents per kilowatt-hour.

But since Public Service is challenging the contract in court, investors are not willing to put money into the two FERC-licensed projects. Even a decision by the Colorado Supreme Court may not satisfy investors. It is at least possible Public Service could start litigation all over again on some other grounds.

That possibility is heightened because the Colorado PUC has been very slow to establish rules under PURPA for small hydro and cogeneration facilities. The PUC established a rate for Energenics for its two projects. But it has yet to establish small power rates for the state's utilities. Each small hydro or cogeneration producer is on its own when it deals with a utility.

And that, Pearson said, requires the five Ls -- longevity, limitless capital, luck, low cunning, and lawyers. "The pattern has been that voluntary negotiation of small power contracts has failed. In Colorado today, there are no contracts between a utility and a developer for PURPA hydropower." The most serious candidates -- Energenics and Anheuser-Busch, which at one time wished to hook a cogeneration facility up to Public Service -- were forced into court, he said.

"The only way I see of proceeding with projects in Colorado is for the regulatory body to start enforcing compliance with the relevant laws and regulations. And the only way for that to happen is for small hydro developers to organize and make it happen politically."

Pearson, who has won for Energenics before the PUC and the courts, concluded: "As Energenics shows, litigation is not the answer."

Pearson's political action suggestion was seconded by Cal-Hydro's CEO, Gerald Korshak. He pointed to California's Independent Energy Producers Association as a model to follow. He said that association is an effective lobbyist and intervenor on behalf of small hydro.

--the staff

A Colorado town is about to swear off coal power

by Gary Sprung

Thanks to a retired Nazarene minister, tiny and remote Lake City, Colorado will soon be powered by water flowing down the Lake Fork of the Gunnison River.

The 1500-kilowatt output (1.5 megawatts) will more than take care of the town's 1200-kilowatt summer tourist peak. Both the stream and most of the town shut down in the winter.

If the juice starts flowing on schedule this spring, Ken Meredith will have succeeded where larger firms have failed. As the accompanying article on hydropower suggests, Colorado utilities are swamped with electric capacity and are possibly fearful of competition from small hydro. The 3 to 4 cents per kilowatt-hour they offer small hydro producers isn't enough to make most projects fly.

But Meredith, who has had a lifelong interest in hydroelectricity, built his project with "a lot of sweat equity" for only \$250,000. That's about \$167 per kilowatt of capacity and far below the \$2.5 million he estimates a commercial turbine system would cost. The coal or gas power plant capacity his hydroproject may make unnecessary would cost about \$1500 per kilowatt, or \$1.8 million.

Meredith's low cost comes from the three years he himself spent going after his FERC (Federal Energy Regulatory Commission) license and his partnership with Richard L. Russell of California, who owns a

machine shop. There they 'home' manufactured the heart of the operation -- the turbine which converts the energy of falling water into the energy of electricity.

The system is homemade, but also sophisticated -- a computer-refined version of an 1849 invention called the cross-flow, or Banki, turbine. It's modularized, and the Banki's four sections let it operate way down to 25 percent of design capacity. More modern designs such as Pelton or Francis must shut down when flows drop below 60 percent of normal.

Meredith, who pastored full time until a massive heart attack three years ago, says he is aware of the environment as well as the economics. He believes the moss-rock covered water-carrying flume should improve the appearance of his Crooke's Falls site. The flume diverts water around the 150-foot-high falls to the turbine.

Meredith is not the first person to put the falls to work. It was first tapped for a placer mining operation in 1874, and the river banks near the falls are lined with slagpiles from an early 20th century smelter the falls helped power.

The site was next used to supply Lake City with hydroelectricity. That project shut down in 1952 when the state-wide power grid finally reached the isolated town located 50 miles south of Gunnison and a few miles north of the Continental Divide. Now that same grid will carry hydropower away from Lake City to the outside world.

Lake City is served by the

Colorado-Ute Electric Association grid. But that REA has enormous amounts of surplus coal-fired power and isn't interested in buying hydropower. So Meredith is selling the power to Public Service Company, which serves the Front Range. Colorado-Ute lines will 'wheel' the power to Public Service.

The wheeling, however, is a bookkeeping device. Physically, most of the hydroelectricity will be used in Lake City while Colorado-Ute delivers an equal amount of coal-fired power to Public Service at some convenient point.

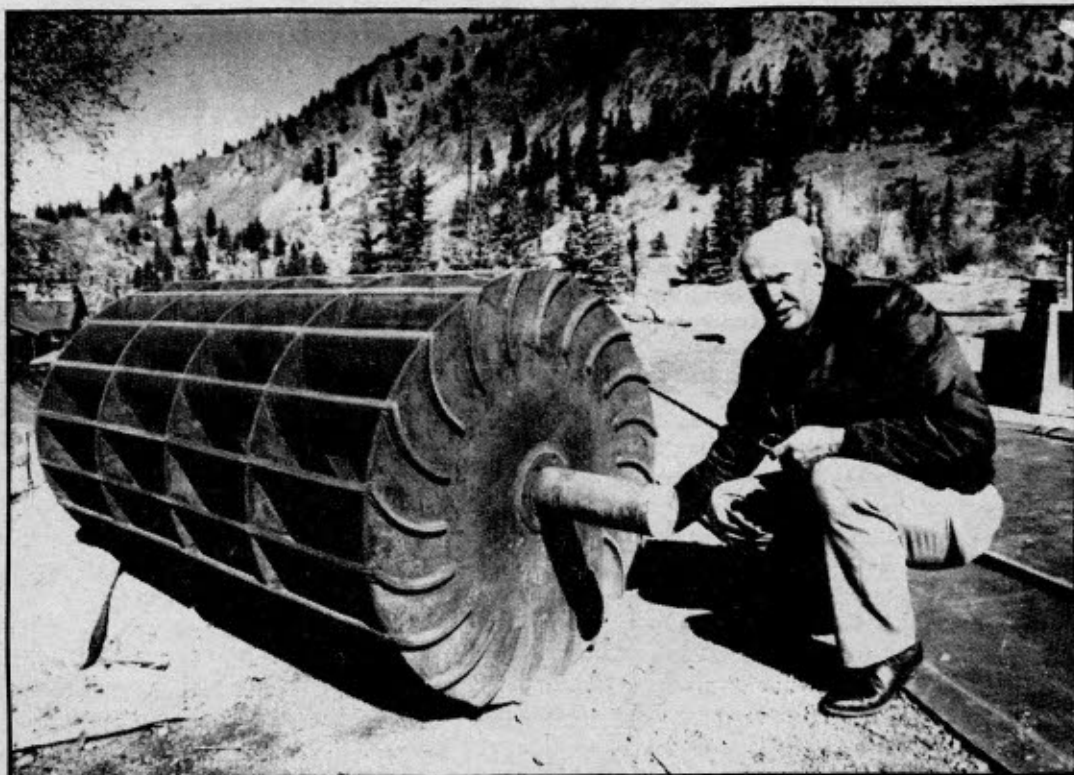
Meredith says the major benefit of his project is that Colorado-Ute will no longer have to push electricity to Lake City over several hundred miles of high-voltage lines from the northern part of the state. Colorado-Ute's system loses ten percent of the

electric energy its power plants produce as a result of such long-distant pushing.

Meredith has assured the Colorado Division of Wildlife that he won't hurt the stream. He intends to keep at least 50 cubic feet per second in the stream, which has spring peaks of about 1400 cfs. He needs to divert 150 to 300 cfs around the falls to spin his turbine.

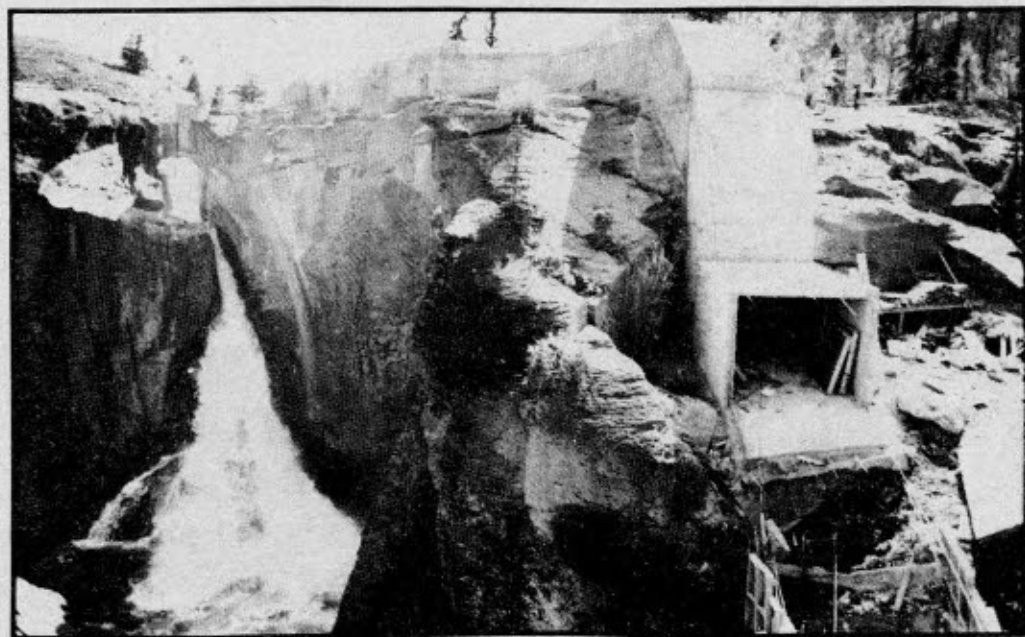
Once he starts generating power, he will also begin consulting on micro-hydro. "There are lots of places up in the hills where people have asked me: What could I put in here to help me run our home?" He hopes to answer the question with a system that will produce up to ten kilowatts (enough for three homes) on two feet of drop. Such tiny systems won't be hooked up to a grid, but will usually produce electricity for home or ranch use.

