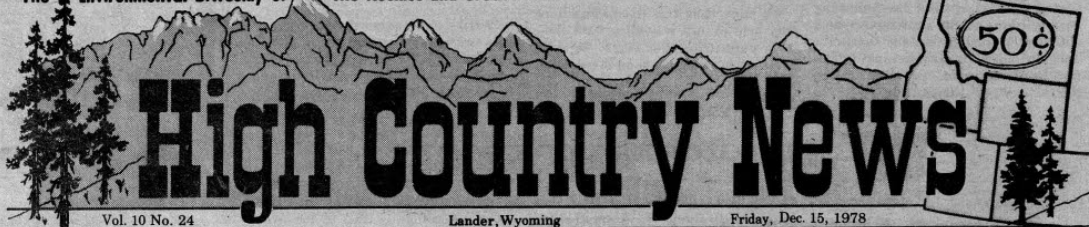


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The Environmental Biweekly of the Rockies and Great Plains



Vol. 10 No. 24

Lander, Wyoming

Friday, Dec. 15, 1978

The underground alternative to dams

Recharge could bring water, wildlife to dry plains

by Joan Nice

The car is stopped next to a dry brown field in treeless rolling country dominated by sage and yucca.

"This could be a field full of alfalfa," says John Andrick, "with cottonwoods, willows and ponds nearby, sheltering foxes, swans, geese and all kinds of ducks."

The promise of water on the parched northeastern Colorado plains has always stirred strong visions. In this case the dreamers are Andrick, a duck hunter from Denver who owns land in the area; Rick Dornfeld, a U.S. Fish and Wildlife Service biologist; and Bob Samples, the local water commissioner.

Anybody who wanted water in the South Platte River Basin used to dig a well. But now the water table has dropped, and there's a moratorium on new wells. Samples has had to shut down some existing ones, too, though he hates doing it.

Samples, the leader of this water project tour, is a tan, soft-spoken former farmer

himself. He and the others met at Ruth's Cafe in Orchard, the tiny South Platte town that has been transformed into the set for the television series based on James Michener's book, **Centennial**. Part of **Centennial** details the introduction of irrigation to the Platte River drainage, the prosperity the irrigation brought, and the human hardship that resulted when sufficient water was not available during the Dust Bowl days. The film makers say they plan to leave Orchard the way they found it — "like it was still back in the Dust Bowl," Samples says. But water developers like Samples hope to bring new prosperity to the area.

In a tour of the area that could be affected by Samples' new water-storing scheme, Badger and Beaver creeks, the men stop by the home of farmer Leo August.

"We get two big thunderstorms every

(continued on page 4)



"WE GET TWO BIG THUNDERSTORMS A YEAR," farmer Leo August (center) tells Bob Samples (left) and Rick Dornfeld. "One too early and one too late."

Appropriate technologists threatened by popularity

by Wade Greene

Drawings by Hannah Hinchman

A recent brief hit of the New York theater was a short production called *The Water Engine*. It's a modern morality play of sorts, set largely in a 1930s radio studio, and its theme, in the fashion of morality plays, is simple but loaded: a man invents an engine that runs on water. The industrial powers find out about the device, and they dispatch the inventor to his creator, presumably burying his invention along with him.

There are camp and other ironic overtones to the plot that ultimately complicate the point of the play, but its scenario comes close to what many members of a growing counter-technology movement see as the threatened fate of their budding counter-technologies.

The term "appropriate technology" — "AT" for short — is the one commonly used by and applied to the movement. The movement's movers generally use the term to mean small-scale, decentralized, environmentally sound, human-oriented technologies, as opposed to what they view

as opposite, inappropriate qualities of most modern technology. Many appropriate technologists feel that their approaches and devices are in danger of being undermined and co-opted by the bastions of industrialism. For instance, there was the recently documented case of automobile makers buying out Los Angeles mass transit companies, folding them and then selling the rights of way, thereby permanently eliminating a competing transportation technology in one major area of the country.

