The Environmental Bi-Weekly

High Country News

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The Geothermal Alternative

Earth Energy

Nestled safely in Yellowstone National Park, these geothermal resources will never be tapped for steam to generate electricity. The rest of the resource, outside of national lands protected by law, could equal the energy potential in one quadrillion tons of coal according to the U.S. Geological Survey. Experts believe that geothermal development will make its mark on the land, but that it is of less environmental consequence than nuclear or fossil fuel development. **Photo by Lynne Bama**

Myth has it that it is just as healthy to turn on geothermal power as it is to turn down the thermostat — that geothermal power is clean and limitless. Unfortunately, geothermal power is not so free of consequence. The earth's innards remain slightly beyond our control.

In first attempts at utilizing the power, developers have stirred up air pollution, heat pollution, water pollution, radiation and potential earthquakes (not to mention legal, financial and governmental tangles). In other words, geothermal energy offers its own special Pandora's box.

Nevertheless, the potential for geothermal power has caught the attention of creative engineers, big oil companies, and the U.S. government. Its costs and consequences look less severe than those posed by fossil fuels and nuclear power. It is no panacea for gluttony, experts admit, but it could supplement other fuels and contribute to self-sufficiency. No one claims the technology is clean, but many geothermal advocates believe that geothermal messes could be cleaned up.

Because we're still pioneers in geothermal exploration, estimates of the resources' potential vary widely. How much of U.S. energy needs could the earth's heat supply? An enthusiastic 30% is shouted from one corner of the geothermal forum and a discouraging one per cent from another.

A National Science Foundation study led by Walter J. Hickel, former Secretary of the Interior, predicts that geothermal power could produce 132,000 megawatts of electricity by 1985 — or 20% of U.S. power needs in that year. "Our earth is a great furnace," Hickel said in the report. "This great power source . . . should be given high priority by both government and industry."

Others are more restrained in their enthusiasm. The Department of Interior's final impact statement on geothermal leasing assumes that the source could provide no more than two per cent of the country's needs by the year 2000.

The entire world is currently producing about 1,000 megawatts of geothermal power. In the U.S. most of the potential and most of the exploration has been in the West. More than one-third of the world's output is produced by dry steam geysers in California.

In a number of Rocky Mountain states, experimental programs are under consideration:

In Montana, Battelle Memorial Institute believes that the energy content of the hot rock

(Continued on page 4)

HIGH COUNTRY

By Tom Bell

My conviction grows that the destiny of this great country, and whether there will be another 200 years of history to celebrate, is going to be determined by our wisdom in regard to energy. And that wisdom is going to have to be displayed before our bicentennial year is ended.

Frankly, I am pessimistic. Up to now the major decisions on energy have been made for political and economic reasons. They were made because they were expedient in the eyes of power-brokers, business and labor leaders, and a naive and over-consumptive public. Little wisdom was attendant upon those who have made the decisions.

We seem to be a crisis-oriented people; we do not move to act until a crisis is upon us. To our great regret, we may one day find that crisis has precipitated catastrophe. When that day arrives, there will be many scapegoats — and many more victims.

There needs to be a complete change in American energy habits and the lifestyle so many of us have become accustomed to. The problem is that we have lived so high off the hog for so long that it is going to be difficult to kick the habits. Some of them are so ingrained and so commonplace now that we tend to think there is no other way to live. And some give us so much pleasure that no one would dare to question the wisdom of giving them up.

Right next door to us are two good examples. To the west of our 40 acres lies a 35-acre hay field. As hayfields go, it is about a third or fourth rater. Yet for the last week, a man has been going around and around that field on a tractor. (Not an ordinary tractor either because this one carries a large front-end loader protruding from its front — certainly not intended to add to fuel efficiency.) The man has mowed, raked and baled what most farmers would consider only a shirt-tail full of hay from that field. But in terms of gasoline burned, machinery depreciated and time spent, that little bit of hay cost as much as it would have if it had run 10 tons to the acre. I ask myself, what kind of mentality does it take to figure that one out? And I also ask myself, how many fields across this big country were harvested at such an energy and money cost — without thought for such costs? How much better it would have been for that man to have rented the land out as pasture, the crop to have been taken by grazing animals and their manure to have been left on the land.

Just over the hill from Halfway, there is a state park on Brownlee Reservoir. We drove over Sunday afternoon (at a cost of about one gallon of gasoline in our Toyota). We were not alone. The parking lot was filled with pickup campers, each towing a boat trailer. Large, powerful boats were churning the water up and down the large arm of the reservoir. There had to have been many more boats out of our sight, judging from the parking lot. People were having great fun and enjoying both the beautiful day and the water conditions.

Who among our leaders is going to have the courage to tell these people to deny themselves? What folly to tell them of energy costs when it has recently been announced that gasoline inventories are amongst the highest ever. And can you imagine the kindly letters fired off by the motorboat industry and the spokesmen for the labor unions involved in making boats and motors!

Yet, it is going to take courage of the highest order to level with the American people and tell them of the pickle we are in.

It isn't enough to carry rather obscure news items in the daily papers telling how much of our money is flowing into Arabian hands. And it isn't enough to carry similar stories about utilities unable to build new facilities because they can't find the money to build them at inflated prices. Even if we really needed them (and we might some years down the road), there is no way we can build them, build an Alaska pipeline, open all the new coal mines we supposedly need, develop all the oil shale predictably needed for domestic oil, and do all the other myriad things to keep our rich, extravagant country going. We may even now be bankrupt, but unwilling to admit it.

We need to return to the frugality — yes, even the penuriousness — of our Pilgrim forefathers. The wisdom of their age might save us from our own improvidence.

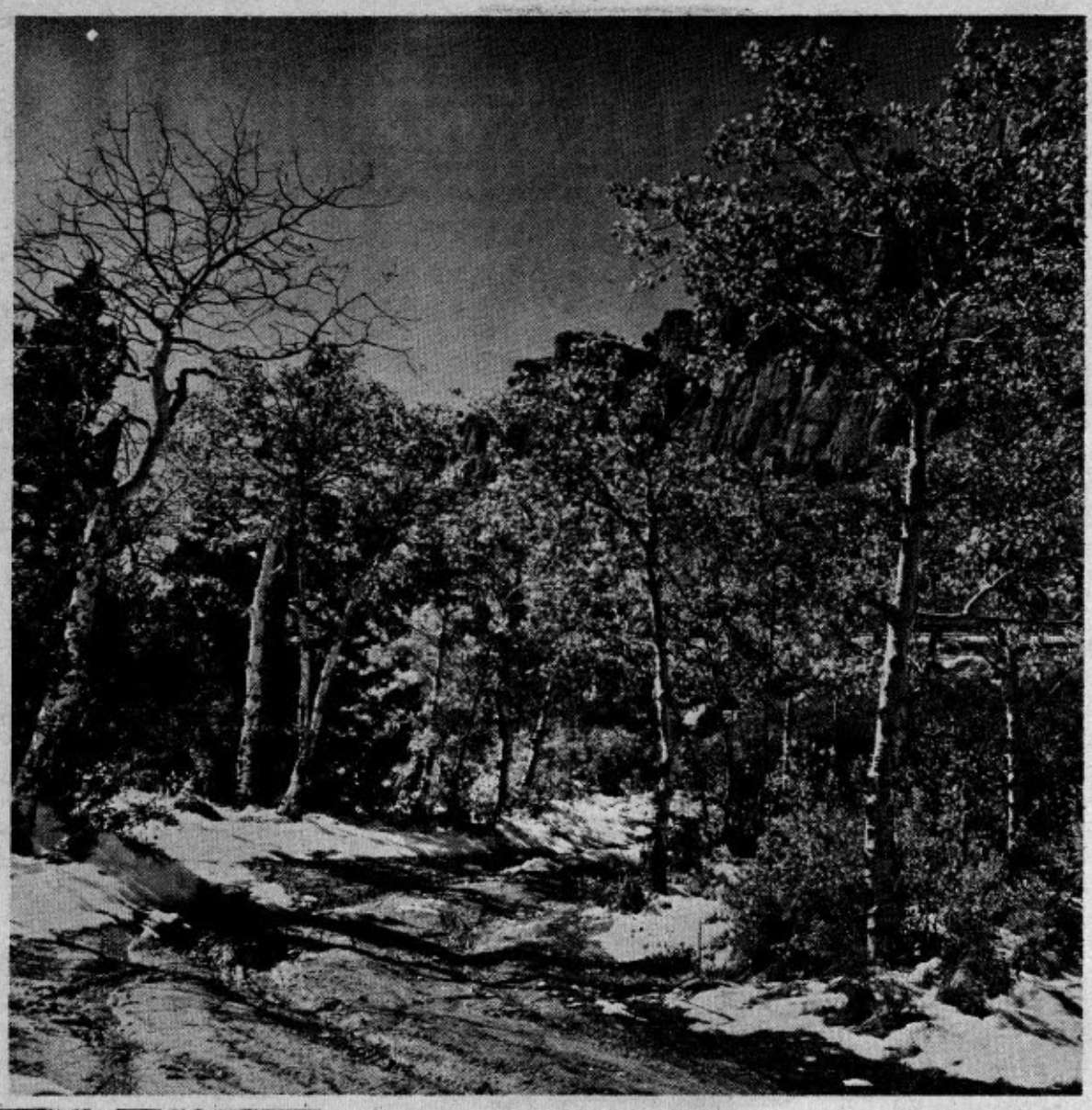

Photo by Marge Higley

Letters

Editors,

Yours is the best little paper north of the San Juan River. Ernest Youens' story in the Sept. 13th issue was top shelf journalism. Carry on, lads.

Edward Abbey
Moab, Utah

* * *

Dear Editor,

As ranchers who will not sell for strip mining at any price we couldn't believe it when we heard that the Joint Committee on the federal reclamation bill is considering rejecting both Mansfield's and Melcher's approach to protecting surface owner's rights. Instead, the committee is considering what amounts to condemnation. We don't care what fancy words you use: a bonding provision or a price arbitration board, either one adds up to condemnation if a land owner cannot say no to the strip mining of his land.

One argument heard in committee was that the right to say no gives the surface owner an interest in coal which belongs to the federal government. Let the surface owner make the decision to sell or not as is his constitutional right. Then if the concern is that the surface owner will get rich off federal coal, it is fine with us if the government arbitrates the price for the rancher who chooses to sell.

If the committee thinks the federal government will be able to give our land to a coal company and arbitrate the price for it, and that we will stand aside and let them take it, they are sadly mistaken. The only way that we will be moved off our land for strip mining is by force. And we don't think the Montana National Guard would obey an order to drive a Montanan off his own land. A goon squad would have to be brought in from the outside.

What's at stake here is more than the rights of a few cowboys and Indians. What is at stake is the basic right of ownership and free enterprise. Taking property from one private party and giving it to another for his own private gain under the guise of "the public interest" is at best un-American. This concerns every American, but the spot light is on the West. Every Westerner should speak up on this issue, for if legislation goes through giving coal companies the right to take our land today, someone else will have the right to take your property tomorrow. To protest this: Write Senator Henry Jackson, Chairman of Joint Committee on the Surface Mine Reclamation Bill, U.S. Senate, Washington, D.C. 20515.

Sincerely,
the Boyd Charter family
Billings, Mont.

* * *

Dear Editors,

I am currently enrolled in an Environmental Studies 101 class at San Jose State University. The professor who is teaching this class, Dr. Spence Havlick believes your paper, **High Country News,** is one of the best educational and informative papers, so much that he is using **High Country News** in place of his originally planned text book.

Lee Ann Peneyra
Santa Clara, Calif.

Guest Editorials

Reprinted from the POWELL TRIBUNE, September 10, 1974.

Hathaway Ignores Growing Coal Concern

Coal development in Wyoming promises to exhibit the most profound impact upon the native people and environment than any single source of activity in its entire history.

An assertion as sobering as that should not be taken lightly.

Yet, even in the shadow of potential economic, social, and environmental chaos, the state's chief executive appears to be frighteningly unworried.

Granted, the Hathawayian charm has brought the state's residents to a state of security and well being, and for that, we are eternally grateful.

However, a few remarks spoken by the governor at a recent meeting of the Federation of Rocky Mountain States, bring tremors of concern and derision from those of us vitally concerned about the future of our state.

Hathaway, replying to a reporter's question about the loss of agricultural land to strip mining possible in the next few years, said the projected mining of Wyoming's 25 billion tons of coal would only disturb about 175,000 acres of land — the same amount consumed by the nation's interstate highway system.

We feel 175,000 acres does not constitute an **only**, since the 3,500-5,000 cattle one could raise on an equivalent amount of land will feed 20,000 people for one year.

Also, the analogy with the nation's interstate mileage is poor since that is spread across 3.6 million square miles, and is not a concentrated gouge out of one state.

Further, Hathaway, in deference to Montana Gov. Thomas Judge who believes state residents should have **the** say in how their state is going to be developed, said it is up to the government to make a decision and that Wyoming's population (which is us), had no real consensus on mining, economic, and environmental issues.

Which is a plainly irresponsible, statement coming from a high office holder.

That statement implies ignorance and an attitude of non-caring on the part of Wyoming's citizens.

And if indeed that is the intent of the statement, it represents a real slap-in-the-face to many voters who put the man where he is today.

Wyoming people **are** strongly concerned with what is going to happen to their land, water, air, and way of life.

And as if that wasn't enough, Hathaway again failed to show a vital concern over the state's environmental fate when he expressed no apparent hope or faith in alternative energy forms, such as solar or nuclear energy, to lessen the long range adverse impact on the state through extended strip mining.

Perhaps we had better keep a closer eye on Cheyenne these days, to see that **our** interests are represented too.