Colorado-Ute will no longer have to push
electricity to Lake City over
several hundred miles of high-voltage lines



Ken Meredith and the 'home' manufactured turbine

Gary Sprung



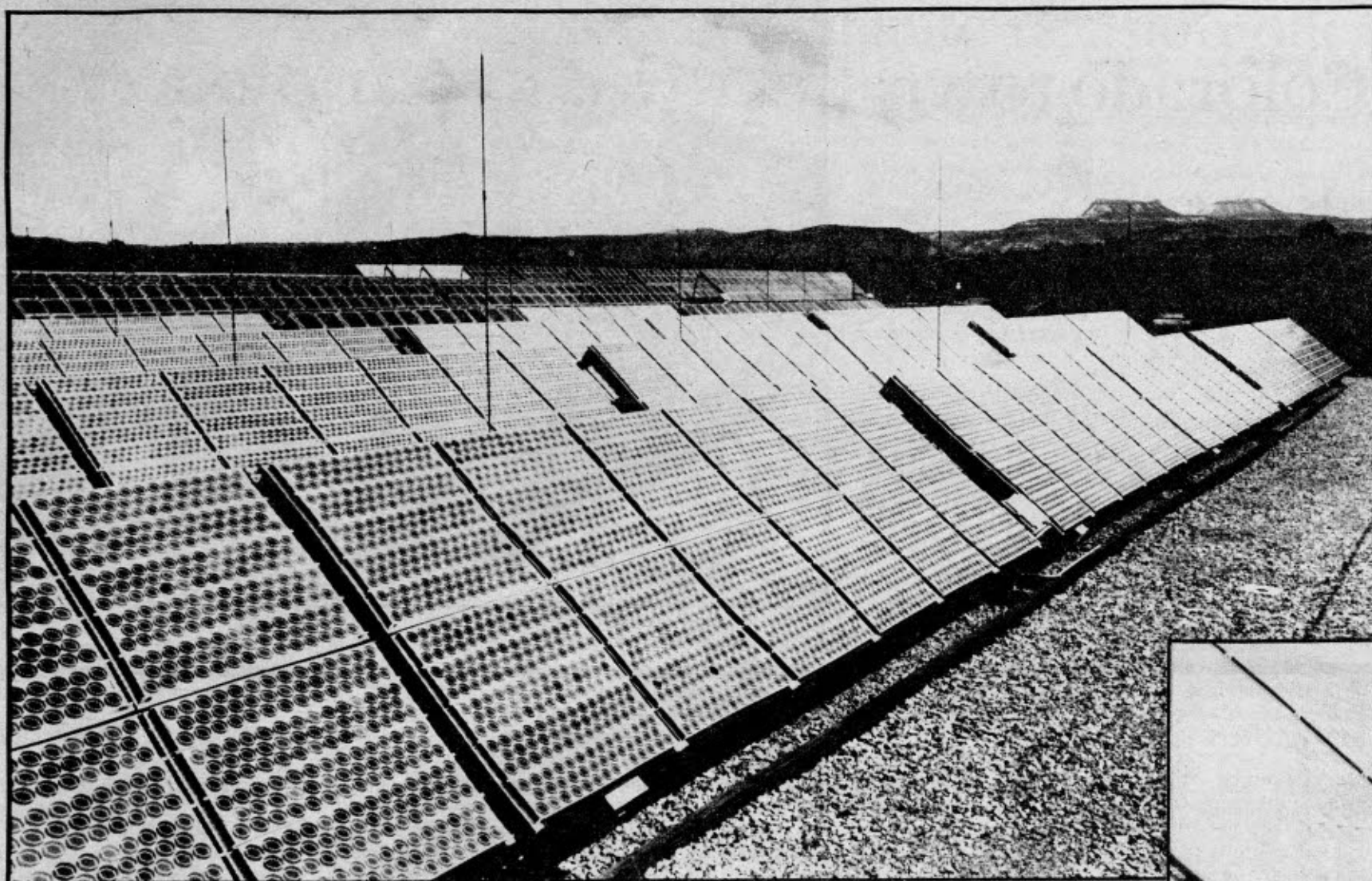
Gary Sprung

On the left, the new concrete structure that will lead water to Meredith's turbine.

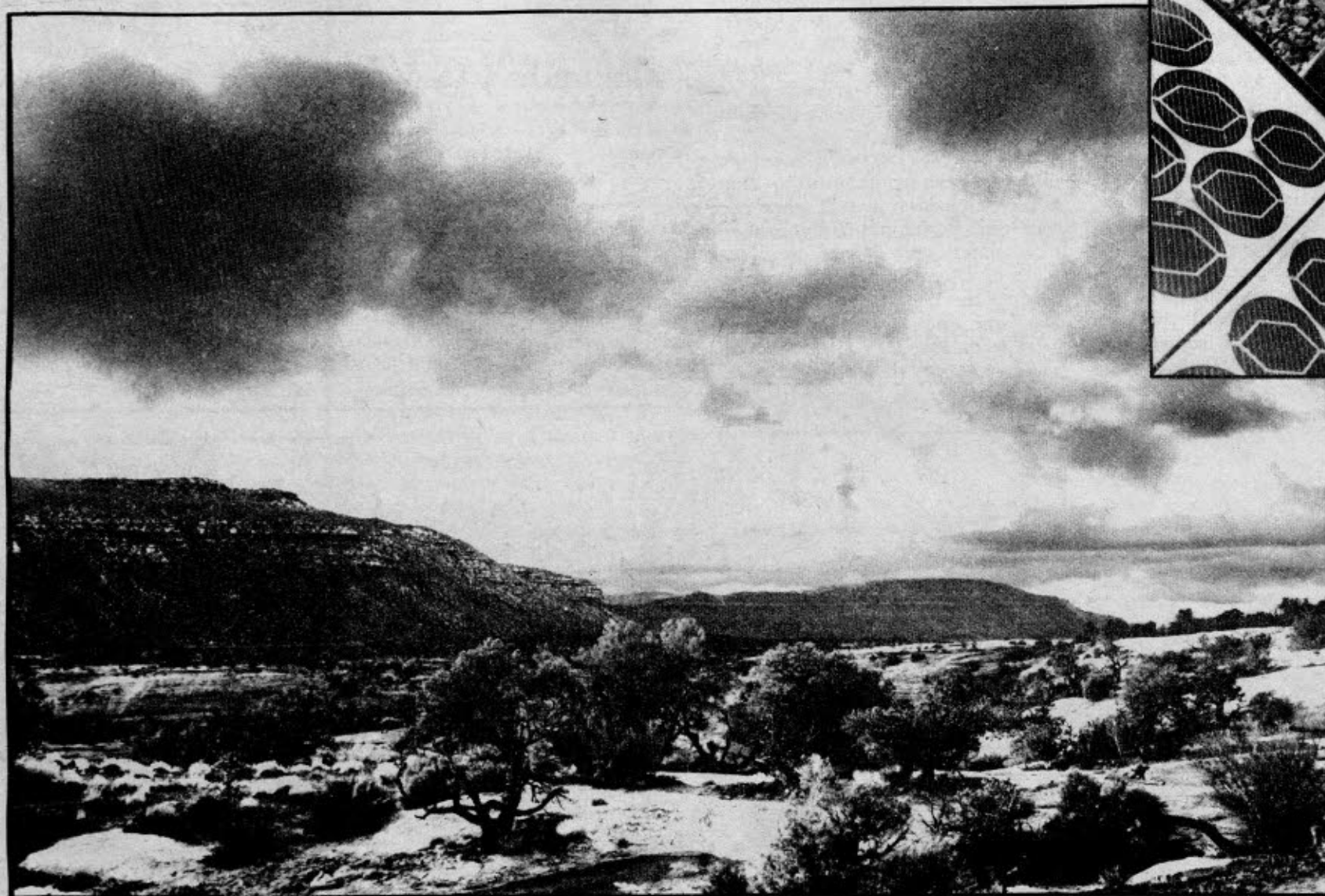
To the right, a picture of the falls during the early twentieth century.



San Juan Hydro



Partners with the sun



Natural Bridges is a solar pioneer

Natural Bridges National Monument, nestled in the southeastern corner of Utah, has attained worldwide recognition within the solar community.

It has been transformed from an energy consumer into an energy producer. The isolated monument was selected from 62 other sites around the country for the installation of a 100-kw Remote Stand-Alone Solar Photovoltaic Power System, the world's largest.

Today, over a quarter of a million silicon photovoltaic cells provide Bridges with more than 95 percent of its electricity.

Before the system's installation, Bridges' electricity was supplied by a diesel generator, and fuel consumption approached 20,000 gallons a year. Electricity by powerline wasn't an option because the nearest grid is 40 miles away, in Blanding.

Designed by solar engineers from the Massachusetts Institute of Technology/Lincoln Laboratory, the system was built under contract from the Department of Energy and in cooperation with the National Park Service. Ground clearing for the one-acre array field and construction of the photovoltaic building (to house storage batteries, invertors, controls, and monitoring equipment) began in July, 1979. Work progressed without any major problems and in February of 1980 preliminary testing began. By April, the system was functioning on a daily basis.

John Solman, who was project engineer for MIT-Lincoln Lab, says "It's the first-of-a-kind-of-its-size in a

remote location. Two hundred million people had a hand in paying for it; I'd like for them to know about the costs as well as the benefits."

The reality associated with any "first" is expense. The total price for the solar power system was \$4.05 million. Today, it could be duplicated for half the cost. Solman says solar panels at Bridges cost \$12 to \$15 a watt in 1978 dollars. "Now, panels are available for \$5 a watt in 1983 dollars. This is very encouraging."

Technical jargon eliminated, this is how the system works: Sunshine strikes the photovoltaic cells in the array field to produce an electrical current - direct current (DC). By underground cable the power is transmitted to the PV building where it is channeled to lead-acid batteries for storage, or into the "invertor." The invertor converts DC into household current, electricity ready for immediate use.

The system was also designed to be energy self-sufficient. In converting DC to AC a portion of the electricity is lost in the form of heat. This "waste heat" is used to warm the PV building. The battery room is warmed by a passive solar-heating design and remains comfortable even in winter.

Says Doug Crispin, the park's technician, "We're plugging directly into the sun for our electrical needs. At night I listen to the solar stereo and in the morning I eat solar toast."

From sunset until dawn, the monument operates from electricity stored in 28 mammoth lead-acid batteries, equivalent to 1,200 car

batteries. Each battery weighs in excess of one ton. With an average load, and assuming the array field is producing some power, the batteries store enough electricity to run the monument for two days.

As a back up power source, the diesel generator is tied directly into the control unit. If ever the stored electricity level reaches a critical low, the generator will automatically kick on and supply power. When the entire system must be shut down for maintenance, the generator is manually switched over to power the site.