Appropriate technologists would see in "The Water Engine" plot close parallel to their perceived opposition to widespread development of solar energy. Devices and systems that run on sun power are probably as close to engines that run on water as any likely to be devised: sunshine is as ubiquitous and "free" a fuel as water, more so in many parts of the world. In the AT paragon of virtues, sun power ranks very high because of its decentralized nature. It's "the first major new resource not under monopoly control," says a Los Angeles-based solar group called Solar-Cal.

No examples have cropped up, as far as I know, of the "monopolizers" directly bury-



ing new solar inventions, but one Machiavellian approach to this end was suggested at a conference in March on passive solar technology. A speaker at the conference, Sim Van der Ryn, the state architect of California and chairman of the

group that oversees the state's Office of Appropriate Technology, pointed out that most of the Department of Energy's solar

(continued on page 6)

The art and folly of making a deal

Ed. Note: When do you go for broke in an environmental battle? When is it smarter to compromise? The following two opinions on the matter both deal with the Wyoming Outdoor Council's decision not to push for denial of Mineral Exploration Co.'s uranium mining permit. WOC instead decided to

negotiate, winning several conditions that will be attached to the permit.

We hope that the discussion here may help others wrestling with similarly perplexing decisions. We welcome other viewpoints on the subject.

Jennie McDonald represents the

Sierra Club on the WOC board of directors.

"WOC won by shrewd compromise" was written by a committee of WOC's board and staff including Leslie Petersen, Laney Hicks, Colleen Kelly and Josephine Porter.

WOC set hazardous precedent

by Jennie McDonald

Compromise is defined in the *American College Dictionary* as a settlement of differences by mutual concessions or as an endangering of reputation; an exposure to suspicion.

A group dedicated to preventing environmental destruction and to protecting the health and welfare of people, should compromise only when all alternative courses of action have been exhausted. If a conservation group agrees to a compromise to avoid prolonged and controversial involvement or to avoid appearing unreasonable, that group may be regarded by its members and the public, as well as the industries involved, as being ineffectual when a real crisis arises.

Recently The Wyoming Outdoor Council, a state-wide conservation group, withdrew its protest against the issuing of a



uranium mining permit to Mineral Exploration Co. for the environmentally sensitive Chain of Lakes area of Wyoming's Red Desert. Despite stringent conditions attached to the mining permit, some WOC board members opposed the compromise settlement because they felt that the group should protest all uranium mining in the Red Desert. Other board members concluded it was futile to further oppose the issuing of the permit.

An undesirable and possibly hazardous precedent has been set. At least six other companies were awaiting the outcome of the WOC protest against Minerals Exploration Co. Already, a German company has applied for a permit for a mine in the Savery-Dixon area of southern Wyoming, an enterprise that could wreak havoc on the small ranching communities there.

Compromise may be likened to a disease. The first attack may meet some resistance, but the body is substantially weakened and becomes easily susceptible to even more virulent attacks.

Those of us involved in efforts to prevent unwise exploitation of our mineral resources in order to preserve Wyoming's air, water and land and the health and welfare of people should not permit ourselves to be intimidated by such designations as "obstructionist" or "preservationists" by would-be exploiters. We must never lose sight of our goals nor cave in to pressure.

A few years ago, a small group of Pinedale residents became alarmed by dangers posed by the proposed Wagon Wheel project. The project called for the use of nuclear power to free natural gas from underground rocks in an area southeast of Pinedale. The citizens organized and informed themselves about the project and its possible damaging effects on their water supplies and their way of life. They even

took the fight to the halls of Congress. They recognized the threat, they persevered and they won.

Another example: The spectacular White Clouds alpine wilderness, north of Sun Valley, Idaho, was threatened by a molybdenum mine. Powerful mining interests were pitted against a handful of people, mostly backpackers and climbers. The controversy eventually received na-

The Wyoming Outdoor Council's involvement with the uranium mining activities of Minerals Exploration Company began over a year and a half ago. The story of what led to the eventual settlement of the WOC protest of a mine in the Red Desert is long. But this is a story that will be enacted again and again as Wyoming's mineral development expands. There are lessons to be learned — by WOC and by others who want to maximize their influence on the decisions that must be made.