Dear Bruce,

Thanks for the good coverage on the Glenwood Canyon problem.

When Bert Melcher attested that "Gruened is better than ruined," I responded with "Put a bill on the Hill to save cut and fill!" I doubt he concurs, but numerous people feel this way — so we'll be working on it.

Modification of the Congressional Act authorizing the Interstate Highway System to give special status to these 13 miles out of the 2,000- miles of I-70 would be a minor change in our law, but a crucial one for the state of Colorado.

President Ford knows the beauties of Colorado. So do our elected officials. Why don't we appeal to them — en masse — to exempt this section of I-70 from the standards requiring four lanes?

Only 13 beautiful miles!

Jean Widman
Denver, Colo.

* * *

Dear People:

We are like Voltaire — we may not agree with what you say but we will defend to the death your right to say it. Included with our subscription renewal is a donation and a gift subscription.

Sincerely,
Dr. S. R. Skaggs
for the entire Skaggs Family
Santa Fe, N.M.

Project Watchdog Hounds Colstrip

by Kit Muller
Northern Plains Resource Council

The utilities promoting the construction of two additional coal fired generating units in Colstrip, Mont. have decided to launch a $100,000 advertising campaign. We find this the least democratic form of communicating information.

Rather than answering letters addressed to them concerning the proposed additions at Colstrip and the associated transmission facilities, rather than speaking out in a forthright manner at public meetings held by the Department of Natural Resources and Conservation and the Northern Plains Resource Council, the consortium has decided to spend a substantial amount of money on advertising — a means of "communication" that other organizations and individuals can ill-afford, a means of "communication" that leaves no opportunity for a fair and open exchange of ideas.

In response, we intend to start a campaign of our own. We are going to call it "Project Watchdog." Through the project we will critique the forthcoming advertisements, point out possible inaccuracies, and publicize problems the utilities choose to ignore.

We don't have the money to compete for radio and TV time with the utilities. We will use whatever means are available to bring forth all the facts. The utilities will be able to get their point of view across more frequently and more cleverly than we will. But we trust Montanans' natural sense of fairplay and think that most people will seek out the other side of the story.

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The Northern Plains Resource Council is an agriculturally-based citizens organization with members in Montana, Wyoming and North Dakota. Their office is at 421 Stapleton Building, Billings, Montana 59101, (406) 248-1154.

STATEMENT AND OWNERSHIP
MANAGEMENT AND
CIRCULATION

NOTICE

(Act of October 23, 1962; Section 4369, Title 39, United States Code)

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B. Paid circulation, 1. Sales - dealers and counter sales	55	45
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C. Total paid circulation	3,060	2,980
D. Free distribution	180	155
E. Total distribution (sum C&D)	3,240	3,135
F. Office use, left-over	160	165
G. Total (sum E&F)	3,400	3,300

I certify that the statements made by me are correct and complete.
October 1, 1974 s Joan Nice

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News Editor	Bruce Hamilton
Office Manager	Mary Margaret Davis

Energy . . .

(Continued from page 1)

under two to five square miles near Marysville could equal the energy in Alaska's North Slope oil field.

In Idaho, one private firm is ready to invest $2 million to explore hot water potential. The federal government may invest $16 million for a test and demonstration project in the Southeastern part of the state.

In Colorado, the Petro-Lewis Corporation and the Public Service Company have launched a program to explore geothermal steam power and build a 1,500-kilowatt pilot electric plant near Buena Vista. If experiments are successful, a 440,000 kilowatt plant might be built there sometime within the next 20 years.

In each of these experiments, the cost of production is largely unknown. And many technical and environmental problems are yet to be explored.

History

Heat to Run Refrigerators and Breed Alligators

Electrical utilization of geothermal energy began in 1904 in Larderello, Italy when a small dynamo driven by geothermal steam lit up five light bulbs. A year later a 20 kilowatt power plant was built in the same place. By 1940 the plant was putting out 127,000 kilowatts and boasted a 200 to 300 year future.

Today commercial electrical power from geothermal steam is produced in seven countries, including New Zealand, Japan, and the Soviet Union. Most of U.S. production is in the Geysers, a field 85 miles north of San Francisco. The Geysers plant puts out 420 megawatts — enough to provide one-half of the electric power needs of a city the size of San Francisco.

The direct use of water heated inside the earth dates back for centuries. Surface springs have been used for bathing, entertainment, and — on a small scale — to heat houses. Refrigeration plants, greenhouse agriculture, desalination operations and the sugar and paper industries have all been run on heat from the earth. Pigs, chickens, eels, alligators and crocodiles have been raised for profit with geothermal warmth. Oregon has used the heat to melt snow off highways in the state.

Reykjavik, Iceland has looked beneath itself for power for centuries. Reykjavik citizens have been washing their clothes in hot springs and, in some areas, baking their bread by burying a loaf-sized oven in the ground. Today, 99% of the city's 85,000 residents heat their homes with geothermal water. Reykjavik homemakers also run the hot water through their taps, their dishwashers and clothes washing machines. Water not needed for domestic purposes is used to heat greenhouses that produce tomatoes, grapes and bananas. Some of the wells which service the city are a mile or more deep.

There are problems to be avoided, of course. When the water comes out of the ground it is boiling hot. It would boil in the pipes unless kept under pressure by pumps in the wells.

Another problem is dissolved nitrogen in the rapidly rising water. There is enough nitrogen in the Reykjavik underground reservoir to give a home plumbing system something akin to "the bends," a fatal condition that occurs when a deep-sea diver surfaces so rapidly that nitrogen in his blood forms bubbles which block blood vessels. Unless nitrogen is removed from geothermal waters, similar barriers would form at high points in the Reykjavik plumbing system. Oxygen must also be kept out of the system to keep dissolved minerals from forming oxide deposits on the pipes.

The flouride Iceland receives through its hot water tap is reportedly ideal for dental health. Sulfur compounds are more troublesome. At the well site they produce a rotten egg smell and in homes they turn silver black and corrode copper utensils.

For regions with geothermal waters that are as pure as Reykjavik's, the city's accomplishments offer inspiration. More corrosive geothermal waters might make these plumbing and heating applications extremely difficult, however.

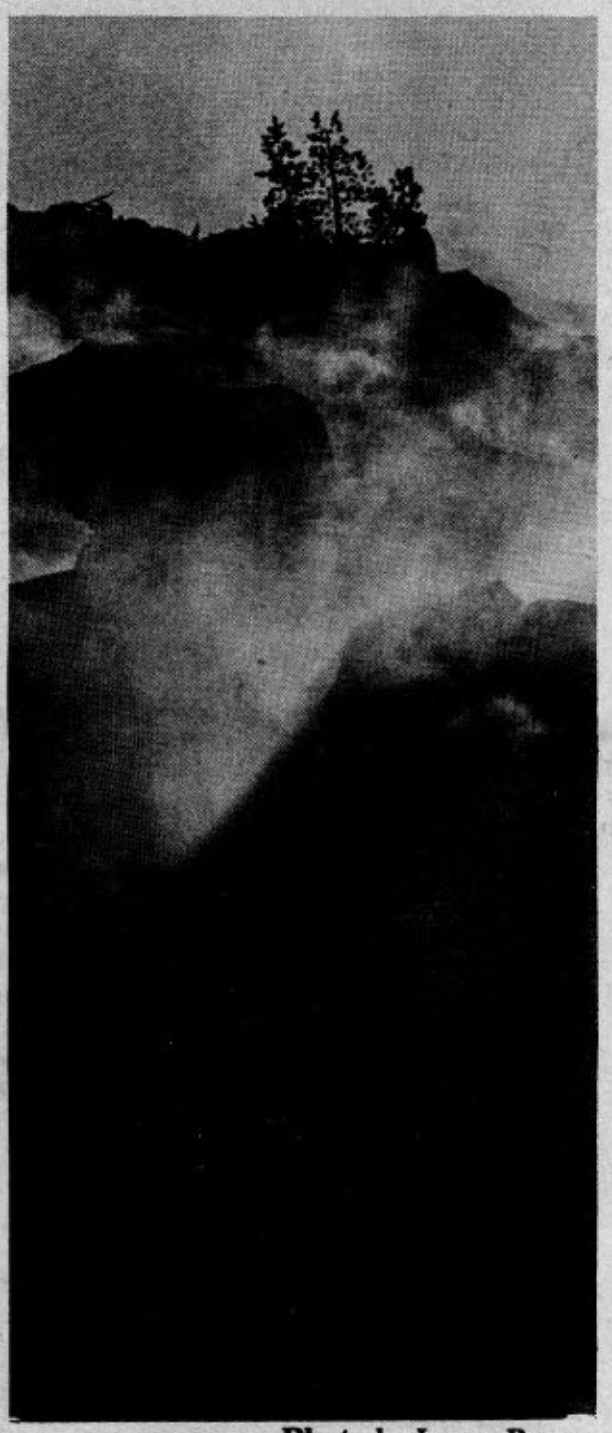


Photo by Lynne Bama

Engineering

Hot Rock and Cold Water

Geothermal heat is generated primarily by the decay of radioactive materials within the earth. Molten rock moves upwards where plates that form the earth's crust meet. Here, volcanism, mountain-building — and geothermal energy — all may be present.

When ground water is close to the heated rock, natural deposits of steam and hot water form. In the past, man has made use of this hot water only when it came to him in a surface hot spring. More recently, steam, steam mixed with hot water, and hot water alone have been tapped for man's use by sinking wells to reach the hot spots.

At the Geysers geothermal field in California, steam from wells is collected, filtered and passed through turbines to produce electricity. The exhaust steam is then condensed in cooling towers. Since this cooled water would pollute streams if released, it is reinjected into the ground through deep wells.

At both Geysers and in the Larderello region in Italy, wells produce "dry" steam, that is, steam unaccompanied by liquid water. Most hot spots are not so accommodating. Most offer a mixture of steam and hot water, which must be separated before the steam can be used to produce electricity. Once separated, hot water can be treated and used for agricultural or domestic purposes. Since the water is already hot, desalting by distillation can be easily accomplished at this stage.

Hot water can also be used to generate power, by warming a liquid with a lower boiling point than water and using that liquid to spin turbines. As technology improves, water of lower and lower temperatures may be utilized.

The geothermal heat bank would be 10 times larger if the country's dry hot rock reservoirs could also be tapped. Energy potential in these masses could be as great as the potential power in all the nation's coal reserves, says Battelle Memorial Institute, a non-profit research firm.

To tap the dry rocks, creating artificial cavities with either conventional or nuclear explosives and then adding water has been proposed.

The water would be injected from the surface, heated and brought back out. The Atomic Energy Commission's Los Alamos Scientific Laboratory suggests using hydrofracturing techniques similar to those used in petroleum recovery. Water could be pumped down one well through the hot, fractured area and return via a higher connecting well.

Mountain States

Willing Guinea Pigs

MONTANA

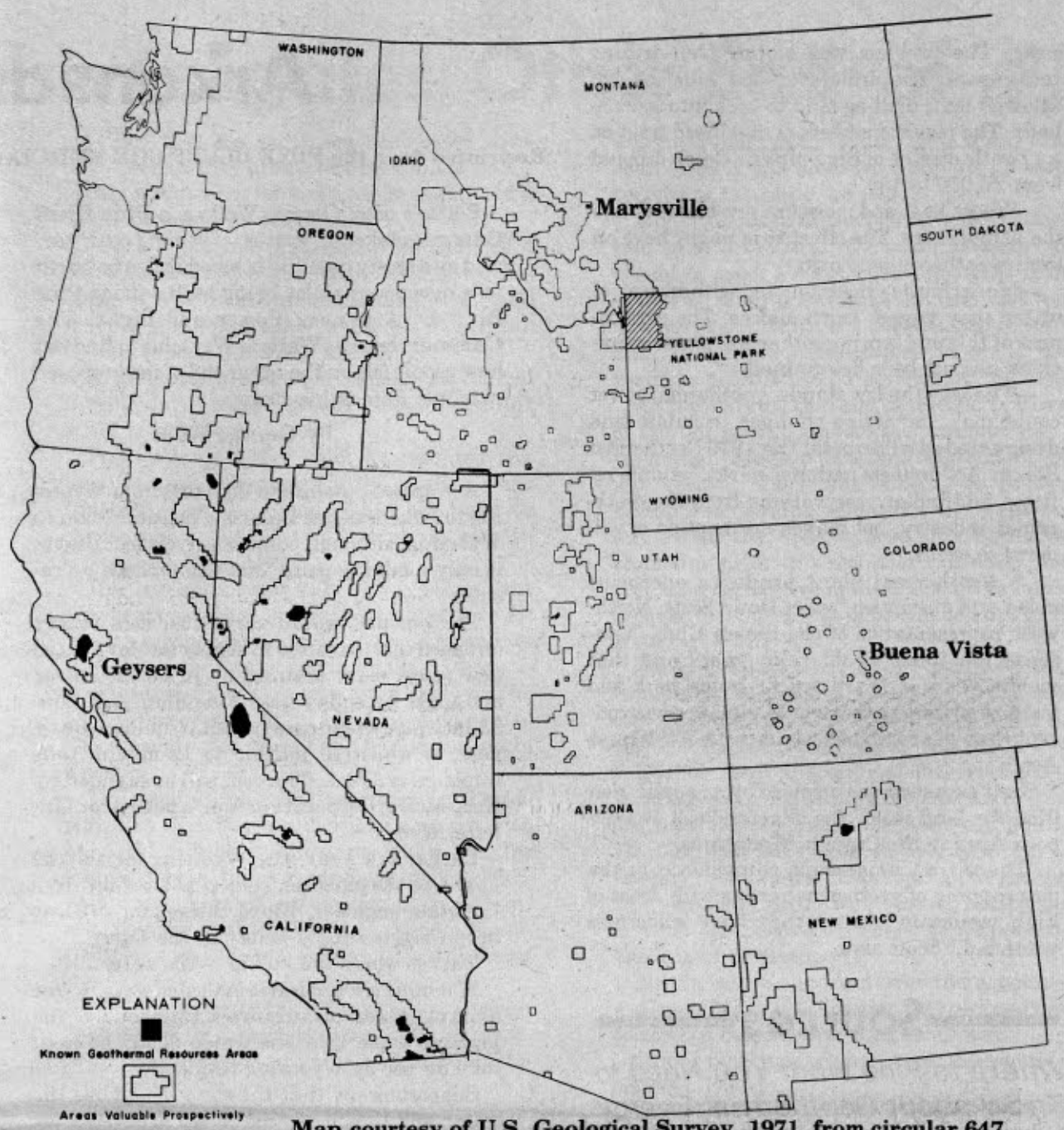
Marysville, Mont. is near a test site for dry hot rock geothermal technology. The Marysville prize, a mass of granite underlying 600 acres, could produce $25 billion worth of electrical energy, according to the National Science Foundation. That makes it potentially just as valuable as all of the oil to be pumped from Alaska's North Slope.