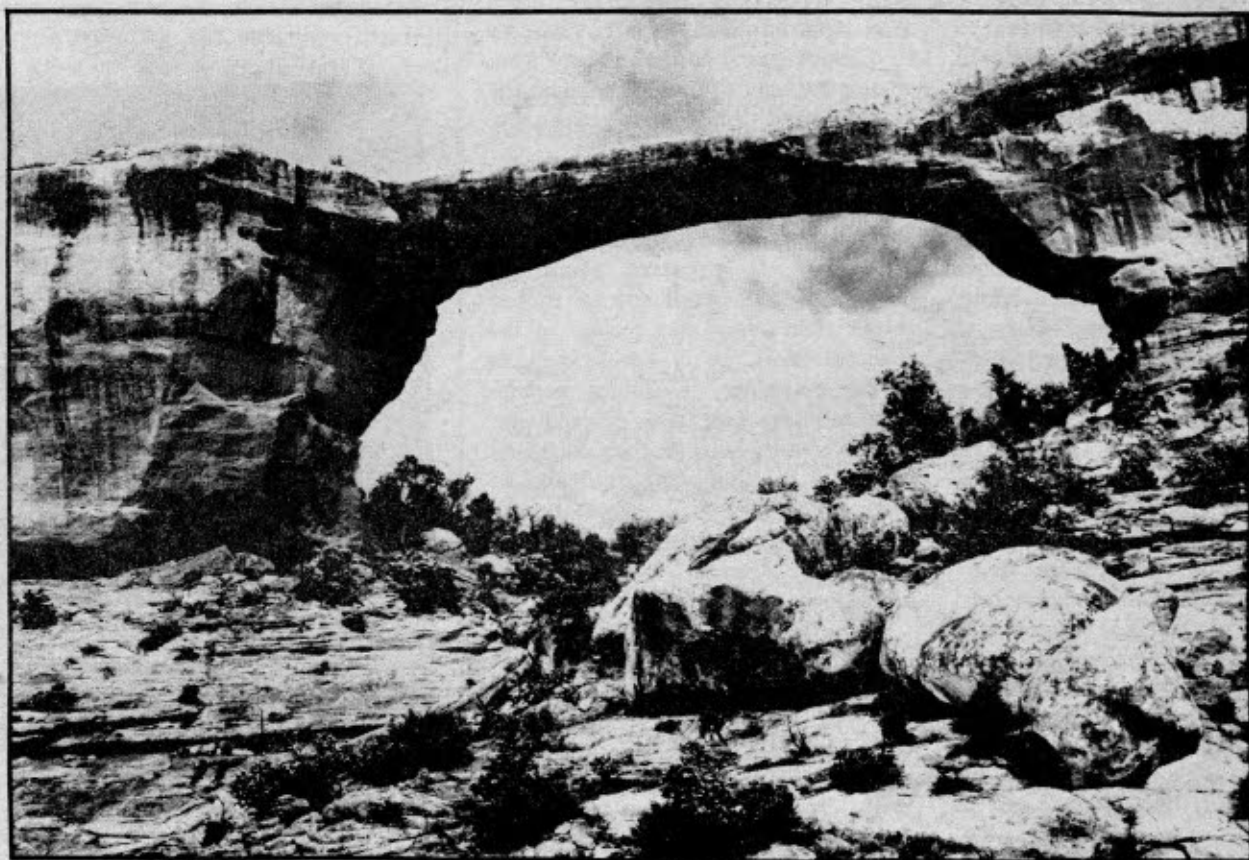
Aside from the solar plant itself, perhaps the second most important feature has been data collection. System functions are continually monitored 24 hours a day and recorded on magnetic tape. A valuable library of PV data has been assembled. Lincoln Laboratory has received requests for data summaries on the Bridges' project not only from within the U.S., but also from many countries throughout the world.

As Doug Crispin puts it, "We who live here are guinea pigs for the whole country regarding the application of solar energy."

The most promising aspect for photovoltaics tested at Natural Bridges is their application in other remote regions, from small schools and hospitals to agricultural use in underdeveloped nations. At Natural Bridges, the blending of technology and wilderness works well. And if the National Monument didn't inform the public about the solar project, a visitor might never realize it existed.



Story and pictures by JONATHAN MEYERS



In nuclear war, bombs will be

by Anne Harvey

Recent scientific research on the global effects of nuclear war shows that survivors will be left in a world that is dark, very cold, dangerously radioactive, highly polluted and hostile to most forms of life.

These conditions are likely to persist from a few months to a few years. Even in a war confined to the Northern Hemisphere, the consequences are likely to spread to the Southern Hemisphere, causing global disruption of ecosystems.

Atmospheric scientists, climatologists, and biologists made these findings public at a conference on "The World After Nuclear War" held in Washington D.C. October 31 and November 1. The scientists emphasized that their work has been critically reviewed by over one hundred of their colleagues, including Soviet and European scientists.

The research involved computer modeling of dozens of different nuclear war scenarios, ranging from relatively small wars of about 100 megatons (1 megaton is the explosive equivalent of 1 million tons of TNT) to large wars of over 10,000 megatons. They found that high-yield nuclear weapons exploding close to the surface will throw huge amounts of fine dust (more than 100,000 tons for every megaton exploded) into the upper atmosphere, while lower-yield airbursts over cities and forests will ignite enormous fires. The black smoke from the fires will rise at least

into the lower atmosphere and possibly higher.

The scientists found that under many of their scenarios, so much dust or smoke, or both, is lifted into the atmosphere that sunlight is blocked. The immediate effects are darkness and extreme cold. For example, in a 5,000-megaton war where 20 percent of the yield is used on urban and industrial targets, light levels would fall to only a few percent of normal and temperatures would drop abruptly to below freezing. After 3 weeks, a minimum temperature of -23 degrees C would be reached. The low temperatures would persist for several months, and full recovery to ordinary daylight would take a year or more.

It doesn't take much biological training to understand that a sudden and severe drop in temperature and long-term widespread darkness coming in spring or summer would have devastating effects on the green plants at the base of our food chain. Photosynthesis would be enormously reduced or would cease altogether. The abrupt onset of freezing cold would kill most green plants outright. Even cold-tolerant plants could be severely damaged or killed since they would have no time to acclimate to the freezing temperatures.

Wild and domestic animals not killed immediately by a nuclear blast would be likely to freeze or starve. Surface water would freeze, and many animals would die of thirst. Biologist Paul Ehrlich of Stanford University pointed out at the conference that scavengers that manage to survive the cold would flourish because of the

billions of unburied human and animal bodies. Rats, roaches, and flies could become the most prominent animals after the war.

Living organisms would have to cope with more than cold and dark; they would be assaulted by other deadly consequences of nuclear war. Huge fires ignited by nuclear blasts could burn for months, adding toxic chemicals such as nitrous oxides, vinyl chlorides, and dioxins to the thick smog and causing localized highly acid rains. Dead forests would provide an abundant fuel source, and severe erosion and flooding is likely to follow burning as global temperatures rise. Siltation and toxic runoff could kill fish and other aquatic life in lakes, streams and coastal waters.

Gigantic firestorms are a possibility following a nuclear attack, and these might be so hot that they could destroy dormant seeds in the soil, further limiting regeneration of plants. Lethal doses of radiation through vast areas down-wind of nuclear blasts could kill sensitive plant and animal species. Lower doses of radiation would lead to illness, cancers, and genetic mutations in humans and other organisms.

Despite the initial intense cold, the oceans will not freeze because of the thermal inertia of water. But they will be damaged, and survivors won't be able to look to them for food. The prolonged darkness will kill the microscopic phytoplankton at the base of the marine food chain, leading to the death of many fish and marine mammals, and possible extinctions of species.

Violent coastal storms will result from the temperature difference between the frozen continents and the warmer oceans. Coastal organisms will face siltation and toxic runoff from the land and stress from storm-driven waves. In addition, filter-feeding shellfish such as clams tend to

concentrate radioactivity in their tissues and would be dangerous to eat.

The tremendous climatic changes in the Northern Hemisphere could spread to the Southern Hemisphere, the scientists found. The dust and soot particles in the atmosphere will heat up as they absorb sunlight, and the warm debris-laden air will tend to mix with cool Southern Hemisphere air, transporting dust and soot across the equator. As the dark clouds move south, darkness and near-freezing cold will have devastating effects on tropical forests. Large-scale extinctions could follow.

A few months after a nuclear exchange, the clouds of dust and soot will begin to thin as particles settle or are washed out of the atmosphere. But the troubles of surviving creatures will not be over. Fireballs produced by high-yield nuclear explosions carry nitrous oxides into the stratosphere, where they react with ozone and deplete the ozone layer. Thinning of the ozone layer allows increased levels of biologically dangerous ultraviolet radiation to reach the earth's surface.

Even low doses of ultraviolet light are known to suppress mammals' immune systems, leading to increased susceptibility to disease. Plants respond to increased levels of ultraviolet light by reducing photosynthesis. Prolonged exposure to ultraviolet light may lead to blindness in humans and terrestrial mammals.

Any one of these deadly effects would be enough to seriously disrupt ecosystems. Taken together, their impact is overwhelming. "Whether, following such a disaster, our species would be able to persist for long in the face of highly modified biological communities, novel climates, high levels of radiation, inbreeding, shattered social and economic systems, psychological stresses, and a host of other difficulties is an open question," said Paul Ehrlich.

Genesis of 'The World After ...'

The revelation that even a 'small' nuclear war would have catastrophic effects on global climate appeared to come out of thin air. But "The World After Nuclear War" conference described on this page was actually the culmination of a great deal of quiet work over a long period of time.

Concern about the global effects of nuclear war arose separately in the environmental and scientific communities. Those communities came together about a year ago, when a committee of scientists and environmentalists was formed to achieve three goals:

- 1) to get biologists to investigate the effects on life of the climate changes the physical scientists were predicting;
- 2) To set up a forum for peer review of the scientific findings about the aftermath of a nuclear war; and
- 3) to publicize the findings.

The first two goals were achieved, and thus far the third has been at least partially achieved.

As the accompanying article shows, biologists did look at the effects of a cold, long night on life and found it devastating.

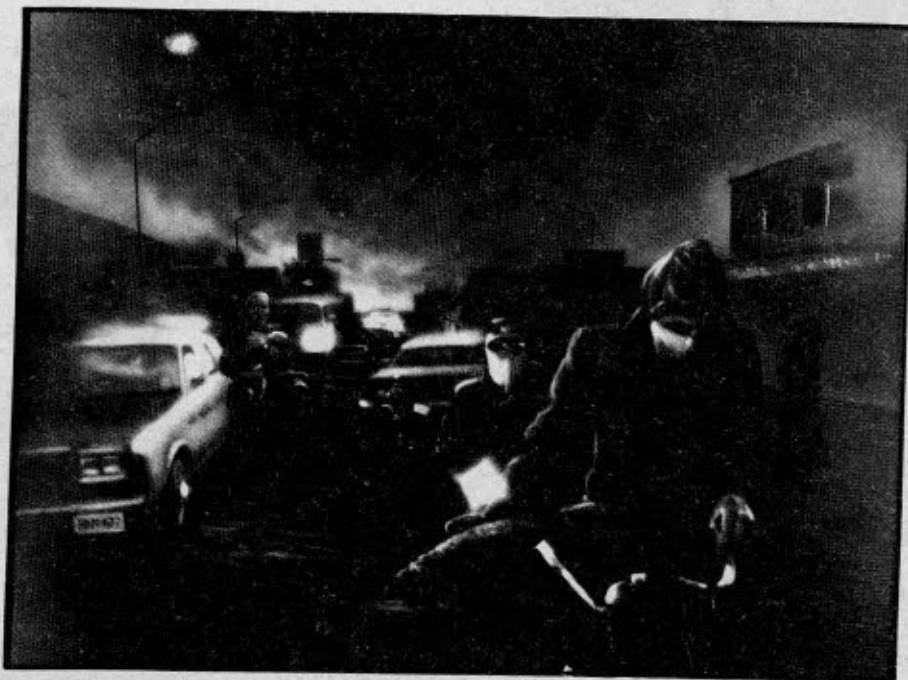
The peer review was accomplished through normal scientific review

processes and through an extraordinary five-day conference in April 1983. One hundred experts gathered in Cambridge, Massachusetts to review the scientific work done on the climatic and biological effects of nuclear war.