It is true that someone should have the courage and tenacity to raise the question of denying a mine permit — to bring it before the public as a viable alternative where the only other course is severe destruction. But it is also true that if to solely champion denial means the loss of any intermediate mitigation, then we have lost sight of our ultimate goal — to do the best we can to save what we can in the Red Desert.

Is this defeatist? No. Realistic, yes. We are building a necessarily incremental case toward such a denial — over time, we are attempting to educate the public of the special hazards of uranium mining. Eventually, the awareness of the full force of that case will tip opinion in our favor.

All these questions loomed large in the hearts and minds of WOC board members as they agonized over this case. It was not easy and it will not get easier. Each decision will remain unique to the context in which it must be made. Life is not made up of absolutes; negotiation is a skill we must master.

In Wyoming, mines are not stopped by outcries — but by a decision process our own environmental movement helped set up. That process is based on the ability to reclaim the mine site — outright denial of a mine will come only from a well-defined case proving that reclamation is not possible.

From the first efforts to publicize potential threats to the Red Desert, through the arduous task of recruiting expert witnesses, a complex series of events shaped the final settlement. Throughout, the council faced the inconsistencies of a citizen review body mandated to decide the legal questions, the sometimes inadequate reviews of the public agency and the constant pressures from company lawyers. All this, in addition, had to be sifted through WOC

tional attention. The outcome was congressional action that resulted in the White Clouds' being incorporated into the Greater Sawtooth National Recreation Area.

These and many other conservation battles were won by utilizing the only tools at our disposal: determination, information, communication, tenacity and support from many groups and individuals.

Compromise may be justifiable as a last



resort or as means of achieving our goals. But let us not compromise away our effectiveness or our strength. Indeed, let us not compromise away the respect of our opponents even as they use power and money to prevent us from achieving our goals. And let us not compromise away our ability to protect the ecological needs of all the wild creatures in our forests, prairies and deserts.

WOC won by shrewd compromise

staff and board members — a political process unique in its own right!

Throughout, we asked ourselves, do we go for broke, for full denial — or do we develop detailed conditions to cover the real possibility of the mine being given the go-ahead?

It has to be understood that in a hearing before the state Environmental Quality Council, real communications do not take place. This is a trial. The EQC is the jury, and the lawyers are combatants, using expert witnesses to prove their points. There is little give and take, little in-depth explanation. Complex legal maneuvering often dominates the proceeding. Hearings such as this are not an open environment for alternatives — once you are committed to a pleading, you go hell bent for leather to prove your case. If we pushed for denial only, it would have been very difficult later to offer conditions.

It must also be understood that the EQC is composed of lay citizens attempting to interpret a legal proceeding. They are very unlikely to make any decision merely on philosophical bias or general principles —



they require factual and often very subtle political reasons for decisions. And their bent is conservative — they are not likely to decide to deny unless the case is proven in the extreme.

On the other hand, negotiations with the company can allow both parties to go directly to the points at issue — the potential to dewater the Chain of Lakes, an oasis for waterfowl in the desert; the problems of reclaiming Battle Springs Flats; and the

effects of the whole operation on the large antelope herds in the area.

By this time, WOC had created an atmosphere for negotiations. The company felt we had enough guns to make it hard on them in a hearing, and we were facing the uncertainties of an EQC decision and the expense of a prolonged hearing. So we traded.

It is important to emphasize what we gained as much as what we lost. Although the desert will never be the same after such an immense intrusion — we did get a satisfactory response to our major concerns. In fact, in the case of wildlife, we got more than the EQC could have statutorily asked for. If we had pressed only for denial, it is doubtful that we could have affected any detailed conditions. We might have lost a great deal, however gallantly we made the effort.

Another final point also must be raised. One very difficult condition was proposed by the company — that WOC must agree not to attack the company through other agencies. The company felt that our conditions would throw the cost of constructing the mine into the arena of the Industrial Siting Council's jurisdiction. We refused to sign such an agreement if it precluded our ability to work with people in the community of Rawlins to make sure they understand their options under the siting act. We finally agreed not to sign any protest of the company's application to the Industrial Siting Council, but we did not give up our right to work with others.