Battelle Memorial Institute is drilling a mile-deep hole down into the granite. This marks the first step in a three-year program of exploration and drilling in the region supported by $2.5 million in grants from the National Science Foundation. One objective of the experiment will be to refine exploration techniques, which are still in the primitive stages.

COLORADO

Colorado has begun to dream of the geysers in their future, but like other states, is not sure exactly where to find them. Some 1,014,000 acres of land in the state have been classified as of "prospective value" as geothermal hot spots. At the turn of the century, primitive oil men knew where to drill when they found a seep. Similarly, today's geothermal explorers are certain of potential only when they discover a hot springs. Remote sensing is being developed which could aid in spotting geothermal hot spots from aircraft and perhaps even from satellites.

The Public Service Company of Colorado and Petro-Lewis, Inc. have agreed to look into the geothermal industry in Colorado. They have both signed a contract to provide the steam to



Map courtesy of U.S. Geological Survey, 1971, from circular 647.

power a 1.5 megawatt electric generating plant southwest of Buena Vista. If prospects look good, they will proceed to build a 55 megawatt plant. Eventually they hope to install a generating capacity of 440 megawatts in the field.

A number of unanswered questions will determine the fate of this plan.

"We have yet to establish the presence or extent of the underground thermal reservoir, the temperature and pressure of steam that can be produced, and what the chemical content of the steam might be," says Robert T. Person, chairman of the board and president of the Public Service Company. "Until those questions and many more are answered, we will not be fully apprised of the project's feasibility or cost."

IDAHO

"Idaho may be on the brink of a major effort to produce electrical energy from geothermal resources," the director of the Idaho Water Resource Board, R. Keith Higginson says. Thirty per cent of the state has been officially designated as a potentially valuable geothermal area. Idaho Gov. Cecil D. Andrus celebrates and pushes the state's position as the nation's geothermal energy laboratory.

More than any other state in the Rocky Mountain region, Idaho is banking on hot rocks to assure its future. According to Andrus, the state has had enough of dams on the Snake River. Development of the underground hot water resource could mean "we are not pushed into a hydroelectric plant in this state because of the energy crisis," he says.

Idaho has welcomed the federal government on its way into the geothermal action. The Atomic Energy Commission is spending $150,000 on geothermal projects in the state in fiscal 1974. So far only test wells have been drilled, but the AEC eventually hopes to build a 10 megawatt power plant in conjunction with private industry to test potential in the Raft River area near Burley.

"One of the great benefits Idaho has for development of geothermal energy plants is the quality of its water. It doesn't have too many minerals and it can be reinjected into the Snake River aquifer without any damage," says Dr. Roy Mink, a geologist for the State Bureau of Mines and Geology.

Leasing

Interior Pushes Steam and Big Oil Moves In

The recent flurry of geothermal activity in the Rocky Mountain states has been promoted by the federal government. In January of this year, the Interior Department offered 50,000 acres of land in the Western U.S. to competitive bidders. The response was overwhelming.

"I almost dropped my store teeth," said Bureau of Land Management official Walter Holmes.

In the three California areas where the auctions took place, bidders — most of them oil companies — paid a total of $6.8 million for the 23,441 acres. Shell Oil Co. was the big spender of the day, offering $4.5 million to develop a 3,874 acre tract in the Geysers field. A decade ago, leases on private lands in the area were selling for 20 cents an acre, Holmes says.

Areas with geothermal potential, but with unknown reserves, were opened up for non-competitive leasing. Bureau of Land Management officials in 10 Western states were swamped with 2,456 applications for the privilege to explore. Applications which overlapped by 50% or more were re-classed as Known Geothermal Resource areas and scheduled for competitive bidding.

This summer Congress followed up the leasing excitement by offering $50 million worth of federally guaranteed loans for geothermal projects.

The big-time players in the fledgling geothermal industry are familiar faces. Union, Gulf, Chevron, Sun, Getty and Mobil oil companies have spent more than $100 million since the mid-1950s.

Some observers claim that Interior's lease-bidding regulations favor big oil. In addition, they charge that the large corporations may be more interested in a monopolize-and-wait approach than in efficient development of the resource.

Ted Toon, former wildcat oil driller and contributing editor of **Geothermal Energy** magazine, is alarmed that "a major new source of power is being stifled right now, and with the aid of the federal government."

The lease-bidding regulations lean toward the larger corporations in several ways, Toon points out. To bid, a $10,000 deposit is required and the potential lessee must have at least $500,000 in assets. On top of that, corporations which hold older mineral leases with the Department of Interior can exchange them for geothermal leases and get first choice on the prime fields.

Other traps have been set for potential competitors. Already in the Geysers areas both Union Oil and Signal Oil have signed exclusive contracts to sell steam solely to Pacific Gas and Electric Company (PG&E). When a group of publicly owned power companies, represented by the Northern California Public Power Agency (NCPPA), tried to buy some Geysers steam, they were refused. When the NCPPA traveled north to the Pacific Energy operation, they found an exclusive contract with PG&E had already been established there, too.

Martin Donough, the attorney for the NCPPA charges "these corporations are acutely concerned with eliminating competition, especially from municipally owned power companies."

All of the PG&E contracts are adorned with "escalator clauses," which stipulate that the price of steam shall rise as the prices of other fuels increase. Thus, the power industry skillfully protects itself against the emergence of a low cost source of electrical energy and assures itself of large profits. Currently, the production cost for steam wells is only 50% that of oil and natural gas.

Problems

Lids on Geothermal Energy

A number of economic and legal constraints are blocking geothermal progress. To elaborate:

—The legal status of geothermal energy is uncertain. In Hawaii, it's a mineral, in Utah it's water, and in Idaho it is "sui generis" — something unique.

"Such confusion is not conducive to rapid development of the resource," says an attorney for Magma Power Co. The federal government is in court over its contention that it owns all geothermal resources under lands where it has reserved mineral rights.

—Experienced workers are in short supply. **World Oil** magazine estimated in Dec. 1973

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Energy . . .

(Continued from page 5)

that no more than 50 explorationists and 50 engineers in the country have any direct experience in the development of geothermal power.

—Geothermal steam, which can be considered a fuel for energy production, is competing with other fuels which are allowed a tax break through depletion allowances. That puts coal, oil, natural gas and uranium one step ahead of all new sources of energy in the marketplace.

—Since power rates are set as a percentage of capital as well as operating costs, the low capital cost of a geothermal power plant may deter utilities from developing geothermal energy.

TECHNO-HURDLES

Geothermal power also has some technological hurdles to leap before it can ever make any large-size contribution to the power pool.

Experts know very little about how to assess the value of the resource before they spot a hot spring or sink in a drill. Remote sensing techniques are under study.

—Geothermal brines corrode equipment. Studies are needed to determine what gases and minerals are involved and at what temperatures and pressures the problems occur.

—Since the power source is at relatively low temperature and pressure, steam turbines are about one-third less efficient than the turbines turning in conventional power plants. They require about 450 megawatts of heat to produce 100 megawatts of electricity.

—How soon the steam from a given well will be depleted is not known. Experts are certain, however, that steam such as that produced at the Geysers field in California can be exhausted. The hot water rising beneath the earth carries silica and other minerals. As it moves up it cools, depositing minerals in the pores and fractures of the rock reservoir. Eventually, the cavity seals itself and cannot be recharged.

THE PRICE OF POWER

In an economic sense, geothermal power is a tough competitor. The Geysers field is producing power at $100 to $150 per kilowatt hour of generating capacity, which is considerably lower than the cost of producing electricity from fossil and nuclear fuels.

Environmentally, geothermal power is also relatively attractive. Fuel recovery and power production take place in the same area. The impacts of surface mining and transportation of fuel are eliminated in the geothermal power set-up.

Geothermal power is not without its environmental impacts, however. The impacts of greatest concern are:

—Waste water is a problem. It must be treated before it can be released on the surface. Or it can be re-injected underground. Reinjection could help prevent land subsidence, which may result when large quantities of water are removed from underground reservoirs.

—Noxious gases are often a by-product of geothermal wells. Martin Goldsmith of the California Institute of Technology estimates that the amount of sulfur escaping from the Geysers is equal to that of a fossil fuel plant of the same size burning low-sulfur oil. Pacific Gas and Electric also discovered small amounts of radioactive radon gas in emissions at the Geysers area this spring. Both of these problems will require careful controls.

—A Geysers operation was caught contaminating a creek and killing fish early this year. The problem was sloppy well-drilling techniques. The drillers eroded hillsides and allowed toxic drilling mud to leak into streambeds. The result: numbers of steelhead trout on a 17-mile stretch of Big Sulphur Creek dropped from 22,000 to 100.

—Waste heat and moisture are released into the atmosphere. The effect this might have on local weather is unknown.

—Near faults, injection or withdrawal of water may trigger earthquakes. The seriousness of this problem in geothermal power operations has not been determined.

—The way the law stands, geothermal power could make terrifying changes in public land designated as wilderness. The 1970 Geothermal Steam Act protects national parks, wildlife refuges and Indian reservations from the geothermal industry, but makes no mention of wilderness areas.

"A geothermal plant produces enormous noise and disruption," says Doug Scott, Northwest representative of the Sierra Club. "Construction itself would take years and that means years of heavy trucks going back and forth. A plant like that would violate every concept that was established under the Wilderness Act."

Scott's concern was inspired by an application filed for land inside the Glacier Peak Wilderness Area in the Cascade Mountains.

"There's an unpleasant coincidence in the outcropping of geothermal areas with areas of high mountain country that have wilderness potential," Scott says.

Sources

Where to Find What You Need to Know about Geothermal Energy

"Geothermal Power" is a 14-minute, 16mm color film or video cassette, showing steam fields and hardware in New Zealand, Mexico and California. Contact AV-ED Films, 7934 Santa Monica Blvd., Hollywood, Calif. 90046.

For a look at the power source through the eyes of its advocates, see **Geothermal Energy** magazine, 318 Cherrywood St., West Covina, Calif. 91791. The magazine offers press clippings about geothermal conferences, the text of scientific papers and patents, and enthusiastic editorials with underdog appeal. (A recent editorial was headlined: "Poormouthing Geothermal: Is It a Conspiracy or a Pastime?")

The editor-publisher of **Geothermal Energy** also runs a business called "Geothermal Information Services." For photographs, publications books, maps and slides, inquire at 318 Cherrywood St., West Covina, Calif. 91791.

The International Society for Geothermal Engineering, Inc. is at P.O. Drawer 4743, Whittier, Calif. 90607.

For information about the Department of Interior's environmental impact statement on the geothermal leasing program, contact The Map Information Office, U.S. Geological Survey, Room 1028, General Services Building, 1st and S Sts. NW, Washington D.C. 20242.

A layman's book on geothermal energy is **Nature's Tea Kettle** by HyDee Small. It can be purchased for $9.95 from Geothermal Information Services, 318 Cherrywood St., West Covina, Calif. 91791.

California's experience with geothermal energy is analyzed by the Caltech Environmental Quality Laboratory in EQL Report No. 5: "Geothermal Resources in California: Potentials and Problems," by M. Goldsmith, Dec. 1971. For a copy write to the Caltech Environmental Quality Laboratory, 1201 E. California Blvd., Pasadena, Calif. 91109.

by Joan Nice

Arkansas

Reprinted from the PINE BLUFF COMMERCIAL

Editor's note: George Wells is a **Pine Bluff Commercial** staff writer. Wyoming coal, carried by a slurry pipeline is scheduled to be burnt in a new power plant being built outside Pine Bluff by Arkansas Power and Light. The **Commercial** sent Wells to Wyoming to find out how people felt on the other end of the proposed pipeline. Here is his story.

by George Wells

A proposed pipeline to float coal from Wyoming to Arkansas has become a political issue in Wyoming, although some observers feel that it is only a talking point that will produce no results.

The pipeline would carry coal in a slurry (crushed coal in water) to supply fuel for a huge new power plant planned by Arkansas Power and Light Company near Pine Bluff, Ark. The 38-inch pipe would carry about 25 million tons a year, of which 10 million to 12 million tons would go to AP&L. The coal will be supplied by Kerr-McGee Corporation from a mine near Gillette, Wyo.

Earlier this year, the Wyoming legislature approved the pipeline, subject to a permit from the state engineer, Floyd Bishop, for drilling deep wells to supply water for the slurry.