With the scientific underpinnings established, work went ahead on the Washington, D.C. conference held last month. It attracted about 500 people. An additional several million people read about the results of the scientific work in a cover story in *Parade* magazine, a Sunday supplement to many American newspapers. The cover story by scientist Carl Sagan presented the scientific estimates of what will happen. In a side story, the magazine urged readers to write to President Reagan and Premier Andropov.

The conference was organized by scientific and environmental leaders. The steering committee included biologist Paul Ehrlich of Stanford, Russell Peterson of the National Audubon Society, Walter Orr Roberts of the National Center for Atmospheric Research (NCAR) in Boulder, Carl Sagan of Cornell, and Patricia Scharlin of the Sierra Club.

--the staff



A darkened world, as seen by the conference on the long-term worldwide biological consequences of nuclear war

the least of it

One of the scientists' more surprising findings is that, in astronomer Carl Sagan's words, "Even a comparatively small nuclear war can have devastating climatic consequences provided cities are targeted. There seems to be a threshold at which severe climatic consequences are triggered -- around a few hundred nuclear explosions over cities for smoke generation, or around 2,000 to 3,000 high-yield surface bursts for dust generation."

"Fine particles can be injected into the atmosphere at increasing rates with only minor effects until these thresholds are crossed. Thereafter, the effects rapidly increase in severity."

The United States 'crossed' the threshold of fewer than 1,000 nuclear warheads in 1953 and the Soviet Union crossed it in 1965. Today we have about 18 times as many weapons as we

need to trigger the climatic catastrophe.

The conference in Washington concluded with a satellite television conference between American scientists and their Soviet colleagues. The Soviets have been doing their own calculations of the long-term effects of nuclear war. If anything, their conclusions are even more pessimistic. One Soviet scientist told the conference participants:

"The only conclusion is that nuclear devices cannot be a tool of war or a tool of politics -- they can only be a tool of suicide."

--Ann Harvey

Ann Harvey is a wildlife biologist and Colorado native currently living in Washington, D.C. This article was paid for by the HCN Research Fund.

PARADISE THE NUCLEAR WINTER

A distinguished scientist reveals startling new findings

Into the eternal darkness, into the silence. Dante, *The Inferno*

EXCEPT FOR FOOLS AND MADMEN, everyone knows that nuclear war would be an unprecedented human catastrophe. A more or less typical strategic warhead has a yield of 2 megatons, the explosive equivalent of 2 million tons of TNT. But 2 million tons of TNT is about the same as all the bombs exploded in World War II--a single bomb with the explosive power of the entire Second World War but compressed into a few seconds of time and an area 500 miles across.

In a 2-megaton explosion over a fairly large city, buildings would be vaporized, people reduced to atoms and shadows, melting structures blown down like matchsticks and raging fires ignited. And if the bomb were exploded on the ground, an enormous, stratospheric cloud could be seen through a telescope on the surface of the Moon, would be all that remained where modern cities had been. There are now more than 50,000 nuclear weapons, more than 11,000 megatons of yield, deployed in the arsenals of the United States and the Soviet Union, enough to obliterate a million Hiroshimas.

But there are fewer than 3,000 cities on the Earth with populations of 100,000 or more. You cannot find anything like a million Hiroshimas to obliterate. Hence military and industrial targets that are far from cities are comparatively rare. Thus, there are only a few nuclear weapons that are needed for any plausible deterrence of a potential adversary.

Nobels, knows, of course, how many megatons would be expended in a real nuclear war. There are some who think that a nuclear war can be "contained," bottled up before it runs amok, as in the case of the world's arsenals. But a number of detailed analyses, ranging from the U.S. Department of Defense and official Soviet pronouncements, all indicate that this containment may be too much to hope for. Once the bombs begin exploding, communications, factories, transportation, the necessity of making a run for the hills, the deaths of millions, and the immense psychological burden of knowing that you

own loved ones may already have been destroyed are likely to result in a nuclear paroxysm. Many investigations, including a number of studies for the U.S. government, envision the explosion of 500 to 10,000 megatons, the detonation of tens of thousands of nuclear weapons that now sit quietly, monotonously, in missile silos, submarines and long-range bombers, waiting for the order to strike.

The World Health Organization, in a recent detailed study chaired by Sune K. Bergstrom (the 1962 Nobel laureate in physiology and medicine), concludes that 1.1 billion people would be killed outright in such a nuclear war, mainly in the United States, the Soviet Union, Europe, China and Japan. An additional 1.1 billion people would suffer serious injuries and radiation sickness, for which medical help would be unavailable. It thus seems possible that more than 2 billion people--almost half of all the humans on Earth--would be destroyed in the immediate aftermath of a global thermonuclear war. This would represent by far the greatest disaster in the history of the human species and, with no other adverse effects, would probably be enough to reduce at least the Northern Hemisphere to a state of prolonged agony and barbarism. Unfortunately, the real situation would be much worse.

In technical studies of the consequences of nuclear weapons explosions, there has been a dangerous tendency to underestimate the results. This is partly due to a tradition of conservatism which generally works well in science but which is more dubious applicability when the lives of billions of people are at stake. In the Bravo test of March 1, 1954, a 15-megaton thermonuclear bomb was exploded on the island of Bikini. It had about double the yield expected, and there was an anticipated but unanticipated shift in the wind direction. As a result, deadly radioactive fallout came down on Rongelap in the Marshall Islands, more than 200 kilometers away. Almost all the fishermen on Rongelap subsequently developed thyroid nodules and leukemia, and other long-term medical problems, due to the radioactive fallout.

Likewise, in 1975, it was discovered that high winds had blown a cloud of radioactive fallout from a Soviet nuclear test in the Arctic to the coast of Alaska. This was a small-scale event, but it was a warning of what could happen in a full-scale nuclear war. The fallout from a nuclear war would be a global disaster, and the temperature changes in the atmosphere and on the

THE WAR BEGINS



Looking down on the North Pole as a global nuclear war begins. The boundary between night and day cuts through the USSR (bottom) and grazes the west coast of the U.S. (top right). Only about 100 of the 10,000 explosions in such a war are depicted at the moment depicted. Each flash over a city typically represents the deaths of hundreds of thousands. Fires are beginning to generate dense smoke clouds.

arbiters will chemically burn the nitrogen in the upper atmosphere into noxious oxides of nitrogen, these, in turn, combine with sulfur dioxide, the product of sulfur in the Earth's atmosphere. The sulfate of the Earth is shielded from deadly solar ultraviolet radiation by a layer of ozone or remains that, were it brought down to sea level, it would be only 3 millimeters thick. Partial destruction of this ozone layer can have serious consequences for the biology of the entire planet.

These discoveries, and others like them, were made by chance. They were largely unexpected. And now another consequence, by far the most dire, has been uncovered, again more or less by accident.

The U.S. Marine Corps carried the first vehicle to the other planet, arrived at Mars in late 1971. The planet was enveloped in a global dust storm. As the fine particles slowly fell out, we were able to measure temperature changes in the atmosphere and on the

BY CARL SAGAN

Utah rancher travels the West preaching peace

by Ed Marston

Cecil Garland travels the West, when his cattle let him, telling audiences: "I don't apologize for being a Russian apologist."

That's an exposed position in these days of downed Korean jetliners and of what he calls "roaring rhetoric." But Garland isn't unarmed. Culturally, he speaks from that most American position: a genuine cattle rancher.

But he is a rancher who is trying to beat the cowboy hat-six shooter-pickup image into a peace symbol. He is working to stand the John Wayne Totem on its head -- to make it mean friendship rather than strife.

Politically he speaks as a conservative -- one who describes the U.S. as a place where American Communist leader Gus Hall's suggested reforms of fifty years ago have now all been adopted. He also speaks as a World War II veteran -- he got into the Army by lying about his age.

He appeared most recently in Durango and then in Delta, Colorado, where he spoke at meetings sponsored by local peace groups. He begins his talks informally, and by the way, establishing his rancher credentials. He told his Delta audience that he lives in Utah near the Nevada border: "It's 100 miles to town or a gas station. There's no telephone or TV. We're perfectly happy, thanks to the mutual antagonism that holds small cattle communities together."

Calleo, Utah, may be small, but its 35 residents tend thousands of cattle. Garland's wife runs the last one-room schoolhouse in Utah, where she teaches nine children in grades K through 8. In his talks, he describes her as a "fifth-generation descendant of cart-pushing Mormon" pioneers.

Garland peppers his talks with jokes, introducing some of them by saying: "It's not very dirty or very funny. I don't know why I'm telling it." He told about smuggling a

textbook about evolution into Utah and about the "Welcome to Utah" border sign which urges people to repent. But he made no jokes about the U.S. Air Force, which first got him into the peace business:

"The Air Force came along and covered that which I care most about." The threat to his land and way of life came from its plan for the Racetrack MX. That plan "had nothing to do with the nation's ability to survive. It had to do with the promotion of the military-industrial complex." The Air Force wanted to place 4600 missile shelters in the Great Basin of Nevada and Utah. With the help of the Mormon Church, the plan was defeated.

"It was absolutely amazing that we didn't get the MX. We were the first to reject enormous federal largess given under the guise of defense."

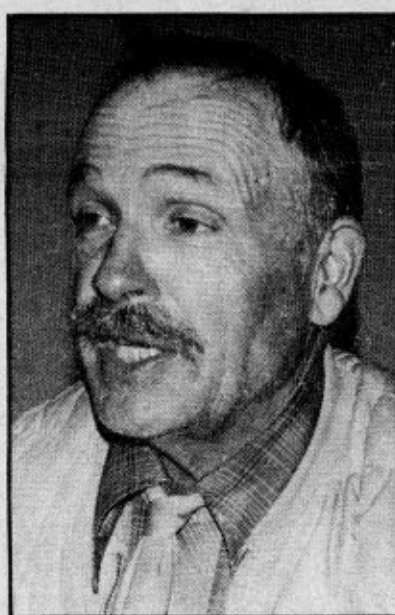
Garland's active opposition to the MX brought him national notice. At one point, he found himself on the Bill Moyers' show surrounded by "military experts arguing about the cheapest way to kill millions of the earth's people."

The experts discussed the relative advantage of the air mode, sea mode, and land mode. Garland told them: "I'd like to suggest the com-mode -- flush nuclear war out of mind. I asked them if they would like to spend one percent of the military budget on peace. It literally blew their minds. They're not prepared for peace."

Also as a result of his MX involvement, Garland was invited to be part of a group of about six ranchers travelling to Russia. The money for the trip was raised by several young Montanans who ran from Washington, D.C. to the state of Washington.

"They felt pointy-toed boots and big hats might make a difference." So a year ago, just about when Leonid Brezhnev died, the group toured the USSR.

Before Garland left the U.S., he



Cecil Garland

studied Soviet history. "It's the most awesome and ugly history -- it's the history of pagan tribes set one against the other on a vast eastern plain."

"Just beyond the horizon are hordes of crazy horsemen with swords whose basic philosophy was hate, rape, murder and pillage. Ghengis Kahn filled the rivers of the Soviet Union with bodies."