In summary, WOC sees its responsibilities as very diverse in promoting an ethic and a process to protect Wyoming's heritage and way of life. The tools we use must be appropriate for the situation in which we find ourselves. The skills of negotiation are important. At the same time, we must maintain a tough stand, continue to build our case at all levels and be prepared to promote outright denial — not just conditioned approval — of actions that outrage our sense of justice, to people and to the earth.

Although negotiated compromise and tenacious denial may seem to be opposites and mutually exclusive, they are both needed. We must all continue to develop the knowledge and wisdom to know how to choose what combination of the two will give the optimal results.

Can we afford to lock up roadless Overthrust?

Dear HCN:

I read with interest the editorial which HCN reprinted from the Idaho Falls Post Register (HCN, Nov. 17, 1978). The editorial attempted to discredit the oil and gas estimates that the Rocky Mountain Oil and Gas Association prepared as part of its public input on RARE II (the Forest Service's Roadless Area Review and Evaluation).

Last February, the Forest Service asked RMOGA if it or its members had any quan-

titative data on oil and gas potential in RARE II areas. The Forest Service said no government agency had any tract-specific data, which would be essential to determining whether an individual area's oil and gas potential was high enough to compel a non-wilderness recommendation in the final environmental statement.

In response, RMOGA asked its members to submit data on as many RARE II tracts as they could. Approximately 25 com-

panies — all of them very active in the Rockies — responded with data based on many years of geological and geophysical assessment work, thousands of seismic miles and millions of dollars invested in exploration.

The figures submitted were averaged for two reasons. First, so that confidential company data would not be released. Second, so that the experience of many geologists and the data of many companies would be included.

These estimates are the best available anywhere. They are the same numbers the companies use in deciding whether to risk \$500,000 to \$5 million or more on a single exploratory well.

The Post-Register's suggestion that there is no factual support for RMOGA's estimates illuminates its inexperience with oil and gas exploration. The editorial suggests that, because no oil or gas has yet been discovered in Idaho, there is none to be found.

Three years ago, there were no discoveries anywhere in the United States Overthrust Belt. But that was before significant discoveries in fields such as Pineview, Ryckman Creek, Painter Reservoir, Whitney Canyon and others near Evanston, Wyo.

There may be no oil or gas in the RARE II areas in the Overthrust Belt. Exploration has barely begun, and it is too early to tell for sure. However, there is a very high probability that oil and gas is present in many of the areas.

Huge gas fields have been producing for years in the Alberta, Canada, portion of the Overthrust Belt. Twelve fields, with proven reserves of more than 600 million barrels of oil and 2 trillion cubic feet of natural gas, have already been discovered in the Utah-Wyoming Overthrust. Several wells have flowed at a rate of 20-35 million cubic feet of gas per day.

It is true that oil companies have already invested millions in Idaho, without discovering anything. That is not unusual in unexplored areas. Over \$500 million was spent on 15 dry holes before Prudhoe Bay — the largest oil field ever discovered in North America — was found.

The real question is, can we afford to lock up these areas before we know how much oil and gas (if any) is present in them? Can the United States continue to ignore its own energy potential, while its domestic production continues to decline, and the nation continues to spend \$45 billion a year

to buy oil and gas from foreign countries? Can Idaho afford to ignore potential royalties and other economic benefits by simply assuming the oil and gas are not present?

Petroleum exploration and production will not permanently impair these areas. The access roads and drill sites are both small and temporary. Moreover, America really has no choice but to continue exploring. The oil and gas will be found where it is located — not where we would prefer it to be. Furthermore, these resources are needed today — not 30 or 40 years from now, when viable alternatives are available to help America reduce its dependence on petroleum.

Whether or not an area's "real potential" is wilderness cannot be determined before all its resources, subsurface as well as surface, have been accurately inventoried. Most of us might agree that a scenic area should be recommended for wilderness if there is no oil or only a million barrels. We might feel differently if a 100-million-barrel field were under the area. Most of us might buy a good car for \$5,000 — but not if the price were \$500,000.