That is where the rub is — the water.

Wyoming is a semi-arid state and water is one of its most precious resources. Opponents of the pipeline argue that the water should be kept here for use by Wyoming residents.

Supporters say that the state should use the water and that it would be too expensive for anything but industrial use anyway.

Politicians are taking both sides.

One state official commented that the issue had become "emotional" and that he thought "every candidate has been on both sides of the issue."

Water probably is the most emotional issue in this state and the pipeline probably serves as a vehicle for venting the feelings of voters, especially those who see Wyoming as on the verge of being invaded by somebody else's idea of progress.

"I'm against the pipeline," Mrs. Harry Underwood said flatly. She helps her husband operate a sheep ranch south of Gillette, Wyoming, which is Ground Zero for the coming boom.

"I'm sure that what this amounts to is mining the water as well as the coal," she said. She added, however, that "if it was brackish water, I might not be opposed."

Proponents of the pipeline "sold" the issue to the legislature on the basis that the water from the deep wells they wanted would not likely be good water. Subsequent tests have indicated that it may well be good water, however, and this has fueled the political controversy.

Bill Barlow, another rancher in the area, said he was opposed to the pipeline regardless and favored transporting coal out by rail. One of his biggest objections, he said, was that "we don't have a lot of facts on the aquifer."

Another person who cited a scarcity of facts as the basis for opposing the pipeline was Bart Koehler, director of the Wyoming Outdoor Council, a coalition of conservationists and organizations.

"The more they look at the Madison Formation (the aquifer from which the water would come), the lower it gets," Koehler said. The pipeline operation would require 15,000 acre feet of water a year.

His organization is also concerned about another aspect. He said the enabling legislation

Investigates Other End of Pipeline

provided that the state engineer could shut down wells if they proved harmful to the water rights of others but he was not sure that the law could, or would, be enforced.

"Once it get into operation," he said, "We don't think anyone can close them down because it will be in interstate commerce" and federal law would take precedent. "Once it's there, it's there forever," he said.

In addition, he said, the tremendous capital investment involved would probably inhibit strict enforcement.

Politically, Koehler said, he resented the issue because proponents of the pipeline were "putting it on the people (that) we have to choose now . . . I don't really think we have to make that choice now."

The law authorized only this pipeline, but opponents note that several companies have already said they want to build one. Opponents note that several say they think that if this one is permitted, the others more than likely will be as well and eventually much of the state's valuable groundwater supply will be pumped out of the state.

The pipeline would be built by Energy Transportation Systems, Inc. It would contract with an AP&L subsidiary, Systems Fuels, Inc., for the delivery of the coal, and one or both companies would search out enough other customers (possibly within the same Middle South Utilities system that includes AP&L) to make the pipeline economically feasible.

John M. Huneke of San Francisco, vice president of Energy Transportation, said the company was formed especially to determine the feasibility of the project.

In this case, feasibility means water supply and rights of way. Test wells have been drilled into the Madison Formation and the results have been something less than spectacular, but Huneke would not say they were inadequate.

An official of the Wyoming Department of Economic Planning and Development said that a flow of 200 gallons a minute would be needed to be economically feasible and that the best test so far showed only 150 gallons a minute. Huneke said only that it would be unfeasible if a flow of substantially less than 100 gallons a minute was all that could be maintained.

He said that there was plenty of water in the formation — an assertion the ranchers and conservationists don't buy — and that the water might as well be used for the pipeline, regardless of quality, because it would be too expensive for agricultural or municipal use. "There's no way the volume we are getting at the test site can be economical for any other use," Huneke said.

This points up one of the fears expressed by opponents — that industry will come in and outbid everybody else for water and thus ruin or severely damage agricultural uses.

How much effect the wells will have on the surrounding water table is not known because the Madison Formation has not been tapped extensively yet. When the pipeline bill passed the legislature, deep wells of at least 2,500-foot depths were required to avoid lowering water tables. Nothing was said about the quality of the water in the bill, although an amendment on water quality was introduced without success.

The law requires the approval of Bishop before production wells can be operated and he has directed Energy Transportation to drill at least one more test well so more could be learned about the aquifer.

Bishop said he was inclined to approve the permits for production wells if the aquifer proved capable of supplying the pipeline water without damaging the water rights of any other users. This is the basic guideline for all water permits in the state, he said.

Myron Goodson of the planning department said he believed that "the water is there" and should be used. He also cited the cost of lifting the water several thousand feet (the test wells now are at the depth of 3,000 feet and cost several hundred thousand dollars to drill). This would be prohibitive for agriculture, he said.

Bishop and Goodson said the original purpose of the bill was to protect the groundwater of Wyoming. Goodson said that before their bill was passed, there was nothing to prevent Bishop from issuing permits for the wells anyway except the existing laws and regulations protecting priority water users. (Bishop, however, said legislative authorization was needed because the water was to be shipped out of the state.)

Goodson, noting that the bill had the effect of being more restrictive on Energy Transportation, said the company "would have loved it if they'd've killed it too dead to skin."

Koehler said the original bill would have been a good thing because it would have given the state the mechanism to study the aquifer. He disagreed with Goodson over whether the company wanted the bill or not. "ETSI got their name written into the bill," he said, noting that, at least temporarily, Energy Transportation had a kind of monopoly.

But for all the concern over the amount of water available, the question that probably will decide the issue is one of rights of way.

Slurry pipelines do not have the power of eminent domain.

More than that, this one starts in the Thunder Basin National Grasslands and would have to travel 1,000 miles or more, crossing at least 44 railroad rights of way.

The railroads think that they should carry the coal.

A measure has been introduced in Congress by Senator Henry M. (Scoop) Jackson, Democrat of Washington, to give slurry pipelines the power to condemn rights of way but it is given little chance of being considered this term. Even if it is approved, it might not clear the question of whose powers of eminent domain are superior — the pipeline's or the railroad's.

This would probably mean lengthy litigation.

AP&L is interested in the pipeline because the company estimates the savings to the utility at $10 billion to $14 billion over the life of the power plant.

Construction of the pipeline was contemplated to begin in 1976, with operation starting two years later.

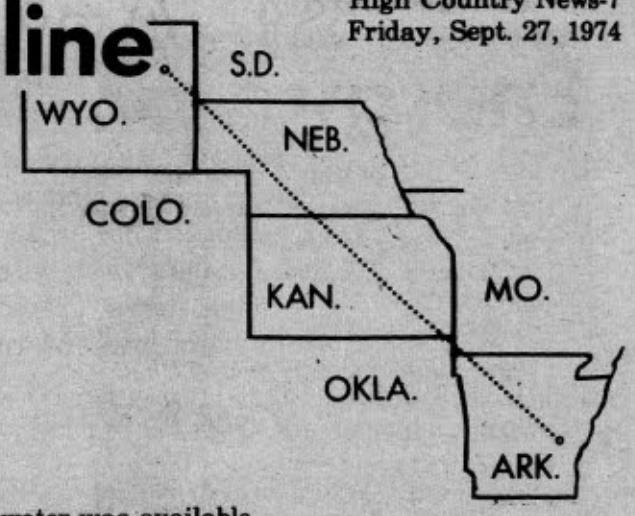
Huneke said he anticipated no trouble in getting a right of way through the national grassland — "provided our environmental impact statement is approved" — because, he said, pipelines cause no permanent damage to the land and the surface generally recovers quickly.

He admitted, however, that the railroads were a problem at the moment. Railroads opposed the Jackson bill in hearings before a Senate subcommittee during this session, he said.

The idea of using surface water from the streams and lakes of Wyoming is virtually unthinkable, in spite of the attitude of the state's planning department that "the water is there" but unused.

The alternative of using surface water from another state, however, has been suggested and is, at least technically, under consideration by Energy Transportation. This probably would involve a return pipeline for part of the way (the idea of pumping water all the way from Arkansas was obviously too costly), beginning where water was available.

There is water available in some rivers, Huneke said, but the legal tangle that would have to be untied to get to it would take years.



S. Dakotans Seek Slurry Suit

The proposed Energy Transportation Systems, Inc. coal slurry pipeline would run from Wyoming to Arkansas, but the state raising the biggest fuss over the plan is South Dakota. Western South Dakota is heavily dependent on the Madison Formation (the underground aquifer that would supply the slurry line's water) and the state may try to protect their water interests in court if Wyoming gives ETSI the go-ahead.

The water wells in Wyoming that would supply the slurry line are only 30 miles from Edgemont, S.D. Edgemont gets its water from the Madison. An aide for Sen. James Abourezk (D-S.D.) says his state could lose 20,000 acre-feet of water annually, if the pipeline proceeds as planned. He said the only recourse will be "to enter a Federal court action seeking an injunction" if Wyoming State Engineer Floyd Bishop approves the project.

All the South Dakota representatives in Congress have voiced opposition to the slurry plan and Gov. Richard Kenip has asked for the formation of a special Wyoming-South Dakota joint committee to study the matter.

South Dakota has a law which prohibits "mining of ground water" (continually pumping ground water from wells for industrial uses until the entire resource is consumed). This means South Dakotans can't pump unlimited amounts of water from the Madison. Now after decades of careful husbandry of their water resource, it may be "mined" out from under their feet by companies in Wyoming.

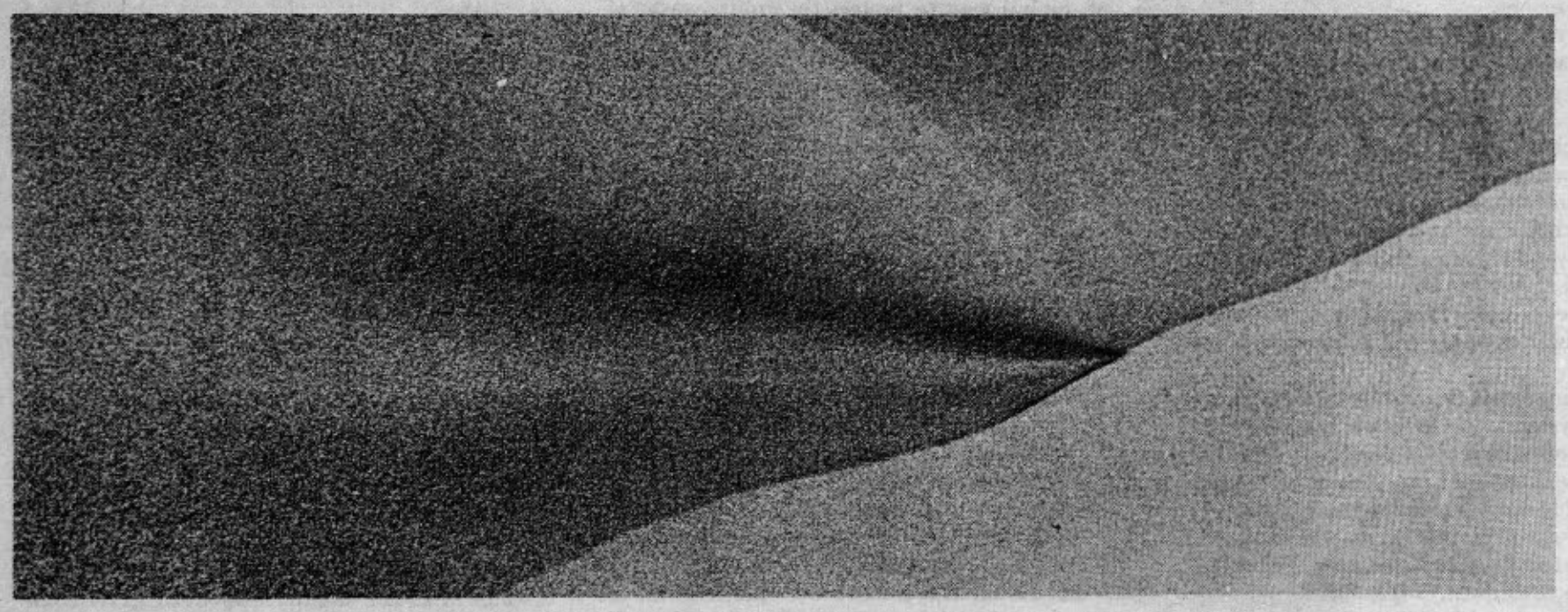
On Sept. 24 Wyoming State Engineer Floyd Bishop gave approval to Energy Transportation Systems Inc. (ETSI) to drill 40 wells in eastern Wyoming for their proposed coal slurry pipeline to Arkansas. ETSI had applied to sink 98 wells in the area, but Bishop said they could get the needed water from the 40 he approved. Bishop said a year-long test program conducted by ETSI shows that the wells can be granted without adverse effects on other water users. Test wells in the area have produced water with about 500 parts per million total dissolved solids which is considered the upper threshold of salts in water suitable for human consumption. Bishop says he does not expect the water quality to vary greatly. South Dakota is expected to take Bishop's decision before federal court.