The 300 years of this bloody rule was followed by that of the Romanov Czars. "They weren't much better." Mostly, he said, they were ineffectual tyrants. But some were also crazy.

The people were either serfs on the land or they lived in wooden cities which "burned often." One result of the frequent fires was a lack of books. Because of their physical and cultural isolation, "It was only 900 years ago that they heard of Christ." And the Renaissance passed them by totally, he said.

Garland's three-week tour of the Soviet Union reinforced what he had read. "When you visit, you begin to know what a great toll the Czars took of them." The Czar's unfortunate legacy was aggravated by World War II.

"We don't know war. But they know war. They lost 22 million people in World War II. That's the population of Canada. They were under siege for 900 days in Leningrad. Never have people been so subject to an attempt to subjugate them. They still argue over their lack of preparation."

The experience made them "order freaks. They want a strong central government. Don't deceive yourself that they want to import a U.S.-style government. They want a strong cohesive government -- they view it as a bulwark" against what happened to them 40 years ago.

In contrast, "They see us as a government and people of anarchy."

The conflict between the U.S. and the USSR, Garland said, is not caused by a tension between capitalism and communism. It comes out of "the degree of social order. We choose a lot of disorder and they choose a lot of order."

They have their dissidents. "They're a very small, brave group of people. I met some of them. They're wonderful people. It breaks your heart. The only thing that saves them is world scrutiny."

"But it's not just the KGB" that's against them. "There's enormous peer pressure." Most of their fellow Soviet citizens see the dissidents as a threat to the strong government Garland said history has conditioned them to want.

Garland wondered how he'd do as a Soviet citizen. "I came away deciding I'd eventually be shot. I'm an American dissident. Why wouldn't I be a Soviet dissident?"

Despite the vastly different political systems, he thinks the two superpowers can live together. But he doesn't look for a first step from the Soviet Union. "We who are free are going to have to speak for those who are not."

Why should Americans take that first step? "Not because they're free of malice. Not because they're not

[Continued on page 13]

Earthquake...

[Continued from page 1]

the center of the Lost River Valley, climbing from the 5,906 foot elevation at Mackay to over 7,000 feet at Willow Summit. Rising dramatically to the east is the Lost River Range, the tallest in the state, and now a little taller. Mount Borah may have risen several feet during the earthquake. To the west are the White Knobs.

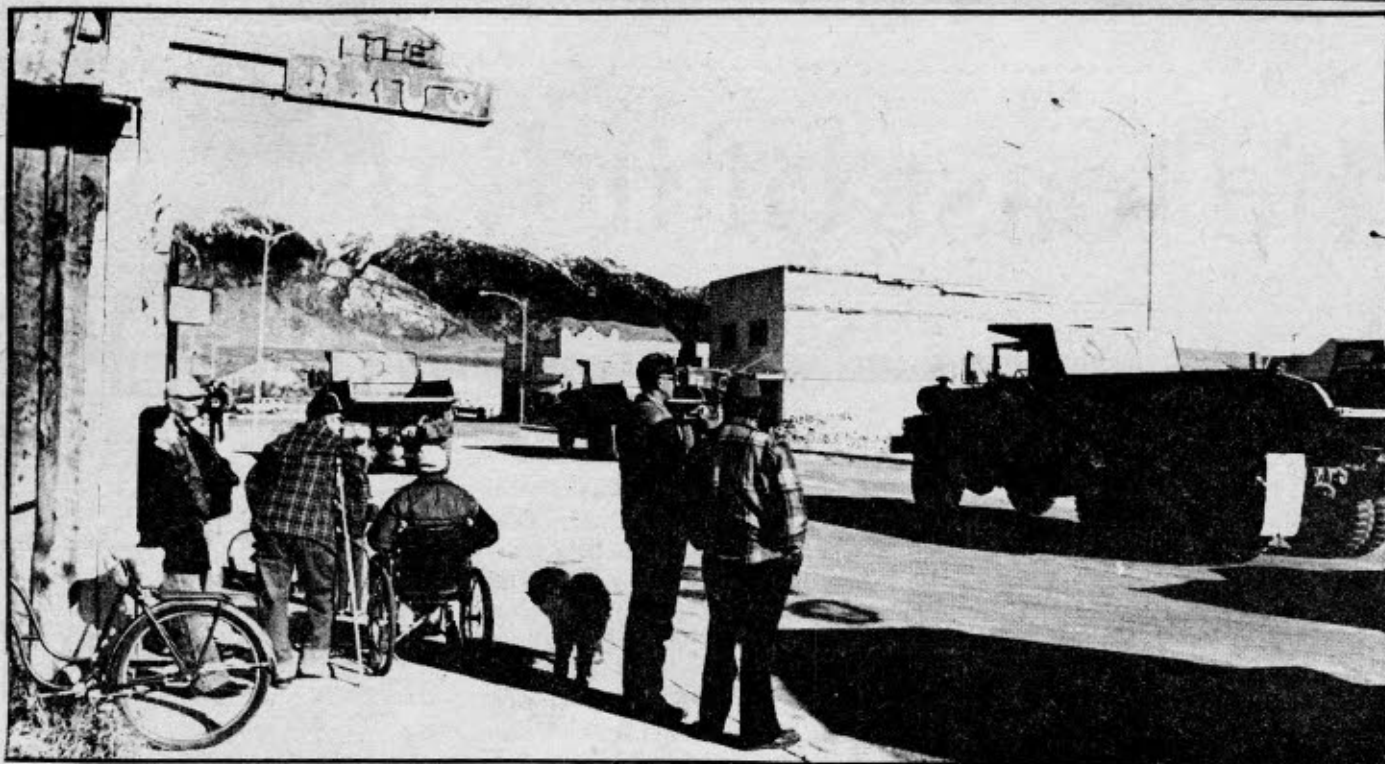
This is the northern part of the huge basin and range country lying roughly between California's Sierra Nevada Mountains and the Colorado Plateau and Rocky Mountains. It was formed by the dropping of valley blocks and the raising of mountain blocks along faults or breaks in the earth. Or more accurately, it is *forming*, since the earthquake clearly demonstrated that geological forces have not stopped simply because humans have taken up residency. Forces continue to pull the area apart, expanding it in an east-west direction.

Boise State University geologist Spencer Wood says that the earthquake was "exactly the type of earthquake that is expected to rip right through Salt Lake City ... We're all certain it will; it's just a matter of time."

The last earthquake bigger than Mount Borah occurred not far from here, just across the Montana line by Yellowstone Park. The 1959 Hebgen Lake earthquake shook loose a mountainside that slid into the Madison River Canyon. It dammed the river to form Earthquake Lake. The mountainside also buried 25 campers.

The Mount Borah quake, originally classed as a 6.9 on the Richter scale but since upgraded to a 7.1, will be the most intensively studied earthquake in history, according to several geologists at the site. The earthquake has already provided geologists with information never before available.

Hunters Turner and Hendricksen, for example, are believed to be the



Mackay residents watch the rubble trucked away

first people in recent history to witness the formation of a scarp -- a cliff where a fault reaches the ground surface. Although earthquakes are fairly common in the world -- about 18 occur each year at a magnitude of 7 on the Richter scale -- many of the quakes occur on the ocean floor. Or as Chuck Meissner, a geologist at Boise State University notes, "Most of the people who are close enough to see the scarp form, die."

Meissner says the eyewitness report of the hunters confirms what was believed to occur during scarp formation: swelling followed by the shaking and fracturing. Meissner adds that the bouncing of the jeep proves that the shock waves exceeded 1 G -- the force of gravity.

The just-formed scarp is reached by turning east off Highway 93 onto the Willow Creek Road, a jeep track which snakes up a massive alluvial fan to the base of the mountains. Finally off the road altogether, USGS geologists Tony Crone and Susan Plymell try to keep their heads from hitting the roof as the truck lurches over sagebrush and boulders.

They hike the remaining 200 yards to the fault scarp above, a jagged cream-colored line of exposed cobble and earth -- mountain topsoil. In the

stiff, chill wind, Crone and Plymell begin placing orange flags in a line perpendicular to the scarp.

With a plane table and alidade, Crone sights down the line of flags to measure any changes, any movement, in the scarp. The ground is still settling since the earthquake, finding a nice, comfortable position until enough pressure builds again to force the opposing blocks to lurch.

As if to underscore the process, a low rumbling like a faraway sonic boom roots everyone to the spot. It is an aftershock, one of many which continue along the range.

Crone says that by monitoring the aging process of the fault scarp, which is the rate at which it erodes and fades into the landscape, geologists will be better able to estimate the ages of old scarps, from past earthquakes. Crone punctuates this conversation by nodding upslope at an innocuous bench which he casually describes as an old fault line.

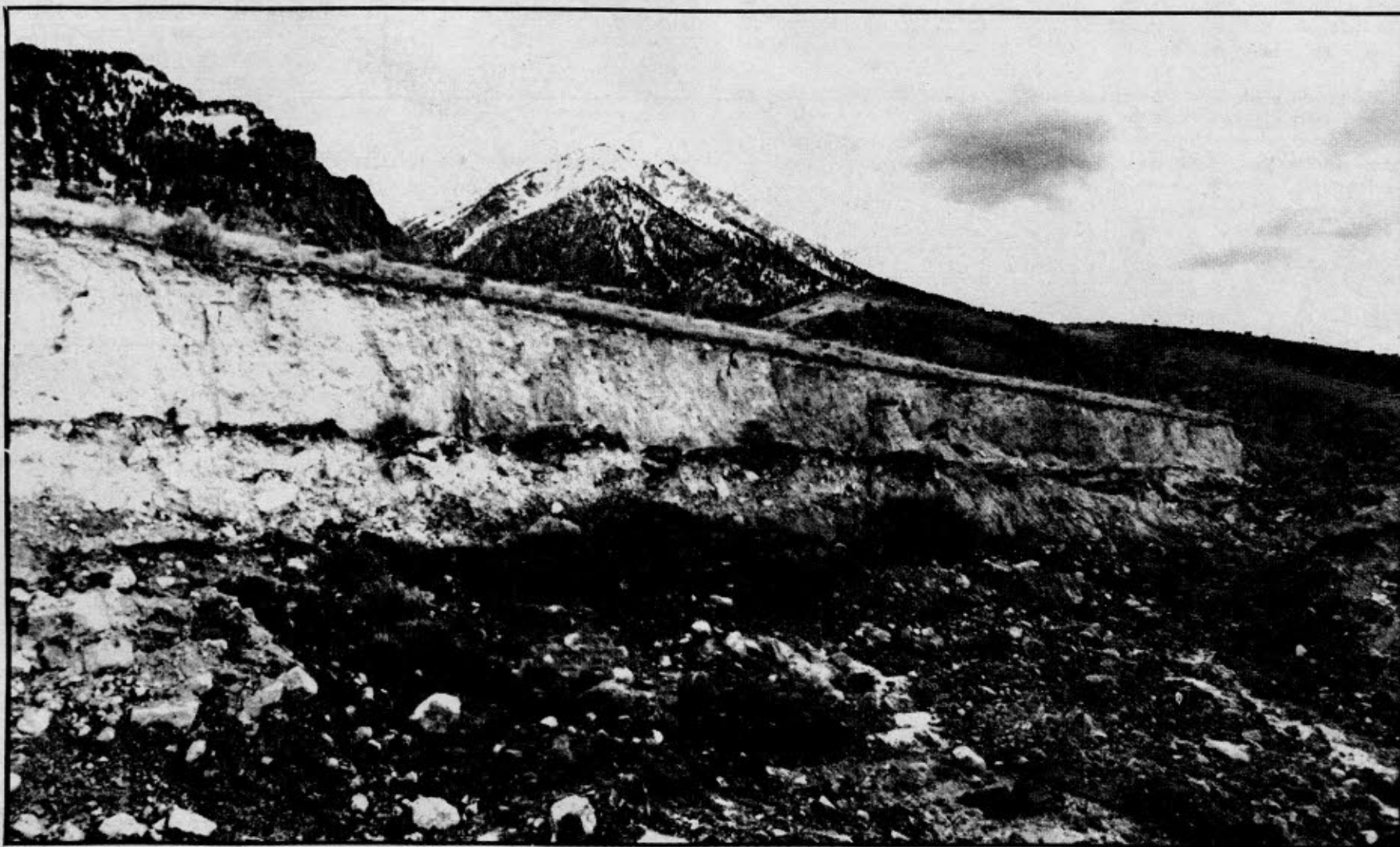
When an earthquake happens again is anyone's guess, and the professional geologists are the last ones to hazard an opinion. But the research being done up and down the basin may help in someday being able to predict earthquake occurrences.