Finally, "further study" is not the answer. No drilling is allowed in these areas, either, and directional drilling simply will not work in the Rockies. At the end of the further study period, nothing more will be known about the actual presence or absence of oil and gas than is known now.

RMOGA's estimates, oil and gas operations and the entire RARE II program are extremely complex issues, which do not lend themselves to simple answers. If HCN or any of its readers have questions regarding mineral exploration and development, I will be happy to try to answer them.

Paul K. Driessen
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Dear Friends

In one story this issue we ask you to consider blue-green algae. May we also ask you to consider the Carter administration's action on Alaskan lands (see page 13)? That enormous gift to the public, sought for so long by conservation groups, sets a fitting tone for the season.

In the best Christmas spirit we can muster this early in the month, we offer some other good news this issue: a thoughtful piece about the appropriate technology movement, the announcement of the trust fund for cranes, and news of a promising water development scheme in Colorado that we believe deserves careful study.

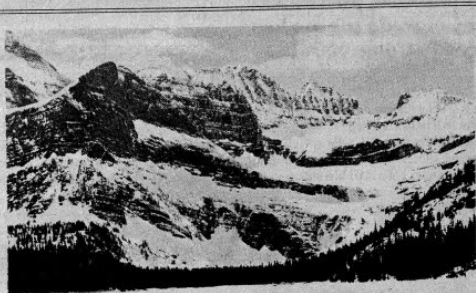
Christmas comes on publication week this year, so we are working on two papers at once to make ourselves

some space for the holiday. We'll take off the 19th to the 26th, then rush back on the 26th to put the finishing touches on the paper we'll publish the 29th. (That means, unfortunately, that any gift orders that arrive here after the 18th won't be processed until after Christmas.)

We'll celebrate Christmas in various places around the country. It's the first time since the automobile accident in August that we've had a chance to visit with faraway family and friends.

Once again, thank you for your donations to the medical fund for injured staffers. (The total is now \$33,003.30.) We hope that your holidays are as heartwarming as you have made our recent months.

— the staff



Montana Department of Highways photo

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Recharge on the dry plains. . .

(continued from page 1)



BOB SAMPLES, water commissioner, hopes to bring water, wildlife and new prosperity to a part of the South Platte River Basin.

year," August says. "One too early and one too late."

"Well then, how much rain do you get out here?"

"None or less."

August used to pump groundwater to irrigate most of his farm. As the water became harder to get, he and his neighbors drilled more wells. Wells began to suck air, not water. August has turned to dryland farming on some of his acreage, but the soils are compacted, and it will be 10 years before he gets good production out of formerly irrigated lands, he says.

Where farmers can get adequate water to these South Platte Basin lands, they produce corn, hay, grains and alfalfa — in prodigious quantities. Morgan County, where August lives, is the fourth highest producer of agricultural products in the U.S., according to Samples.

A number of agricultural cure-alls have come along since August's family settled here in 1906 — including wells, fertilizer, center pivot irrigation and the scheme for Narrows Dam. The panacea this time is an "underground recharge project."

Samples and the Badger-Beaver Conservancy District he helped form in 1976 want to channel water from the South Platte to sandy uplands south of the river. These sandhills, just a few miles up the road from August's place, would act as a sponge during times when nobody else wanted the water, probably in October, November and December and perhaps for a few months in the spring. From the sandhills the water would slowly trickle underground in the general direction of the South Platte and settle into the underground rock formations tapped by August and his neighbor's wells. No new farms would be served by the project, but it would help keep about 80 old farms from dying.

The Badger-Beaver project would store water underground, safe from the desiccating winds that blow from the Rocky Mountains. That would be an advantage over storing the water in a dam, where huge quantities would be lost to evaporation, Samples says.

WETLANDS FOR WILDLIFE

Dornfeld and Andrick, while sympathetic to August's problems, aren't primarily out to increase his yields. They're more interested in what the Badger-Beaver project could do for wildlife. Acres of sandy sponge at the top of the project's canal could be

devoted to birds and mammals, Dornfeld says. If the project goes ahead, dry prairie depressions would become lush wetlands — prime habitat for ducks, geese and swans during the spring and fall when these species are migrating. The project could put willows and cottonwoods on the treeless plains, providing cover for quail, pheasants, deer, foxes and coyotes, Dornfeld says.