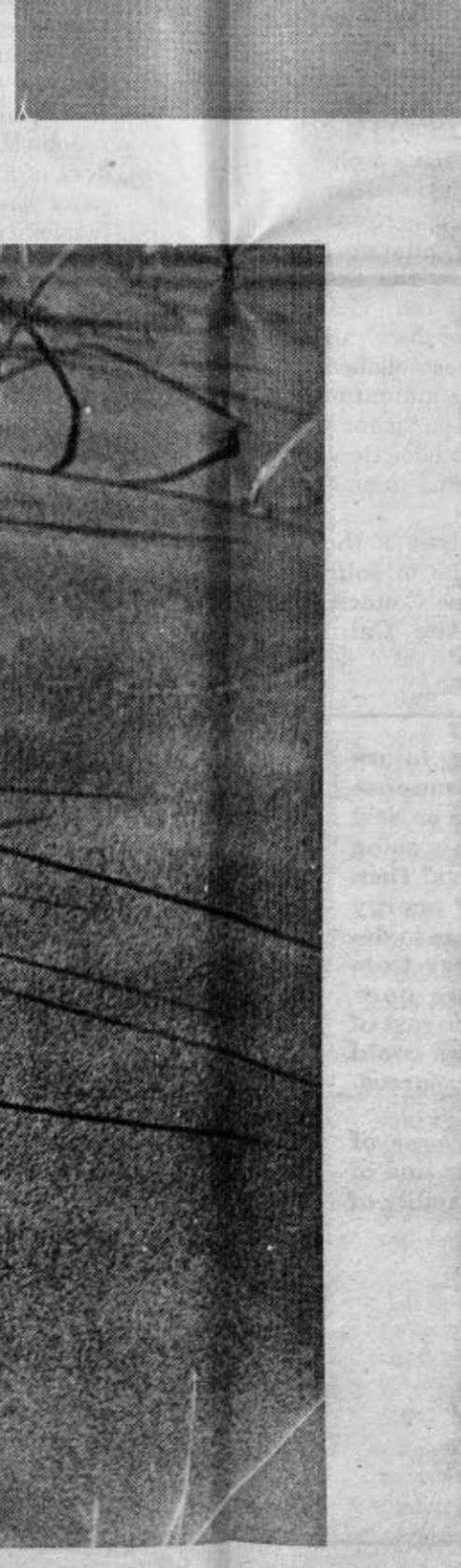
St. Anthony Dune Patterns

These mountains in motion are the St. Anthony Dunes of eastern Idaho — one of the many parcels of public land in this country with no special protection, but with special charm. The Bureau of Land Management manages most of the dune region.

There's vast, wild territory here for the foot traveler. The sand covers about 15,000 acres. Traces of the dunes' travels can be followed back for about 50 miles to a shallow, intermittent lake.

Photos by Barbara B. Brown





Reckoning from Washington

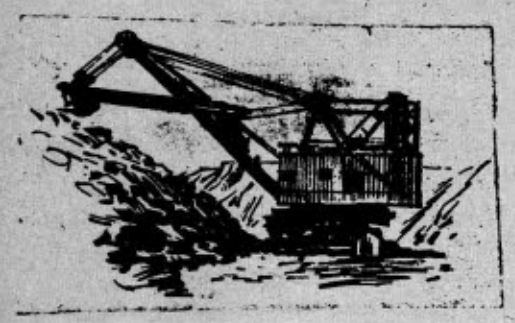
by Lee Catterall

Some mammoth coal mines in southern Wyoming might have slipped through a loophole as it was widened in mid-September in the strip mining bill.

The action occurred at the end of three afternoon sessions of unexpectedly prolonged debate on that part of the bill by senators and congressmen trying to hammer out differences between versions that have passed each chamber.

The loophole was intended originally in the House version to exempt an open pit mine near Kemmerer, Wyo. from having to comply with some stiff standards set forth in the proposed law. The Senate version would have exempted all open pit mines, which environmentalists warned would cause a "ripoff" of the West.

The Kemmerer mine is more than 10 years old. Rep. Teno Roncalio (D-Wyo.) got the House to be kind



to the company because of economic problems that would result from making it meet certain water and regrading standards.

He wrote that part of the House bill so it would exempt only that mine. Rep. Patsy Mink (D-Hawaii) argued in the joint House-Senate conference that it should stay that way.

"This exemption should be specifically tied to the Kemmerer mine situation," Mrs. Mink said, offering a proposal she said had been written "about as tightly as an amendment can be drawn up."

"It seems to me the language has been tightened too much," Sen. Clifford Hansen (R-Wyo.) said. Hansen also voiced dissatisfaction with a compromise offered by Sen. Lee Metcalf (D-Mont.).

Hansen argued that while both proposals would allow the present Kemmerer pit to expand, neither would allow a new pit to be dug even in the same coal seam. The 11-mile-long seam is disected by the Lincoln Highway, so the present pit couldn't be expanded to cover the entire seam.

But Hansen and Roncalio agreed with other parts of the Metcalf proposal, which tended to broaden the exemption to possibly cover other mines.

"I don't think it's fair to exempt only one particular mine," Sen. Floyd Haskell (D-Colo.) agreed.

And Metcalf said other mines in about the same situation should be treated the same. "All I'm trying to do is protect ongoing mine operations," he said.

The Mink proposal was defeated by a tie vote among House members, with Roncalio voting against it. The conference eventually accepted the Metcalf language.

But some questions were left unsettled. Information gathered by Kemmerer Coal Co. about other mines indicates two huge ones in the Hanna coal basin east of Rawlins, Wyo. may also qualify for the exemption, as well as a mine in Washington state. The two Hanna mines are operated by Arch Mineral Co.

Environmentalists were angered over the action, and a House staffer who sides with that group — and who had worked on that part of the bill — fumed that the conference had created a loophole that would exempt many other mines throughout the West.

That's one of several areas of the bill that are likely to bring lawsuits among people arguing in the future over what the bill means.

Western Coal Called Inferior

The Natural Resources Defense Council (NRDC), a national environmental organization has charged that the government and the electric utilities have greatly overrated the advantages of burning Western coal in power plants.

"The federal government has mistakenly calculated the sulfur content of western coal," NRDC attorney John Leshy says. "If properly measured there is just as much low-sulfur coal in the East as in the West."

Western coal is higher in moisture and lower in heat value than Eastern coal. Therefore sulfur content should be measured against the amount of heat the coal can put out — not by weight, as the federal government measures it, Leshy says.

"No matter which coal is used some form of sulfur control scheme will have to be adopted soon," says NRDC scientist Dr. Terry Lash. "There just isn't enough coal with low enough sulfur content to avoid serious degradation of air quality."

SHOOTING FROM THE HIP

In an analysis of the Interior Department's environmental statement on its "Proposed Coal Leasing Program," NRDC charged that the "grand plan to open up vast new acreages of Western public and private lands to rapid strip mining for coal is based upon faulty analysis and inadequate consideration of likely environmental harm."

"At a time when clear-headed public policy regarding energy has never been more urgent, the federal government once again is shooting from the hip for the short-term, politically attractive solution instead of coming to grips with the much more difficult long-term problems," Lash says.

CONTRADICTIONS

In their analysis NRDC also points to contradictions between Interior's public position on coal and its internal studies and recommendations. NRDC claims that some Interior documents show that shifting to Western coal would pose problems:

"a. The environmental study concludes that massive federal coal leasing and strip mining is necessary as a long-term solution to the 'energy crisis,' while an internal Interior Department study concluded that heavy reliance on strip mining of Western coal could exhaust current surface mine reserves in the West in 20 years.

"b. The environmental statement makes no mention of material, equipment or trained manpower shortages as posing any obstacles to rapidly increasing strip mined coal production. By contrast, Federal Energy Administrator Sawhill and an AEC (Atomic Energy Commission) task force have recently noted that equipment and manpower shortages will pose significant obstacles to both coal and oil shale production.

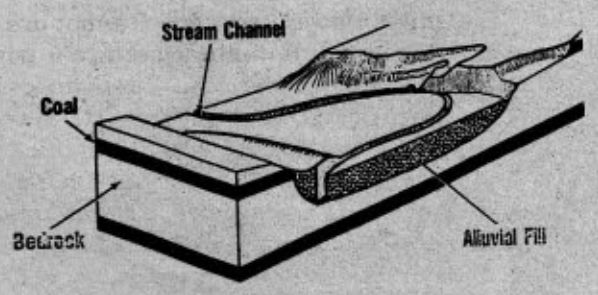
"c. The statement does not foresee any problems regarding having sufficient personnel for adequate monitoring of strip mining operations to ensure compliance with federal regulations. However, an earlier draft report by the Department observed that during 1971 and 1972, department personnel performed less than half of the inspections and examinations established by the U.S. Geological Survey as a minimum required level and criticism of the department's performance on this score by the watchdog General Accounting Office still remains unanswered."

For a summary of NRDC's analysis of the federal coal leasing program, write to John Leshy, Natural Resources Defense Council, Inc., 664 Hamilton Ave., Palo Alto, Calif. 94301.

Streambeds Spared-- Grasslands Sacrificed

A joint House-Senate conference committee has decided that strip mining should not be allowed on productive grazing lands in river valleys. As part of the federal strip mining bill, the committee passed a ban on the issuance of permits in alluvial valley floors where there is farming or forage potential.

In the version of the strip mining bill passed by the House, mining was prohibited on any alluvial valley floor — any land created by sediment from rivers and streams. The revised version represents a compromise between members of the Senate and the House. The provision



was originally inspired by a National Academy of Sciences report which pointed out that coal companies could harm water resources in western states.

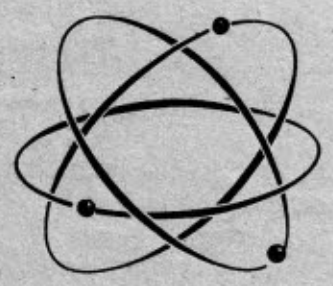
The conference committee resolved another controversial section of the strip mining bill this month when it reversed the House's ban on mining on the national grasslands. Substantial coal reserves underlie the federally-owned grasslands in the West. Coal companies have immediate plans for the Thunder Basin National Grasslands in Wyoming and the Little Missouri National Grasslands in North Dakota.

The conference committee left intact a House ban on strip mining coal in national forests.

Surface landowner rights — and the controversial Melcher and Mansfield amendments — will be tackled next week by the committee.

It is foolish to rest our energy future on nuclear power. Do you suppose that after we lost Philadelphia or New York or Chicago that anyone is going to tolerate nuclear power plants? Then we're going to have a real energy crisis. The only sensible way is to decide now to derive our energy from renewable sources that are non-polluting. For a pittance of the cost of developing nuclear power, we could already have developed other sources.

Dr. John Gofman, co-discoverer of U-232 and other rare elements, and of slow and fast neutron fissionability of U-233.



Emphasis ENERGY

in the Northern Rockies and Great Plains

Wheatland, Wyo. has been chosen as the site for a new three-unit 1,500 megawatt capacity **coal-fired power plant.** The Missouri Basin Power Project plant will be constructed five miles northeast of the town on the lower Laramie River. Construction should begin next year to be completed in 1979, a utility spokesman said.

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"It is important Western states work together in **energy development,** otherwise we'll get ripped off one at a time," **Montana Gov. Thomas Judge** told the Federation of Rocky Mountain States this month. "We have to present a strong front to the government and energy companies."

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Wyoming welcomes strip mining because it will enhance the state and make little used lands productive, Wyoming Gov. Stanley Hathaway told a news conference at Expo '74 this month. "We believe that 95% of any land strip mined in our state can be made more productive than it is now. It can't be made pristine, but it will be more productive. We are fortunate that our coal resources are in prairie lands," Hathaway said.

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A new **coal strip mine** is opening south of **Kemmerer, Wyo.** to fuel the FMC (Food Machinery Corporation of Delaware) trona plant near Green River, Wyo. The mining will be done by the Morrison-Knudson Company with overburden stripping to commence next month. The mine will yield 600,000 tons of coal per year.

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School construction will cost $64 million over the next 11 years to service **coal development boom growth** in **Wyoming's Powder River Basin.** This estimate comes from a report by the Governor's Task Force on the Powder River Basin. Department of Education official Gary Lane told the Board of Education that immediate state action was needed to cope with this anticipated impact. Failure to move could "seriously jeopardize the quality of education in the area," according to the task force report.

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"The economics of **oil shale** are **inflationary,** (and) the energy, equipment and water requirements are excessive. The potential contribution of shale oil to our nation's energy supply is small," seven major conservation organizations told President Gerald Ford in a joint letter this month. The group included the Colorado Open Space Council, Trout Unlimited, the Environmental Defense Fund, the Environmental Policy Center, the National Audubon Society, the Sierra Club, and the Natural Resources Defense Council.

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Coal development in Wyoming, Montana and the Dakotas is proceeding faster than anticipated, says Northern Great Plains Resource Program manager John VanDerwalker. He says production by 1980 will surpass the original estimate by 37%.

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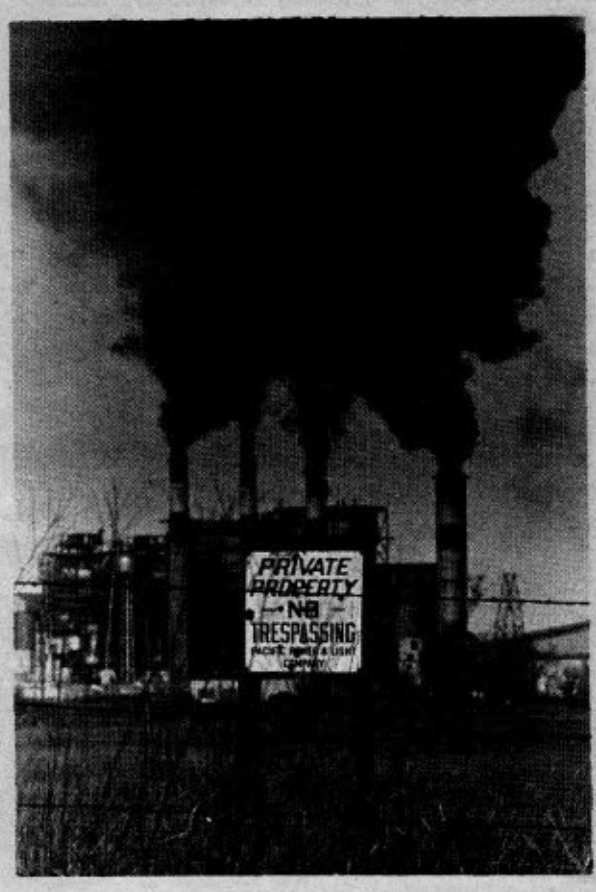
A North Dakota University professor has developed a **wind power system** for his house that supplies hot water and space heating. Jack Krueger, an electrical engineer, spent about $250 designing and building the system. He uses a second-hand generator and a hand-carved two-bladed propeller that could save between 500 and 600 gallons of fuel oil a year, according to Krueger.