The next day Crone is climbing

along the mountainside, using a handful of aerial photographs as maps to locate fresh breaks in the ground. He hunkers down against the wind to write notes, keeping his gloves on as the wind increases. He soon discounts the cracks as slumping fractures -- landslide breaks caused by the shaking of the earthquake, but not part of the scarp, which is the direct expression of movement along a block-bounding fault.

Crone and Plymell, like most of the geologists here, came to the site immediately after the earthquake. In concert, the scientists have walked the entire length of the scarp, mapping it on the ground and from the air. They have taken hundreds of readings of aftershocks on the seismographs tucked away in every gulch and canyon, and have monitored changes in groundwater flows and begun seismic soundings of the fault.

Crone and a party of geologists were working along the scarp the day after the earthquake when a 5.5 aftershock began shaking the ground. "It was like the parting of the seas," Crone recalled with a smile. "Everybody scattered in both directions away from the scarp. And after it stopped, everybody clapped and cheered."



A scarp face at Birch Creek

Glenn Oakley

Glenn Oakley

Idaho earthquake raises new questions about INEL

The mountains, the groundwater, and the communities are beginning to return to normal in the Lost River Valley. The warm springs at the Ingram Ranch, after being dry for a week, have been gradually increasing in flow. The National Guard is tearing down the weakened buildings and hauling away the debris. The aftershocks are deminishing.

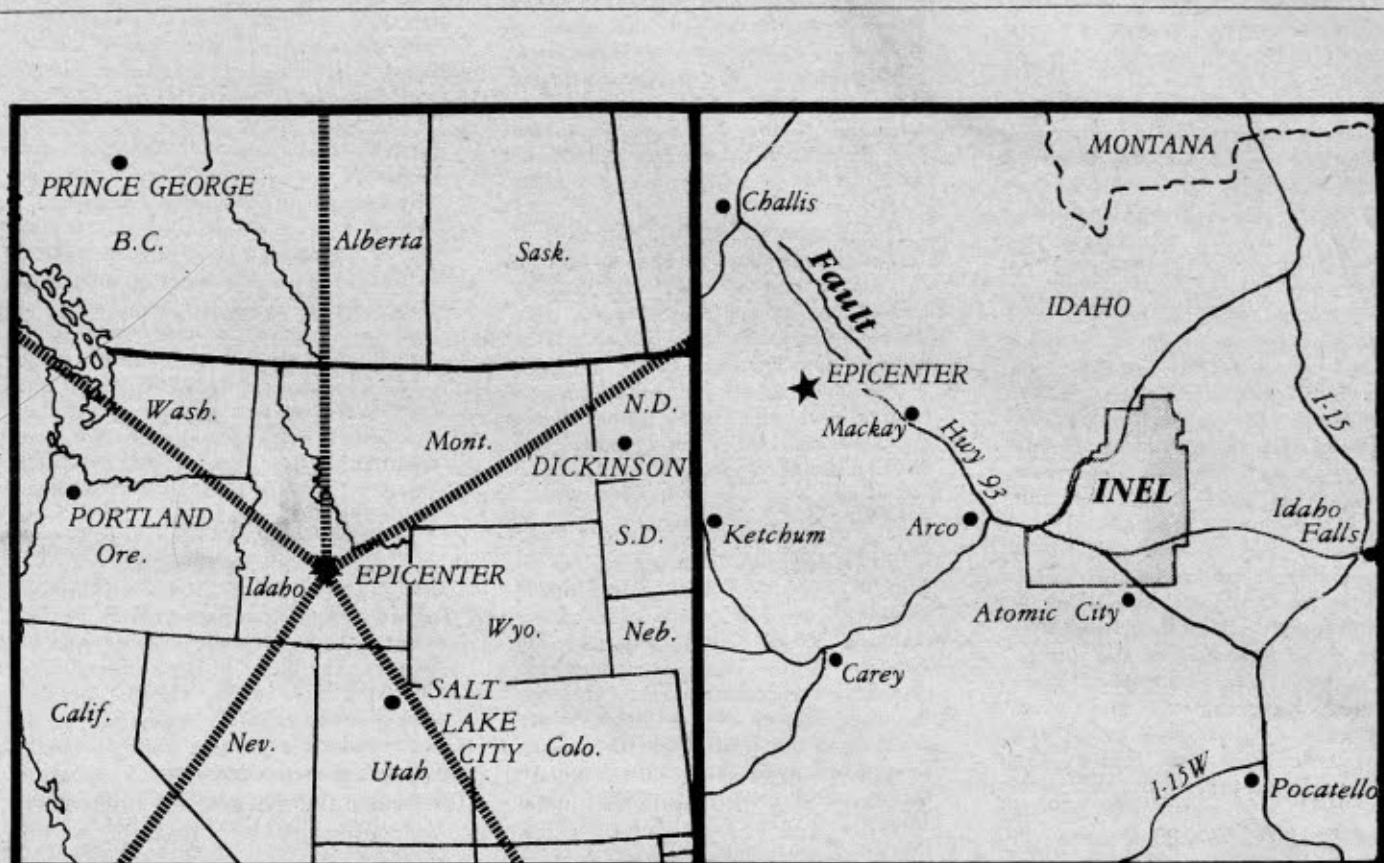
But the earthquake of October 28 may have permanently changed peoples' attitudes about the stability of eastern Idaho. The area must now be recognized as an active earthquake zone, where buildings should be able to withstand heavy jolts of the earth.

While brick school buildings built in the 1920s are an obvious concern, the more ominous question of safety focuses on the Idaho National Engineering Laboratory. Just 50 miles away from the epicenter of the Mount Borah earthquake is the federal testing facility, which houses 15 nuclear reactors plus a chemical processing plant and waste-storage dumps. INEL is also the chosen site for the \$4.5 billion New Production Reactor, which would produce tritium for nuclear warheads.

INEL reported only minor cracks in two buildings at the site and has said there was no danger whatsoever to the reactors, which shut down immediately after the earthquake. Idaho Senator James McClure, who is largely responsible for having Idaho named as the proposed site for the NPR (a scientific study placed Idaho a distant third in a choice of three sites), was quick to point to the lack of damage at the facility.

Said McClure: "The recent earthquake demonstrates the integrity of the facilities at INEL and provides important data on the dissipation of earthquake forces through the Eastern Snake River Plain." Governor John Evans briefly retracted his complete support for the New Production Reactor after the earthquake, but said later he has had his fears assuaged by INEL Supervisor Troy Wade.

Not everyone believes that INEL is immune from earthquake damage. "If I was in the geological consulting



Epicenter of the October 28 Mount Borah earthquake and the large affected area of the Northwest. The quake was felt in Salt Lake City, Portland, Prince George, B.C., and Dickinson, N.D.

Central-Eastern Idaho, with the earthquake epicenter between Challis and Mackay and the 23-mile fault line. The Idaho National Engineering Laboratory is 50 miles southeast of the epicenter.

business," Boise State University geologist Spencer Wood told a crowd of Boiseans, "there are two places I would advise against building a nuclear reactor. One is along the California coast, and the other is in the basin and range."

INEL officials note correctly that they are not in the basin and range, but on the Snake River Plain, where thick basaltic volcanic rocks help to weaken shock waves from the basin and range country which lies to the north and south.

The problem in assessing the vulnerability of the INEL site lies in the fact that the people who are judging INEL are from INEL. Boise State's Wood said, "You've got to have an outside panel without vested interest study the area." Wood added that INEL is staffed with engineers,

not seismologists qualified to assess the influences of earthquakes.

Before the Mount Borah earthquake, INEL engaged in some scientific gerrymandering. The INEL site had fallen within a long hotdog-shaped region known as the Intermountain Seismic Belt, which stretches from north of Helena, Montana to southern Utah. It was classified as a Zone 3 earthquake hazard. The classification under the Uniform Building Code requires more stable and more expensive building requirements. Because Zone 3 is the highest rating for earthquake hazard, that would also jeopardize siting of the New Production Reactor. At a 1980 geological symposium in Boise, EG&G, the major contractor at INEL, submitted its proposal to make an

indentation in the Zone 3 boundaries to exclude INEL. Two years later the proposal was adopted.

In its presentation, EG&G backed the change by noting: "... the range-front faults contained in the basin and range structure province immediately northwest of the INEL display no earthquake epicenters with magnitudes greater than or equal to 4.2." EG&G went on to say: "It should also be noted that seismometers located in the region for continuous microseismic surveillance since 1972 have indicated extremely limited seismic activity in the vicinity of the faults immediately northwest of the INEL site."

The Mount Borah earthquake registered a magnitude of 7.1.

--G.O.

Rancher for peace

(Continued from page 7)

capable of shooting down civilian aircraft. But because we have to understand each other to survive.

"This roaring rhetoric on both sides is the thing we do to prepare ourselves to kill each other. The threat of holocaust and terror are greater than they've ever been."

It is an American reflex to lump the Soviets with Hitler's Germany or Mussolini's Italy. Garland said the analogies are false. "I don't see them becoming aggressive -- there's no Ghengis Khan or Hitler in their history." He sees their actions in Afghanistan and Poland as part of their fear of invasion -- as ways to keep their borders secure.

He said their response to an aggressive U.S. policy is likely to be withdrawal. "The most dangerous thing we can do is to let them become recluses in that vast, enormous Asian space they have. They've done it in the past."