Dornfeld, a native of North Dakota, imagines the project creating something like the pothole country in North Dakota.

"It might even be better than the pothole country," he says, "because you could add water to these potholes whenever you wanted." The U.S. Fish and Wildlife Service, while not endorsing the project, has put \$73,650 into study of its hydrologic feasibility. The study, being conducted by the U.S. Geological Survey, will consider:

- 1) the availability of water from the South Platte River;
- 2) the fate of the diverted river;
- 3) the effects of recharge on the ground water system; and
- 4) the total impact of the proposed project on the South Platte River Basin.

Although results from the study aren't due until February, Andrick is a strong

advocate of the Badger-Beaver project. He's seen the concept working on his property, northeast of the Badger-Beaver site. For the past three years, the Riverside Ditch Co. has turned its extra water out onto his property. Potholes near the ditch provide a resting place for thousands of ducks, as well as geese, cormorants, pelicans and swans. Andrick, who has lived in Denver for 12 years, wants to keep livestock off his land and make the place a refuge for duck hunters. He goes out on the South Platte in waders in January, ostensibly to hunt, but mostly to watch in solitude as the wind blows and the ice forms.

Samples is pleased with the coalition he's assembled. By planning to let wildlife use the water in the sponge area before it goes to the irrigators, he's drummed up broad support.

"The irrigators are happy — everybody's happy," Samples says.

Even Al Simpson of the Colorado Division of Water Resources nods approvingly. "The project has real potential."

CRITICS

But the project has its critics, particularly among advocates of Narrows Dam.

While the two projects do not serve the same areas, there is some doubt about whether they could peacefully co-exist. Since President Carter refused to allow Congress to fund Narrows this year, its future is not bright.

But if Narrows somehow did get funds from Congress, "it is questionable whether

appropriations are handled, for the right to "change the point of diversion" on 80,000 acre-feet of existing well rights. If the court complies, the district would fill its wells through the recharge system with water taken out of the South Platte. The district has also asked for the right to divert an additional 180,000 acre-feet from the stream for storage underground. They would have a fairly senior right on their well water — most of the wells were drilled in the 1930s through the '50s — but a very junior right on the storage water, 1979. The storage water isn't essential to the project, Samples says, but it would cut farmers' pumping costs by raising the level of the groundwater and generally give the district "more flexibility."

Narrows has a water right dated 1957 on 700,000 acre-feet, with the condition that it cannot pre-empt well rights issued before 1968. Since Colorado's water law puts the earliest appropriator first in line for available water, most of Badger-Beaver's well rights would come before Narrows' appropriation.

Gary Frieauf, secretary-manager of the Lower South Platte Water Conservancy District, which would be served by Narrows, says the conflict between the two projects may not be as serious as it looks, however. Narrows would capture much of its water from the floods that nobody else has facilities to handle, Frieauf says.

"From the viewpoint of a Washington, D.C., bureaucrat, there may be a conflict, because there are far more decrees than there is water. But we'd be getting water no one else could handle," he says. Weideman of the Bureau of Reclamation says this is a major advantage of a dam over a recharge project — the dam can usually deliver more water.

Samples doesn't argue that his underground recharge scheme could get as much floodwater as a dam. He does say that Badger-Beaver will be able to capture enough water to deliver between 69,000 and 80,000 acre-feet of water annually five out of seven years. Conservancy district engineers have assured him of this. Preliminary information from the hydrologic feasibility study also indicates that water supply is not a problem, he says.