John VanDerwalker, director of the Northern Great Plains Resources Program says an interim report due to be released Sept. 27 will conclude that coal development and power plant construction can proceed in the region without exceeding air quality standards. VanDerwalker said that even with the highest level of development — 900 million tons of coal produced in the year 2000 — national secondary air quality standards, which could reduce visibility to 12.5 miles on some days, would not be exceeded. The potential effect of the added smoke is still not known, he added.

Photo by Terry Moore

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Ted Rooney has resigned as executive secretary of the **Powder River Basin Resource Council.** He has been replaced by Lynn Dickey of Buffalo, Wyo. Dickey will be assisted in the Sheridan office by Lucie Bourdon, a volunteer.

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The United Power Association cannot use the power of **eminent domain** to acquire a power plant site near Underwood, N.D. unless it proves "substantial benefits" to North Dakota consumers, according to a ruling by District Judge Alfred Thompson. Since the UPA plant would supply energy to only one North Dakota customer — a coal company — the judge ruled that the power supplied was not an in-state "public use" of benefit to North Dakotans.

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Bill Tweedle, Town Councilman in **Meeteetse, Wyo.** has told the Northern Plains Resource Council that the **Montana Power Company** is considering building a power plant on the lower Greybull River near the town. NPRC was told by Roger Rice, Senior Exploration Geologist for Western Energy, that his firm was acquiring coal leases in the Meeteetse area last summer.

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The **Pacific Power and Light Co.** and **Peabody Coal Co.** have bought the 55-Ranch in central Wyoming near Glenrock. The two energy firms paid $4.4 million for the surface rights to the land. They already own the mineral rights — which include "significant amounts" of coal reserves.

The Hot Line

across the country

"We're going to make a hell of a lot of money out of coal," said **Burlington Northern** Railroad board chairman Louis Menk. Menk said his company's second quarter profits rose 69%.

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Energy conservation and research and development "can be one of our most important weapons in the battle against inflation," said **Sen. Gaylord Nelson** (D-Wis.). Nelson made the remark at an economic summit conference on natural resources, recreation and energy called by President Gerald Ford. "It is essential for economic, national security, ecological and other reasons that the United States embark on a conservation program of real substance," Nelson said.

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The **coal industry** is expected to need as many as **125,000 new miners** in the next 10 years, said Robert Freeman, president of Eastern Associated Coal Corp. The Bureau of Mines reports that in 1973 the coal work force totaled 157,800.

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The **Government Accounting Office** (GAO) has released a critical study of the **Federal Power Commission** (FPC) that has been called "one of the most powerful indictments of a federal regulatory agency within memory," by Rep. John E. Moss (D-Calif.). Moss said the study "makes a very strong case for concluding that cumulative financial exploitation of consumers by an industry was aided and abetted by the very federal agency charged with protecting the public against monopoly and profiteering." The GAO report discribed FPC rate setting as "a sham of the regulatory process." It also said FPC members violated conflict of interest standards."

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Mobil Oil plans to invest up to $30 million in a process that produces **ribbons of silicon** — the basic material for converting sunlight directly to electricity through **solar cells.** In the past, solar silicon crystals have had to be grown one crystal at a time which made solar cells prohibitively expensive. By growing the silicon in ribbons, costs could be substantially reduced. **Solar Energy Digest** reports that the National Science Foundation sees this breakthrough in silicon manufacturing as a means whereby "on site" electricity could be produced "at cost levels competitive with that obtained from conventional (fossil fuel, nuclear etc.) means."

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Starting October 1, 1974 all new single family residences in **Florida** must be plumbed for **solar water heaters.** State Sen. William Gillespie, the sponsor of the bill, said the law was necessary because of the high cost of converting conventional water heating systems to solar.

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Peabody Coal Co. has closed its Northern Illinois mine at Wilmington after 47 years of operation. No, they aren't out of coal. Commonwealth Edison of Chicago has purchased the site for construction of a **nuclear power plant.**

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Federal Energy Administrator John Sawhill says already this year utilities have cancelled or postponed more than $12 billion worth of planned construction of power plants. The companies can't obtain adequate financing through debt and equity sales, he says. **Treasury Sec. William Simon** says the solution is to raise utility rates to make more capital available.

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The **price of coal is skyrocketing.** The Tennessee Valley Authority (TVA) announced this month that it is paying $30 per ton for coal — a six-fold increase since 1969. Just one month ago TVA was paying $20 per ton.

"Blow to the heart"

Congress Considers Canyon Giveaway

The proposed Congressional "giveaway" of 185,000 acres of Grand Canyon National Park and other public lands has been challenged by a coalition of six national conservation groups. Coalition spokesmen say that a proposal to transfer the land to the Havasupai Indian tribe for economic development would be a "blow to the heart" of the Grand Canyon and a threat to other National Parks and public lands.

"We have grave reservations about transferring lands held in trust for all Americans, including Indians, to a small segment of the population," a coalition spokesman explained. "National Parks and National Forests are inviolable and not to be bartered."

The release of the National Park lands would be authorized by amendments to proposed Congressional action which would reorganize the existing boundaries of Grand Canyon National Park. The amendments, sponsored by Reps. Morris Udall and Sam Steiger, both of Arizona, would give the tiny Havasupai tribe, less than 300 people, a huge chunk of the Grand Canyon National Park and Monument and the adjoining Kaibab National Forest for "economic purposes." The transfer includes 67,000 acres of canyons and cliffs in spectacular Havasu Canyon, as well as three of the most famous waterfalls in the Park.

Besides these lands, the whole integrity of the Grand Canyon is indeed in jeopardy," a conservation spokesman said. The coalition expressed concern that the Grand Canyon may be opened for extensive and unwarranted tourist facility development. The Havasupai tribe has already endorsed construction of a major dam in the Canyon and addition of aerial tramways.

The six groups include the National Wildlife Federation, American Forestry Association, Friends of the Earth, Sierra Club, Izaak Walton League, and the Wilderness Society.

The conservationists also see the land transfer as a possible "stalking horse" for withdrawal of other National Park and National Forest lands. At present, over 57 million acres of public parks and other lands are claimed by Indians in scores of places. The Navajo lay claim to the whole eastern half of Grand Canyon National Park, and the Pit River Indians in California argue that they once owned all of Mount Lassen National Park. The Mescalero Apaches claim part of Lincoln National Forest in New Mexico, the Blackfeet claim part of Lewis and Clark National Forest in Montana, the Piscataway Indians claim 700 acres of National Park lands on Maryland's Piscataway Bay, the Coos Umpqua tribe claims all of the Oregon Dunes National Recreation Area, and the Ganienkeh of the Mohawk claim New York State public lands near Big Moose Lake.


belted kingfisher

"If any of these claims is allowed on an ad hoc basis by Congress," a coalition representative stated, "the prospects for expensive lawsuits and dwindling supplies of precious public land are clear."

Ironically, the coalition notes that the land transfer is unnecessary if the Havasupai claims that they only want this land to establish a grazing industry are true. The tribe now has all grazing rights to this land guaranteed by the 1919 Act which established Grand Canyon National Park. Additionally, the Havasupai adjudicated their claim to the land when they were paid $1.24 million in 1969 by the Indian Land Claims Commission.

"It's a disastrous precedent," the conservationists contend, "one which could lead to the reopening of hundreds of already adjudicated claims on other National Park lands."

The coalition acknowledged that the Havasupai and other Indian tribes may well need special economic help, but "there are other ways Congress can do it other than chopping a piece out of Grand Canyon National Park." One recommendation by the coalition is that the Havasupai be given management of Park concessions. The group also urged that serious consideration be given to former Park Service Director George Hartzog's proposal for Park Service purchase and Havasupai management of tourist facilities just outside the entrance to the South Rim of Grand Canyon National Park.

Ruckelshaus Enters Meeteetse Fight

William Ruckelshaus, former head of the Environmental Protection Agency, former acting director of the FBI and former assistant Attorney General of the United States, has been hired by a group of landowners in Meeteetse, Wyo. to investigate the activities of a big industrial development firm. The citizens, banded together in a group called the Meeteetse Preservation Council, want Ruckelshaus to look into the proposed American Metals Climax (AMAX) Kirwin copper mine that would be located 34 miles from the group's small rural community.

"We believe that the future and the unique character and quality of life of the people of Wyoming is endangered by possible uncontrolled development by the mining industry. As citizens of Meeteetse we need to speak out to insure that our community will not be sacrificed," said Charles Rumsey, chairman of the citizens group. Rumsey told the **Cody Enterprise** that if Ruckelshaus finds that the proposed mine will be harmful to the agricultural, social and general well-being of the area, his organization will do everything in its power to stop the project.

The copper ore body is located on top of Little Bald Mountain (elevation 10,500 feet) in the Absaroka Mountains of northwestern Wyoming. The mining plan calls for removal of about 500-700 feet of earth from the summit to form an open pit mine. Mine wastes would be disposed of in nearby river valleys (see **HCN**, July 19, 1974, p. 13 for photo and story). Peak summer construction employment would be 700 with the average daily work force over 300. AMAX geologist Jim Cooper told the **Enterprise**, "The effect of 165 new families on a town the size of Meeteetse could be devastating." He said AMAX is looking into a trailer village at the mine site and housing employees in the larger community of Cody.

Public Land Threat Imminent?

The Coalition to Protect the Public Lands is mounting an attack against provisions in the House version of the Bureau of Land Management Organic Act (H.R. 16676) that "would make protection of the public lands and endangered wildlife species vastly more difficult to achieve, and that would promote giveaways and sales of the public lands."

Unlike the Senate version (S. 424) which simply establishes a multiple-use, sustained-yield mandate for the BLM and grants the agency wilderness review and law enforcement authority, the House bill has additional provisions that the Coalition calls "chaotic and reactionary." Specifically, the Coalition objects to provisions that:

1) Give mining top priority — "Under the new provisions of H.R. 16676, mining companies could locate claims and obtain title to them without restriction, while the Interior Secretary could protect lands with high public values only by going to Congress."

2) Give public lands to state agencies — "H.R. 16676 allows unlimited acreages of BLM recreation lands to be given away to state and local government agencies. And, for a start, it specifically hands over to the state of Nevada the 62,000-acre Red Rock Recreation Area, which BLM has established as an exemplary conservation area . . . (and which) contains potential wilderness lands and highly scenic cliffs and canyons."

3) Takes away endangered species protection — "H.R. 16676 reverses the top priority which Congress only last year gave to endangered and threatened species in federal agencies' decisions . . . . (A) provision in the bill directs that 'endangered and threatened species shall be given equal but not greater consideration than other uses' in BLM and Forest Service decisions."

4) Put national forests up for grabs — "It allows the forests to be sold into private ownership, at the whim of the Secretary of Agriculture . . . . Provisions of the bill could also throw out the window many land planning decisions already made by the Forest Service, such as the setting aside of 274 wilderness study areas and many natural areas throughout the national forests. All these would be subject to replanning. Under this bill, any decision to bar mining from a national forest tract over 5,000 acres could be reversed by only one house of Congress."

This bill has passed the House Subcommittee on Public Lands and may be coming up before the full House Interior Committee at the end of this month. The Coalition urges citizens to contact Congressmen on the Interior Committee to delete the damaging provisions listed above. More information can be obtained from the Coalition to Protect the Public Lands, 620 C Street, S.E., Washington, D.C. 20003.

Western Roundup

Jackson Fears Forest Fires

The Park Service in Grand Teton National Park is letting a naturally-caused fire burn on the north shore of Jackson Lake and many tourists and residents are furious. The fire has burned about 700 acres and filled the skies of Jackson Hole with smoke. "I can't see what purpose it serves to make the whole lake a disaster area. It is clearly out of control and I am afraid they won't be able to stop it," Joanne Hennes, a local artist, told the **Jackson Hole News.** Another local critic, Jane Seeley said, "I was absolutely appalled. There are two and three hundred year old trees going up like torches." While this happens, Seeley said park employees are "like a bunch of pyromaniacs dancing around in glee." A guest at the Jackson Lake Lodge said, "We came to Jackson Hole to get away from smog. This is worse!"

Fire specialist George Gruell with the Bridger-Teton National Forest has assured the community that the fire is contained. "It looks a lot worse than it is," said Gruell. Park information officer Tony Bevinetto said, "It is fifty years of learning that can't be easily overcome to allow us to realize that fire is a natural thing." Gruell added, "If fire was foreign to this area we could see it as destructive. But if future generations want to see what we have seen,we will have to permit fires."

Scientists Tackle Predator Problem

Predator control researchers at Colorado State University in Fort Collins are busy studying coyote predation on sheep. Dr. Kerry Gee has been granted $250,000 to survey the economic impact of coyote predation in the 17 western states. Gee says the study will cover such areas as the cost of coyote control and geographic data about where losses to coyotes are heaviest.

A colleague, Dr. Vern Swanson, is experimenting with sheep collars that give off odors to repell coyotes. The collars have little rubber sponges attached to them that smell like anything from "strong cinnamon to rancid cabbage." A range of chemical repellents are being tested. Experimental collared sheep in the field have a better chance of survival, reports Swanson.