Garland said the threat the Soviets

see from anarchistic America has pushed them into an economically painful situation. He told of watching a well-dressed lady in a Russian city pay the equivalent of \$10 for a chunk of brisket hacked off a butchered old dairy cow. He also told of the drunkenness and of the black market.

They put up with the distorted economy "because of fear of America."

He cautioned against making too much of that nation's supposed low scale of living, saying that comparisons with modern America are misleading. Their apartments are small. But they're stone -- they won't burn. They're more comfortable than our log cabin of 150 years ago, or today's house trailer on some windy Wyoming desert."

Garland was impressed with the Soviet people -- with their warmth, sense of humor, love of children, and the way strangers would take the group into their homes. "We met a lovely lady. She invited us to her house and broke out the champagne and those damned fish eggs."

He was less impressed with the official line from the Soviet govern-

ment, presented to the touring ranchers at meetings with the government-sponsored peace groups. It was always the "same old B.S." When Garland's turn to speak came:

"I'd always thank them for pointing out the inadequacy of my country of which I'm often painfully

aware. Then I'd say: Stop making peace a contest. We've been doing that for 35 years." He would tell them he hoped the U.S. will, on its own initiative, stop testing, building and deploying additional bombs.

"The audiences replied: 'If you do that, you won't be alone.'"

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NONGAME TAX

The Interior Department is looking toward non-sportsmen wilderness lovers for money to support nongame species, such as badgers and bats.

The Fish and Wildlife Conservation Act of 1980 requires the U.S. Fish and Wildlife Service to look for potential sources of revenue to support states' conservation of fish and wildlife. Emphasis is placed on species not ordinarily hunted, fished or trapped.

Sportsmen currently provide most of the financial support to state fish and wildlife management programs. Revenue is in the form of state fishing and hunting licenses and, less significantly, federal excise taxes on fishing and hunting gear. Non-game species sometimes benefit from current game habitat-improvement programs, but they lack a specific, comprehensive source of funds.

Some of the 18 potential money sources under scrutiny are: appropriations from the U.S. Treasury, a voluntary federal income tax "check off," and user fees on some federal lands and waters. Other potential sources are special taxes on items such as wild bird seed, backpacking and camping equipment, off-road vehicles, wildlife field guides, binoculars, cameras and film, and travel trailers.

G. Ray Arnett, Assistant Secretary of the Interior for Fish and Wildlife and Parks, says, "It's time that Americans who do their hunting with binoculars instead of shotguns be given the opportunity to shoulder part of the financial responsibility for conserving fish and wildlife."

More details on the U.S. Fish and Wildlife study and the potential revenue sources can be found in the October 28, 1983 *Federal Register*. A public comment period ends December 12, 1983. Comments and requests for copies of the *Federal Register* notice should be addressed to the Chief, Division of Federal Aid, U.S. Fish and Wildlife Service, Department of the Interior, Washington, D.C. 20240.

COSC IS LOOKING

The Colorado Open Space Council is looking for a part-time staffer to specialize in air quality issues, from organizing forums to strengthening a statewide citizens network. The job pays \$5,250 plus benefits and vacations; resumes must be submitted by January 1, 1984. Write COSC at 2239 E. Colfax Ave., Denver, Co 80206 or call 303/393-0466.

WYOMING GAME WARDEN EXAM

So you want to be a game warden? Here's the process in the state of Wyoming: Submit a standard state application, proof of a bachelor's degree (by August 1, 1984) and college transcripts to the Wyoming Game and Fish Department, Attention: Chief Game Warden Rex Corsi, Cheyenne, WY 82002 by Dec. 15, 1983.

Next, show up at the University of Wyoming in Laramie on Feb. 4, 1984 for the written part of the Game Warden Examination. If you pass, you may take the remaining essay and oral parts of the exam on Feb. 5 or Feb. 6.

If you pass again, you will be put on a waiting list until either a game warden position is available or until another exam is administered.

WASATCH FRONT AIR

Public hearings are coming up on vehicle inspection and maintenance programs in Salt Lake and Davis Counties, Utah. The proposals are additions to the State Implementation Plan designed to control ozone and carbon monoxide. Copies of the proposals are available at the Utah State Division of Environmental Health, Bureau of Air Quality, Room 426, 150 West North Temple, Salt Lake City; the Davis County Health Department, Davis County Courthouse, Farmington, Utah; and the Salt Lake City-County Health Department, 610 South 200 East, Salt Lake City.

Hearings will be held December 8 at 1:30 P.M. and again at 7:00 P.M. in the Davis County Commission Chambers in the Davis County Courthouse in Farmington, and also December 8 in the Salt Lake City-County Health Department.

Written statements and requests for time to speak should be sent to: Executive Secretary, Utah Air Conservation Committee, P.O. Box 2500, Salt Lake City, Utah 84110.

WANTED BY THE WILDERNESS SOCIETY

The Wilderness Society wants to hire a part-time assistant to the Northern Rockies Regional Director, who is based in Boise, Idaho. The position pays \$6,000 for 20 hours of work a week but may become a full-time job as soon as May 1, 1984. For more information, call Tom Robinson at 208/343-8153 or write to him at the Regional Office, Wilderness Society, 413 West Idaho St., Suite 102, Boise, ID 83702.

TETON SCHOOL SERIES

The Teton Science School in Kelly, Wyoming has once again come up with provocative and thoughtful speakers for its annual series, "The Humanities and the Environment."

The visionary poet-farmer, Wendell Berry, kicks off the series on December 2 with his talk called "Memories of Life on Land." Next is story-teller Laura Simms and musician-composer Steven Gorn on January 27, whose theme is "Joining Heaven and Earth." The next two lecturers are writers: Barry Lopez on "Reflections on our Interior Landscape," February 24, and Simon Ortiz, "It's all Story," on March 23. All talks will relate to the way in which we develop a sense of place for a particular community or landscape, and how that identity is conveyed through myth and story.

All lectures are \$3.50 for adults and are followed the next day by 9 a.m.-5 p.m. workshops, which are \$25 each. For more information, or to register, call the Teton Science School at 307/733-4765 or write Box 68, Kelly, WY 83011.

FARMERS' JUBILEE

The Rocky Mountain Farmers Union will celebrate its 75-year history with a Diamond Jubilee Convention in Denver. The theme of the convention is "Looking Back; Forging Ahead." Besides speeches and activities, legislative, social and economic issues facing family farmers will be addressed by speakers including Senator Gary Hart (D-Colo.), U.S. Rep. Hank Brown (R-Colo.), and Colorado Governor Richard Lamm. The convention will be December 2-5 at the new Holiday Inn Denver East at I-70 and Chambers Road. The public is invited. For details, call 303/371-9090.



George Kelly

CATALOG FROM GEORGE KELLY

George Kelly, who has become known as the dean of Rocky Mountain horticulture, has just published a catalog of his books. The catalog makes available seven decades of his research and writing, including *Good Gardens with Less Water*, *Grow Your Own Food*, and *Useful Native Plants of the Four Corners Area*. For more information, write George Kelly at 15126 County Rd. G., Cortez, Co 81321.

CHRISTMAS BIRD COUNT

As the holiday season approaches, so does the Audubon Society's Annual Christmas Bird Count. The census originated in 1900 and by the 1980s, 33,000 people around the nation were taking to the swamps, fields, woods, deserts and oceans for a day to log bird species and the number of birds seen. Count dates vary for local Audubon Society chapters, but all are within the last half of December. To sign up, contact the chapter nearest you.

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FENCED, Katie Lee's newest recording of songs about the old West, has just been released on high-quality cassette tape by Katydid Records, Jerome, Arizona.

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OPINION

Democrats look east

by Bob Gottlieb and Peter Wiley

Seattle.

Western Republicans are riding high following the election of Daniel Evans in the state of Washington to fill the senate seat held for years by the late Democratic warhorse, Henry Jackson. Evans, appointed to fill the seat after Jackson's death, defeated liberal Democratic Congressman Mike Lowry.

The nonwestern media were eager to portray the election as a referendum on the policies of the Reagan administration. Issues such as the invasion of Grenada undoubtedly affected the outcome. But given Evans' very liberal record during three years as governor, the election was hardly a plebiscite on Reaganism.

What the outcome does indicate is the likelihood of another Republican sweep of the West in the 1984 presidential election. There may be Democratic governors in twelve of the nineteen states that lie west of the 95th meridian (that is, the tier of states from Texas to North Dakota including Alaska and Hawaii), and the Western congressional delegations may also be tilted toward the Democrats. But in presidential politics, the Republicans have a lock on the West that began with the election of Dwight Eisenhower in 1952 and has essentially held through Ronald Reagan's defeat of Jimmy Carter.

Only Lyndon Johnson reversed this trend: he took every Western state except Arizona from Barry Goldwater in 1964. John Kennedy took Nevada, New Mexico, and Texas in 1960, and Carter won Hawaii and Texas in 1976 and Hawaii again in 1980. The rest of the time the West has voted solidly Republican in the presidential column.

This Republican presidential strength has become increasingly significant as population has shifted westward. Commentators have been calling attention to this shift in power for almost two decades. In his provocative study, *The Emerging Republican Majority*, former Nixon aide Kevin Phillips identified the Great Plains and Rocky Mountain West as bastions of Republican strength and called the Pacific Coast states a significant battleground, with California as the

pivotal state. If anything, Phillips' 1969 projections slightly underestimated the strength of Republican presidential candidates in the next three elections.

Although dated, Phillips' analysis of Western presidential voting still holds for Republican strategists. Senator Paul Laxalt of Nevada, chairman of Reagan's reelection campaign, recently told a reporter that the Reagan strategy will be to retain his base in the West, overcome Democratic registration gains in the South, and make inroads in the Northeast.

Horace Busby, Washington, D.C. publisher of the *Busby Papers* and former close associate of Lyndon Johnson, called Republican domination of presidential voting "a simple fact of electoral arithmetic." Democrats, he told us, "don't want to and don't like to pay attention to this. They don't think of candidates and their platform in terms of attacking this core of electoral strength."

Busby recalled how Jimmy Carter's first six months in office were known as the War on the West because of his attempt to cut back funding for water projects. "Carter had absolutely no idea," said Busby, that Westerners "were from those states that think that the Democratic Party is not their party in the White House."

Busby said the North and East still dominate the strategic thinking of Democrats, but what those Eastern voters want is anathema in much of the West. He called the strategy "an instinctual reaction to play for the electoral vote in the Northeast even though the vote is not in those states."

Walter Mondale's successful bid for labor support is typical of Democratic instincts, according to Busby. Labor support will help him in large Eastern and Midwestern states, where more than 60 percent of the work force is unionized. It won't help him at all in the right-to-work West, where less than 12 percent of the labor force is unionized.

"The Democrats could become competitive," Busby concluded, "if they said, 'What could win for us in these states?'"