Briefly Noted . . .

Ranchers near Aspen, Colo. are requesting restrictive county zoning to prevent being invaded by ranchettes. The Snowmass Creek — Capitol Creek area ranchers are calling for a 160-acre minimum lot size. Presently 95% of the area is unzoned and subject only to state subdivision laws which the ranchers feel are not restrictive enough to "keep the beauty and the agriculture."

* * *

Two years ago, the Ketchum-Sun Valley ski resort area in Idaho was faced with a condominium invasion of unprecedented size. Three large developments around Ketchum "threatened to more than double the population of the town almost overnight," reported **Ketchum Tomorrow.** But with today's tight money, that building boom has been hushed to a whimper. None of the major developers are proceeding with a project that matches the original large size or early timetable that was first announced.

* * *

A voting analysis released by the Idaho Conservation League shows that about 50% of the state legislature supported key environmental issues in the last session. In the Senate the average was 5.7 out of 11 positive votes. Democratic senators averaged 7.8 while Republican senators averaged 3.8 in agreement with ICL stands. The House averaged 5.28 out of 12 positive votes. House Democrats averaged 10.5 and House Republicans 3.3 in the analysis.

* * *

Both the Republican and Democratic parties in Utah have endorsed the state land use planning act scheduled to face voters in a referendum this November. The act is also supported by 28 out of 29 county commissions, the Utah Association of Cities and the Salt Lake Area Chamber of Commerce. "Failure of the states to meet their responsibilities in this area is an open invitation to federal intervention," said Democratic state chairman John Klas.

* * *

The Anaconda Company has announced the opening of a new copper mine and mill at Carr Fork south of Salt Lake City in the Oquirrh Mountains. Ore will be taken from an underground mine in limestone formations 2,000 to 5,000 feet below the collar of the production shaft. Waste will be disposed on the surface. No smelter is planned for the operation. Anaconda plans to ship the copper concentrate to the smelter at Anaconda, Mont. nor processing. Approximately 800 will be employed by the new mine.

A 9.6 mile stretch of the Bighorn Canyon Transpark Road near the Wyoming-Montana state line has been given the go-ahead by the National Park Service. The proposed road has been under fire in recent months because of concern over destruction of archeological sites in the area. Now the Park Service says an archeologist will remain on site during all construction phases to halt construction if any important sites are unearthed. Off road vehicle use will also be restricted to protect archeological sites and areas held sacred by the Crow Indian tribe.

Several Montana conservationists are still seeking to halt road construction through a court injunction. They cite Park Service figures that reveal visitation (now 250,000 people per year) to this fragile land will double once the road is put through. Heavy visitor use and easy access are not compatible with park values such as fossil areas, range for wild horses and other wildlife, and Indian artifact areas, say the road's critics. The critics say mitigation measures are not enough — the road should not be built. This photo was taken from Devil's Canyon Overlook looking out over Bighorn Lake (Yellowtail Reservoir). Photo by Lynne Bama

Corps Abandons Oahe Wildlife

The Secretary of South Dakota's Game, Fish and Parks Department has accused the U.S. Army Corps of Engineers of failure to fulfill its obligations regarding the mitigation of wildlife losses suffered as a result of construction of Oahe Dam and Reservoir. Secretary John Popowski called the Corps' failure to compensate the state inexcusable. "We accepted all the commitments from the Corps in good faith," Popowski said, "but they never bothered to tell us of their plans to abandon the mitigation procedures. It seems now that they have the dam they were originally interested in, they have forgotten about their responsibilities to wildlife." Popowski said the massive dam across the Missouri River has inundated "hundreds of thousands of acres of prime river bottom wildlife habitat."

Lead Kills Kellogg Animals

A lead and zinc smelter in the Northern Idaho mining town of Kellogg may be the cause of animal deaths as well as lead poisoning in local children and hazardous air pollution levels (see **HCN,** Sept. 13, 1974, p. 13). Earlier studies showed dangerous levels of lead in 98% of the school children tested in the community and severe sulfur pollution. Now Dr. Roy Larson, a local veterinarian and a consultant for the smelter operator, Bunker Hill Co., estimates that more than 100 horses have died of lead poisoning during the three years he has been investigating such cases. "It kills any horse that eats the forage around the mining and smelting operations," said Larson. Other animals, including dogs and cats, living in a seven mile radius around the Bunker Hill smelter have died of lead poisoning, according to Larson.

Noting that the Bunker Hill Kellogg smelter has been identified as the cause of 99% of the sulfur dioxide air pollution in Northern Idaho, the Idaho Environmental Council has called for early state adoption of proposed sulfur pollution standards. "Sulfur dioxide in the air should not be taken lightly," wrote Gerald Jayne of the IEC. Jayne said sulfur control at the Kellogg smelter has only reached 72%.

Thoughts from the Distaff Corner

by Marge Higley

On a sunny morning in late June, a friend and I sat on the front porch of the cabin drinking coffee.

"It's beautiful," my friend remarked, "but it seems so quiet. If you stay up here all summer, what will you do to pass the time?"

"That's easy," I told her. "I have lots of fishing to catch up on, I brought up plenty of reading material, and so far, I've never walked clear around the lake. Besides," I added, confidentially, "I've always wanted to try some wood carving — and this seems like the right time and place."

She was polite but skeptical. "Oh, you'll manage to keep busy, I'm sure — but it doesn't sound too exciting!"

It is now past the middle of September. I've only gone fishing two or three times. I did manage to read a lighthearted whodunit on the day it rained. Maybe next summer I'll hike clear around the lake. And Michelangelo need fear no competition from me! The carefully chosen piece of properly aged aspen wood which was to be my first masterpiece lies untouched near the woodpile at the side of the house.

Three months have passed by in what seems to be three weeks' time. Summer is over, and even my dubious friend would have found much of it exciting.

There was one morning, early in the summer, that a flash of motion in the nearby trees caught my eye as I was sunning in a lawn chair back of the house. A deer, maybe? We see them often out in the meadow — but so close? I watched, motionless, as a young spiked buck appeared from behind the coal shed, browsed along the side of the house toward the front, then turned and ambled up the path toward me. He was only about 10 feet away before he turned aside — and I'm certain that I was more startled than he!

It was a different kind of thrill I felt late one night as I sat on the porch and watched an electrical storm pass across the basin. It's been a dry dry summer, and I worried that lightning might start a forest fire. Nevertheless, I watched, almost awe-struck, as nature put on the most spectacular fireworks display I've ever seen! Did you know that lightning comes in assorted colors? (And shapes, and sizes?)

I shared the excitement of my nine-year-old granddaughter the day she went fishing and caught her limit. And I shared a wonderful day with other relatives when a beloved aunt invited us for a cookout. As steaks and potatoes sizzled in the old-fashioned Dutch ovens over the campfire, my eyes feasted on the scenery. Aunt Etta had chosen a spot with which I was very familiar more than 20 years ago, and had not seen since then.

There have been numerous other exhilarating times. Watching as a hawk circles gracefully over the meadow, then swoops suddenly down on his prey — a fieldmouse, perhaps? The day the Steller's jays flew in from wherever they spend the early part of the summer. The haunting "hooo" of the large owl who occasionally perches atop a nearby utility pole. A large-eared doe, suckling twin fawns in the meadow. A red fox darting across the road, his beautiful tail looking like a fiery plume. A big fat woodchuck strutting down the path between Pearl's cabin and this one, as though he owned the world. The discovery that "yellow-bellied-sapsucker" is not just a funny-sounding name, but is a real live beautiful bird, who plays his own special tattoo on the tree trunks. The fluorescent flutter of gossamer wings as fiesty, gluttonous hummingbirds crowd the feeders.

Oh yes — this summer has had its exciting moments. And one of the most spell-binding events is just beginning. The aspens are starting to turn. Some are still summergreen . . . most are turning pale gold. If the winter winds don't blow in too soon, they'll change from deep gold to fiery orange to polished copper. In sharp contrast stand the evergreens — tall pines, symmetrical firs, and the beautiful blue spruce.

There's excitement aplenty yet to come. Weather and water pipes permitting, another month .... Perhaps I should invite my friend to come spend a week!

Mountain Eagle Still Screams

"It Screams" used to be the slogan found on the masthead of the **Mountain Eagle,** a weekly newspaper in Whitesburg, Ky. For the past 18 years, since editor-publisher Tom Gish bought the paper, it's been screaming about strip mining disasters, illegal coal company activities and other issues that threaten the lives of the residents in Letcher County, Ky.

In return, Gish and his family have received numerous threats. At a meeting a few months ago, a truck driver said publicly that if Gish disclosed details of an arrangement whereby officials had agreed to overlook overweight coal trucks, "we'll burn his building down." But Gish just learned to live with enemies.

On August first the **Mountain Eagle** almost stopped screaming. A fire was set in the newspaper office late one night when Gish was out of town. As a result, the building was condemned and the loss totalled $17,000. The Whitesburg police, whom Gish has been highly critical of on the pages of the **Eagle,** ruled out arson but later Gish found a broken window and some kerosene soaked envelopes in the alleyway. Gish tried to set up business again in the same building which he claims was still structurally sound but the police came back and tacked a condemned sign on his front door.

"The most untouchable of all untouchables are your local police — a lesson we should have learned," Gish observed. "Ordinarily, you'd think that when a leading institution in town is hit by disaster, you would hear some offer of help. All we got was a condemnation order."

Now Gish has moved the paper into his living room. It's a little skinnier and he's had to change the type face, but he's determined to stay in business.

"No, you just never quit," says Gish. The new slogan on the masthead defiantly reads, "It Still Screams."

"It Still Screams"

Editor's note: The **Mountain Eagle** was reviewed along with **High Country News** in the July 1973 issue of **Audubon** in an article entitled "A Different Kind of Paper." The **Mountain Eagle** is published every Thursday at 120 West Main Street, Whitesburg, Ky. 41858.

Atomic Scientists Say:
9 minutes to go

The international nuclear arms race "is now more than ever beyond control," a group of nuclear scientists believes. The scientists, who are directors of **The Bulletin of the Atomic Scientists,** have pushed the hands of a symbolic doomsday clock three minutes closer to midnight, the hour of atomic holocaust.

We have moved closer to doom, they believe, because of the failure of the U.S. and the U.S.S.R. to reach agreement on strategic arms limitations, because of the introduction of nuclear reactors into a volatile Middle East situation, and because of India's explosion of a nuclear device in May.

Two years ago the directors moved the clock's hand back to 12 minutes to midnight after the signing of the first arms control agreements in the SALT talks with Russia.

"In recognition that the danger of nuclear doomsday is measurably greater today than it was in 1972, we now move the clock forward to nine minutes to midnight," said a statement in the monthly bulletin.

Unlikely Coalition Forms in Aspen To Oppose Destruction of West

Strange bedfellows met in Aspen, Colo. this month to form what they say could become the most powerful organization in the West — the G.A.R.

The crisis which inspired an unlikely coalition of business, ranching and environmental interests is "the destruction of the West." Avoiding that tragedy will take the unified effort of groups throughout the region, the G.A.R. says.

G.A.R. general headquarters in Aspen has taken the first step toward unification by organizing diverse groups in the local Pitkin County area. At its first meeting Sept. 17 the G.A.R. brought together representatives of such organizations as the Holy Cross Cattlemen's Association, the League of Woman Voters, the Sierra Club and the Condominium and Lodging Association.

The G.A.R. plans to organize similar groups in every county in Colorado within six months and to eventually spread to other states.

The G.A.R. takes its name and inspiration from the original General and Active Reserve formed by the American colonists in 1776 to unify them in their struggle against the British. The modern group plans to confront problems such as energy development, land inheritance tax laws, growth control and water diversion in the American West.

Georges Odier is the group's executive officer. He can be reached at G.A.R. general headquarters, P.O. Box 11120, Aspen, Colo. 81611.

G.A.R. RESOLUTION

WHEREAS,
the West is in danger from impending over-population and rapid consumption of its natural assets which threaten our western way of life with extinction, and

WHEREAS,
the exploitation of the West is presently accelerating to critical levels at the expense of its environment and citizens, and can no longer be declared beneficial to the vast majority of Americans, and

WHEREAS,
the West is a symbol of America's vigor and independence throughout the world and its destruction would be a tragic step in the history of our nation.

THEREFORE BE IT RESOLVED:
That the people of the western United States unite in a common cause to protect our heritage, our natural assets and our way of life under the instrument of unification which is G.A.R.

Book Review

Topsoil and Civilization

by Vernon Carter & Tom Dale, Rev. 1974, University of Oklahoma Press, Norman, Okla., $2.95.

Review by Larry Edwards

In their eye-opening book, Carter and Dale give the only credible explanation I have ever heard for the downfall of the great ancient civilizations. They also present a strong argument that we must end our abuses of the land or suffer the same fate.

Their thesis is very straightforward. Civilization cannot exist without the city — the seat of government, higher learning, and manufacturing. Cities must be supplied with food, clothing, and building materials provided by farmers, herders, loggers, and other primary producers. Therefore, for cities (and civilization) to exist, the primary producers must produce a surplus beyond their own needs. If civilization thrives, the cities grow. And primary producers are pressured into producing larger and larger surpluses — or in other words, into working the land harder.

Of course, there are limits to how hard the land can be worked, and the authors claim that with but three exceptions all ancient civilizations declined because that limit was exceeded. They discuss all significant civilizations and their land use policies in fair detail, and the facts fall right into place with the thesis.

The pattern was generally the same for each civilization. Increasing population or a lucrative foreign market pressured primary producers to overcut the forests, overgraze pastures, clear and cultivate steep hillsides, and abandon two-year field rotation in favor of yearly harvests. These abusive practices all led to severe erosion and depletion of the soil. As the land became less productive it became necessary to work it harder still, until it would no longer support cattle or bear grain — only goats and sheep, olives and grapes. The land was no longer capable of producing the surpluses to support a civilization. It would only yield enough for a few peasants to subsist.

Increasing population and standard of living are signs of possible problems in this country. We have seen some rather substantial ones in the recent past — severe erosion earlier in the century, and the dust bowls of the 1930s and '50s.

The causes of these extreme abuses were easily pinpointed, and at least partially corrected, but the greatest danger is from a gradual depletion of the soil, the authors contend. "The odds very much favor a continuing steady decline in the basic stock of topsoil in the United States. The crop output may be shored up, maintained, or even increased for a time by various scientific tricks . . . , and this is what is deceiving the country. Losing topsoil means losing minerals (which can be replaced by commercial fertilizers) . . . . It also means losing organic matter and micro-organisms which are not so easy to come by. Much of the land in great danger has gentle slopes. The sheet erosion here is insidious. Yet in 50 or 100 years, all the topsoil may easily be washed off and end up at the bottom of the slopes, in farm ponds, in streams, or down the rivers, filling up reservoirs with silt or choking harbors. This sheet and rill erosion damage proceeds too slowly to alarm the farmer, but it is a creeping death for the country."

The Soil Conservation Service has blunted the threat of really severe erosion and dust bowls. "But out of sight, out of mind. From now on, what is going to shock the public into saving

its topsoil? Emotional reactions do not swell the breast because streams run muddy after rains, yet that is one unconcealable piece of evidence which should alarm every American citizen. They will have to be taught to look at muddy water."

All who love the land and work to protect it should read this book. It gives a good historical perspective of current land use problems and offers some solutions.

SPREAD THE NEWS

Each month **High Country News** has to drop readers that don't renew their subscriptions. Unless we find an equal number of new readers each month our circulation, our financial support and our effectiveness drops. To find these new readers we rely largely on word of mouth — a reader talks to a friend who in turn sends in a subscription request. That's a slow process, but it seems to work.

Would you help us by accepting our offer to pass **High Country News** along to a friend?

If you have a friend or friends you think might be interested in **High Country News,** send us the details and we'll send off a sample copy of the paper and an invitation to subscribe. We need all the friends we can get. Thank you.

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Eavesdropper

LOONEY LIMERICKS

by Zane E. Cology

Geothermal's the solution, don't you see?
There's no strip mining this energy
But the geyser's so tainted
The fish have all fainted
Is there any source that's pollution free?

A federal court ruling in Ohio has established that the public's interest in park land is more vital than an electric utility's interest in the same land for use as a transmission corridor. An Ohio utility was denied the use of eminent domain over land in the 23,000-acre Cuyahoga Valley Park and Preserve. Probate Judge Ralph Locher, a former Cleveland mayor, ruled that the natural area . . . "was required by the soul of man which has very significant, almost insatiable, psychological needs which only nature can satisfy." The judge said safe, feasible alternative routes existed.

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The Datsun B-210 received top gas mileage rating in an Environmental Protection Agency survey of 1975 model cars. The Datsun got 39 miles per gallon (mpg) on the highway and 27 mpg in the city. The Ford and Lincoln-Mercury station wagons with 400 cubic-inch engines got the lowest rating — 9 mpg.

- - -

The Bureau of Land Management (BLM) has refused to grant a permit for a 155-mile cross country desert motorcycle race on Thanksgiving weekend in California and Nevada. The BLM said the Barston-to-Las Vegas race would attract 3,000 cyclists and 15,000 spectators that would cause severe damage to wildlife and archeological sites along the proposed route.

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The world's most populous country will likely become the first major developing nation to reduce population growth below one per cent per year, according to a study released by the House Committee on Foreign Affairs. But the study cautions that the success reported in China is most likely not applicable to other developing countries. The report says the Chinese success story can be attributed to two motivating forces — the desire to please Chairman Mao Tse-tung and to get ahead in a society that makes birth control a matter of honor and policy. Other ingredients of the Chinese program include bringing family planning services to the user rather than making the user seek them out, providing free contraceptives, abortions and sterilizations, and developing a network of para-professionals to run the program.

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About 430 kilowatt hours of electricity are required to produce a ton of lumber. A ton of steel requires 2,700 kilowatt hours and a ton of aluminum, 17,000 kilowatt hours.

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Carpenter ants are toppling giant sequoia trees in Sequoia National Park. In 1969 one falling monarch infested with ants killed a 60-year-old picnicker. Last December a 36-foot branch fell from the heights of the General Sherman Tree — the largest living thing known to man. Ants were again found at the scene of the crime. To study the problem, the Park Service has hired a British myrmecologist (ant specialist). Preliminary studies show that the ants have been living in the trees for over 100 years hollowing out trunks and limbs. As the trees get older, they become weaker and more susceptible to ant infestations.

Land Advocates on the Ballot

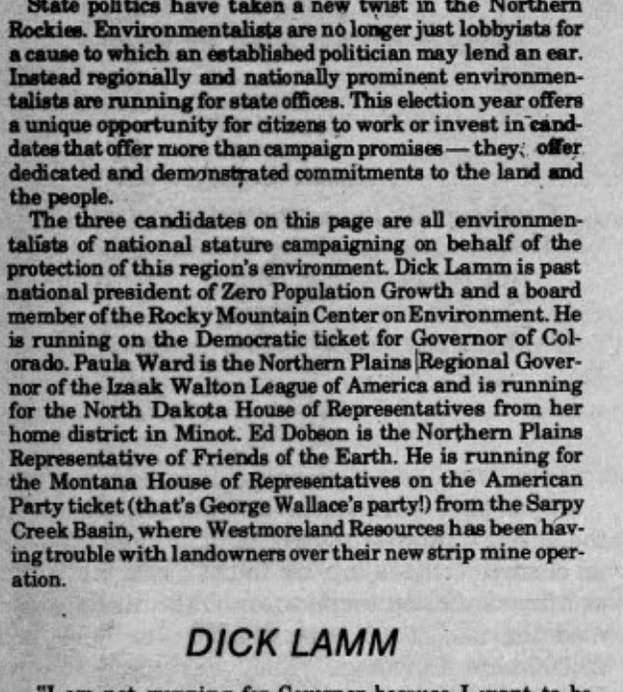
State politics have taken a new twist in the Northern Rockies. Environmentalists are no longer just lobbyists for a cause to which an established politician may lend an ear. Instead regionally and nationally prominent environmentalists are running for state offices. This election year offers a unique opportunity for citizens to work or invest in candidates that offer more than campaign promises — they offer dedicated and demonstrated commitments to the land and the people.

The three candidates on this page are all environmentalists of national stature campaigning on behalf of the protection of this region's environment. Dick Lamm is past national president of Zero Population Growth and a board member of the Rocky Mountain Center on Environment. He is running on the Democratic ticket for Governor of Colorado. Paula Ward is the Northern Plains Regional Governor of the Izaak Walton League of America and is running for the North Dakota House of Representatives from her home district in Minot. Ed Dobson is the Northern Plains Representative of Friends of the Earth. He is running for the Montana House of Representatives on the American Party ticket (that's George Wallace's party!) from the Sarpy Creek Basin, where Westmoreland Resources has been having trouble with landowners over their new strip mine operation.

DICK LAMM

"I am not running for Governor because I want to be governor but to fight for issues I believe in," says Dick Lamm. "There are many important issues in this election: education, housing, crime, inflation, jobs, environment, etc. Directly or indirectly they all relate to the growth issue."

And if any one politician has been in the forefront of the growth issue in Colorado for the last few years it has been Dick Lamm. In 1967 he was the chief sponsor of the nation's first liberalized abortion bill, in 1969 and 1970 he attempted to broaden that law. In 1972 he was the attorney for the



Dick Lamm

Colorado Medical Association in attempting to get his own law declared unconstitutional because he felt it was still too restrictive of the right of a woman and her doctor to choose abortion. "I think abortion is a poor method of birth control, but it exists and should be done in hospitals rather than back alleys," says Lamm.

In 1969, when former Colorado Gov. John Love and former Lt. Gov. John Vanderhoof (now the Governor and Lamm's Republican opponent) were busy with their "Sell Colorado" program to encourage new industries in the state, Lamm was questioning the wisdom of the sales pitch. In 1971 and 1972 he led the successful opposition to Colorado hosting the 1976 Winter Olympics, and the "Sell Colorado mentality" inherent in the scheme.

Jim Monaghan, a former lobbyist for the Colorado Open Space Council, says, "Lamm has been the author of numerous land use bills and either the primary sponsor or the co-sponsor of virtually every environmental bill passed by the Colorado General Assembly." In a COSC voting analysis of last years session, Lamm scored 96% in agreement with COSC on selected environmental issues.

Lamm says, "Colorado is at a watershed in its history. National magazines are publishing articles like 'Goodbye, Colorado.' I am not willing to say, 'goodbye.' I believe we can make a sane and livable Colorado in the years ahead — if we fight for it."

"I need your help, badly," says Lamm. "As we showed in the Olympics, if enough people care, they can change the state."

Lamm for Governor headquarters is at 1450 Logan Street, Denver, Colo. 80203.

PAULA WARD

"Coal development is an issue that overshadows all others in this campaign," says Paula Ward. "It could change North Dakota from the Nation's foodbasket into its wastebasket.

Paula Ward

We need laws to control energy development and to direct the flow of money into areas of need here in the West and not back into the pockets of businessmen in the East.

"The energy industries will be sending their lobbyists to Bismarck to influence North Dakota's legislators. Getting the coal is their business. Keeping North Dakota a good place to live and grow is ours."

Ward says the coal companies owe it to the people of the United States "to demonstrate conclusively that coal development in this region is necessary in view of viable alternatives that have not yet received sufficient consideration. The burden of proof is upon the developers to show that their operation is oriented toward providing a service rather than toward reaping quick profits under the cloak of an energy crisis."

Ward would like to see a tri-state (North Dakota, Montana, Wyoming) review of strip mining laws to provide "uniformity and consistency of controls so that stripping will not be encouraged where the laws are less protective of the land."

"If bonds for mining are raised . . . if our strip mining laws are toughened . . . yes, there are a lot of 'ifs' and that is why I want to be a part of North Dakota's Legislature when it meets in 1975," says Ward. "We all know the coal companies will do only what the law requires, no more."

To finance her campaign, Ward offers individuals "shares in preserving the quality of life in North Dakota." In contrast to energy industry stock that can offer at best monetary profits, Ward's stock offers benefits "such as clean air, good earth and uncrowded communities" that are difficult to measure in dollars. "But if you know the value of these things, take stock in North Dakota's environment," she says.

In return for a $1 to $50 contribution, Ward sends a certificate designating the donor as a "shareholder in the campaign to keep North Dakota from becoming the Appalachia of the West." Shares are not offered to any organizations or special interests. Stock is available to individuals from: Citizens for Ward, 800 Northwest 15th Street, Minot, N.D. 58701.

ED DOBSON

Folks around the Northern Plains know Ed Dobson best by his Volkswagon bug and his traveling anti-strip mining slide show. Dobson shows his slides and gives his talk in small communities from Montana to Nebraska — anywhere where the people want to see the other side of coal development's promise of prosperity. He remembers the words of an eastern Ohio farmer, Boyd Wallace and he carries Wallace's message wherever he travels: "Strip mining may enrich an individual, but it always improverishes a community."

Studying the devastating effects of strip mining and communicating that knowledge has been a obsession with Dobson. He spent the better part of a year in Europe studying stripping and reclamation there. He traveled through the tortured hills of Appalachia further documenting his case. Dobson also served as Friends of the Earth's representative in Ohio — the land where the world's biggest strip mine dragline, Big Muskie, stalks the countryside.

"The belief that strip mining can be stopped is what brought me to Montana," says Dobson, "but stopping it will require intensive educational efforts, state-wide."

The education process has been Dobson's primary thrust since he landed in the Northern Plains. Once citizens appreciate the magnitude of the environmental problems they face, then they can begin to tackle the problem. "Will people have a chance in decision making, or will energy and the environment be the pawns of the fossil fuel industry, which only plays for profits?" asks Dobson, who serves on the National Board of Directors of the Institute for Citizens' Government.

"When I came to Montana's coal fields two years ago, this candidacy was the last thing I would have envisioned," says Dobson. "My earliest political thoughts were of developing alternative candidates. But when few others jump at the 'opportunity' to run, it can be hard to avoid being swept into one's own vortex."

"The American Party has not been noted for producing strong environmental candidates," says Dobson, "I hope to alter that image, at least in Montana. Montana is not actually ripe for the third party movement, mind you. But there will always be races lacking a certain type of candidate who can develop the issues. This increases the potential for a fully participating electorate, in itself a major goal." Win or lose, Dobson sees the exercise as a good educational process.

"Coal will not be a big campaign issue," says Dobson. "Almost everyone who might be the least bit interested knows where I stand. Filling in the holes that are bound to remain in any federal strip mining law will be a major concern. The legislature should deal with a no new starts bill, both for strip mines exporting coal and conversion facilities exporting processed energy. Failing enactment, the state electorate should have a chance to vote a referendum. I am confident that our nation could prosper without strip mining, given an adequate phase-out period, dislocation allowances and efforts in the development of alternatives. The longer the stripping continues, the louder we must implore: How much more?!"

Dobson finances his campaign the same way he pays for taking his traveling slide show to the people, by passing the hat. Contributions can be sent to: Dobson for Legislature Club, Box 40, Hardin, MT 59034.

Ed Dobson

In the NEWS