Democrat Cecil Andrus, former governor of Idaho and Interior Secretary under Carter, thinks

the Republicans are vulnerable in the West on a number of issues. "Their boisterous economy," he said, "has not hit the Rocky Mountain West." In timber-growing Rocky Mountain states like Idaho, as well as in California, Oregon, and Washington, this means that the lumber industry has not fully recovered from the recession because housing starts have tapered off due to continuing high interest rates.

The environment is another area where the Democrats hope to score points. When Andrus' successor, James Watt, was still at Interior, "The Democrats had an issue," according to Andrus. With the appointment of William Clark to replace Watt, Andrus thinks "a festering sore has been amputated. Now Judge What's His Name will go in there and play it low-keyed following the direction of his friend and confidant in the White House and the Republican senate."

Mondale, whom Andrus supports, is "for protecting public lands instead of selling them as Ronald Reagan proposed," said Andrus. "The people of the Rocky Mountain West," he went on, "are more concerned and sensitive to that issue than any other area of the country." Andrus feels that Reagan does not understand that Westerners are "for development as long as it does not destroy the environment." Wilderness areas, for example, are very important to the future of tourism, a major money-maker in most Western states.

"It's going to be very difficult to defeat Reagan," Andrus conceded. "He is excellent at articulating positions on the TV tube that people will relate to. It doesn't matter if they are accurate." For Andrus, the key point is that the West is not Republican. He said it is independent.

To tap potential votes in the West, Democrats will have to focus on vital issues that move people, such as uncontrolled urban sprawl, the inequities and absurdities of the Republican agricultural program, and the fact that the Western economy has, at best, benefited unevenly from the Reagan recovery.

At this point, there are very few indications that any of the Democratic candidates, even Westerners Alan Cranston and Gary Hart, are taking the regional peculiarities of the West into account in their electoral strategies. Least of all do they seem to be aware that they are far behind in the region even before they start.

□

Bob Gottlieb and Peter Wiley are based in California, where they produce a weekly column on the West.

BOOKS

A candidate tests our electoral hypocrisy

Stumping the District

Curt Donaldson. Nebraska. Privately printed. Fifty pages.

Review by Ed Marston

This slim, Xeroxed booklet describes the nasty trick a carpenter named Curt Donaldson played on voters in Nebraska's First Congressional District. In 1982, Donaldson gave them what they said they wanted.

He gave them a clear choice between a candidate who tacked before every political gust and one who determinedly, some might say fanatically, kept free of special interests. For example, Democrat Donaldson told the National Rifle Association:

"I can't see how we'd be any worse off with gun registration. And with a waiting period for purchasers, many future victims would get to live a couple more days. Maybe not much to the individual, but statistically it adds up."

He referred to Lincoln's health establishment as the "medical-

industrial" complex. And he deplored the lack of servants in hospitals: "If hospitals had butlers, at least there'd be a likely suspect" to explain exploding costs.

At times he found himself in agreement with a special interest group. He told the Nebraska State Education Association that America did need to spend more on education. But, lest he seem to be toadying, he added that increasing teachers' salaries was secondary to him.

He was most at ease baiting special interests. He told the Realtors PAC that their election questionnaire was too long: "That is why I must ask for earnest money in the amount of \$25 before I can consider" filling out the form.

He told the Nebraska Catholic Conference that he was against tax credits for parents who send their children to parochial schools. He told supporters of Israel: "When Menachem Begin says nobody lectures the State of Israel on ethics or morality, I am inclined to accept his statement."

And, just to be strictly ecumenical, he said of his Born Again sister: "Feeling as she does that when things

really go to pot on this planet, God will swoop down in his Holycopter and take her off, she votes for Ronald Reagan and doesn't worry much about politics."

There was more to Donaldson's campaign than wisecracks. Mixed in with his refusal to kowtow was a solid platform based on an intelligent economic theory, a reasonable foreign policy, and a strong feeling for the plight of the farmer.

For example, he told a farm group that they needed to form Farmers Anonymous. "Whenever you get the urge to go to bank to borrow more money than the crops will pay for, you can call me or some other recovered farmer and we'll go drinking." Donaldson also supported the farmer by his unique fund raising: he bought local flour and made New Day Bread to finance his campaign.

Needless to say, Donaldson lost even though toward the end he compromised his principles and began using yard signs. His defeat by a wide margin raises again the question of what we want from our elected officials. We say we want independent officials. But Donaldson is only the



last in a long line of candidates who demonstrate that the vast majority of us want lackeys. We get upset when the other side elects its lackeys, and we may then call for high-minded, independent officials. But when the next campaign comes, few of us go looking for people of judgment and independence. We go looking for one of our own lackeys who can win.

So at the best, in normal times we end up with good-hearted but weak men like Jimmy Carter, or with deep-voiced, shallow men like Ronald Reagan. Only in crises do the democracies hand themselves over to a Roosevelt or Churchill.

The nice thing about Donaldson's campaign is not just the fun he had and the pleasure he gave. By giving us a choice, he proved there is justice in the world. He showed that the nation gets exactly what it deserves.

16-High Country News -- Nov. 28, 1983

OFF THE WALL

A dry, dull fall

Because city folks didn't drive out into the mountains to see Color Sunday this dry and dull fall, shops in the Jacksons, Park Cities, and Aspens of the West are stuffed with T-shirts asking, "Where's Kremmling?"; coffee mugs proclaiming, "Wow I'm good"; and more hand-thrown pottery than was made in the Stone Age.

This year's failure of aspens and oaks to put on a flamboyant show proved the West's economy doesn't depend on mining and agriculture -- it depends on selling schlock. So the entire region has set out to prevent a Color Sunday disaster from happening again.

The first step occurred at an emergency meeting of dozens of chambers of commerce with the U.S. Forest Service. Chamber representatives at first hooted down the Forest Service, chanting: "Put color back into the Forest," and "The heck with Smokey the Bear."

But tempers cooled once Chief of the Forests Max Peterson let the group know how seriously his agency took the problem. He brought gasps from the audience when he said: "We are even planning to put Color Sunday ahead of timber cutting. From now on, tree color will be our number one multiple use."

For starts, Peterson said the agency would add a Color Sunday section to all Fifty Year Forest Plans. "Certain areas of the Forest will be set aside for color-type use only. Logging will be done with an eye to the color patterns they'll make."

But logging is only one bullet in the Forest Service's approach. The long-term change will come through genetic engineering.

Put the fir to work

According to Peterson, the agency has been working for years to breed beetle resistance into evergreens. "We're close to success. Even better, we're sure we can stick a color-change gene into all the evergreens. Why should the spruce and fir sit there, season in and season out, a dull unproductive green? Why should the aspens and a few scrub oak carry the entire burden of pulling folks into the countryside?"

The group was enthusiastic until they heard it would take 50 years for the non-evergreens to come on line in a big way. "We want Color now," the chamber reps began chanting, thinking of all the T-shirts and plaster mountains they had to move.

That brought the Forest Service's chief social organizer on stage with a short-term plan: to use federal programs to bring juvenile delinquents into the forests. "Not just any delinquents. We're going to bring out those kids who specialize in spray painting buildings and subways."

"We're going to give them all the luminescent spray cans of paint they want and set them loose on the trees along the roads. Not totally loose, of course. We're going to hire Cristo to give them pointers."

"That will take care of roadsides. But it won't touch the big hillside color splashes drivers enjoy. So as soon as the fire fighting season is over, we're going to load slurry bombing planes with orange and yellow paint and set them loose on the

hillsides. I guarantee you a great show next year."

He said the agency would start conservatively -- duplicating the usual fall colors. "But once we get the feel of the thing, we're going to help you go after a new market -- the people bored by fall colors who want to see some whites and blacks and bilious purples out there in the woods."

The agency also agreed to do other things to aid tourism, if not tourists. First, it will immediately close scenic turnouts along forest highways. "That will move people out of the mountains and into the Gift Shoppe. It's silly to have them poking along the road, gaping at trees and feeding ground squirrels when they could be in town spending money."

"The conservationists will scream. But Nature has stabbed us in the back. It's only right that we stab her back."

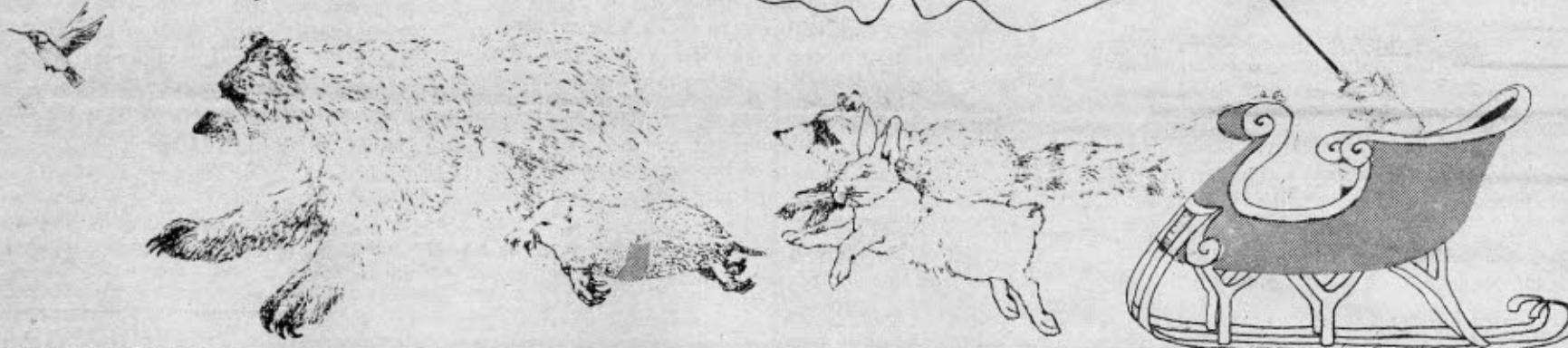
Plumb the woods

The ski industry applauded the plans. A Vail rep said: "Long ago we realized we couldn't depend on nature to provide us with snow. So we installed snowmaking machines. We were wondering when you guys would catch up."

The ski rep suggested that the tourist industry install plumbing under all the trees to spray paint whenever needed. "It's a big expense, but it'll pay. You can have a different Color Sunday every week of the year. Spray the woods white one week and purple the next. And in case of a really bad drought, you can spray all the trees green in the spring and 90 percent of the visitors won't know the difference."

-- Ed Marston

'Twas just before Christmas...



...and all through the West,
Myriad creatures were stirring, they were cold and distressed.
The grizzlies and mule deer and ferrets
black-footed
Looked in wonder at plunder and asked: How
they'd stood it?

James Watt in his fervor and Big Oil in its zeal
Were increasingly leasing the great commonweal.
From rigs and draglines arose such a clatter,
We sprang to our typewriters and started to
batter.

Out of their beds jumped our readers in panic,
Tore open their mailboxes in a state almost manic,
When what to their wondering eyes should appear
But a sixteen-page paper with prose fair and clear

On Utah, Wyoming, Montana, New Mex,
On endrin, on Exxon, on shale and BuRec,
On cows, Colorado and overthrust belts,
On ecotage, flooding, on land trusts and pelts;

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