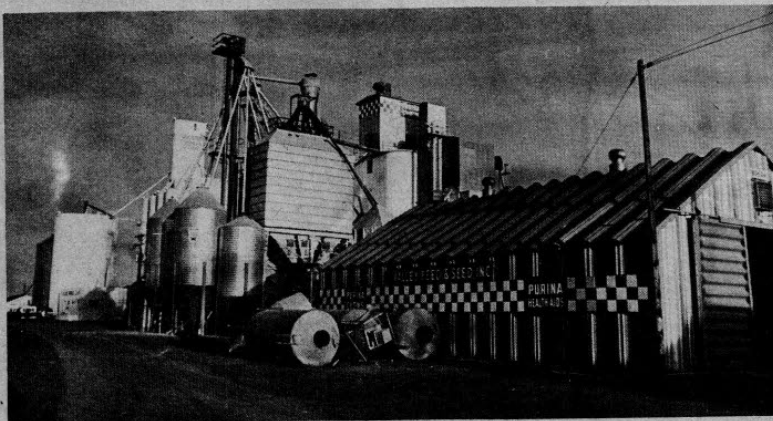
Weideman questions the "alleged capability" of the Badger-Beaver project to deliver this much, however. He says that most of the water available on the South Platte comes in the spring, and that

(continued on page 5)

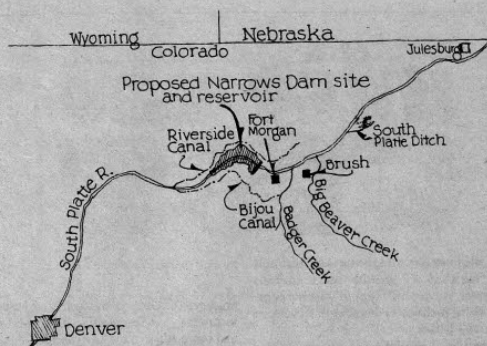
The promise of water on the parched northeastern Colorado plains has stirred strong visions.

both projects could go ahead," says Roger Weideman, chief of the hydrology branch of the regional Bureau of Reclamation office in Denver. "They would be competing for the small amount of available water in the South Platte." Most people are waiting for the USGS hydrologic feasibility study to determine how much water is left to consume in the South Platte, but estimates range from 250,000 to 1 million acre-feet per year.

The Badger-Beaver Conservancy District has asked a local water court, where



THE SOUTH PLATTE BASIN produces corn, hay, grains and alfalfa in prodigious quantities.



THE SOUTH PLATTE RIVER flows north from Denver and moves out over the northeastern Colorado plains to Nebraska. The Bijou Canal, with an extension added, would be used to carry water from the South Platte to recharge wells in the Badger and Beaver creeks area. The proposed Narrows dam site is downstream from the proposed Badger-Beaver diversion.

Badger-Beaver's canal may not be big enough to handle these high waters.

"Their basic problem is that they don't have the facilities to capture the excess water on the Platte when it is available. Spring floodwaters would be past the project before they even got the end of their ditch wet," Frieauf says.

"MOST ECONOMICAL WAY"

While Badger-Beaver advocates don't brag much about the size of the project they are proud of the cost at which they hope to be able to supply the water.

According to figures from the state of Colorado and the Bureau of Reclamation, Narrows would cost well over \$1,000 for every acre-foot of water it provided. Badger-Beaver, while providing only about half as much water, would provide it for about \$70 an acre-foot, according to Samples' estimates.

"The state is trying to encourage this technique (underground recharge)," says A.R. Qazi, a water resource engineer with the Colorado Division of Water Resources. "It is the best way of conserving water and the most economical way."

Qazi has spent four years working on a similar project, the South Platte Ditch Recharge Demonstration project. Using existing ditches and diversion structures, the project was able to make underground water available at a cost of \$60 an acre-foot in 1973 when the capital costs were being paid off. Qazi says the project is able to supply water at about \$2 an acre-foot now that only operation and maintenance costs are involved. The ditch project was small. It involved sending only 1,500 to 3,000 acre-feet into underground storage. But as far as Qazi is concerned, it proved the concept in that area. "We are exploring the possibility of recharge at another Colorado site," he says.

FEDS NOT OPTIMISTIC

Despite activities in the South Platte Basin, many federal officials in Washington, D.C., are not particularly hopeful about widespread use of underground recharge as an alternative to dams.

Leonard Wood, a U.S. Geological Survey hydrologist in Reston, Va., says his agency is shutting down a 10-year office in Lubbock, Tex., that performed experiments on underground recharge.

"We tried everything — and concluded that recharge is an expensive way to go. You do it when you have no other choice," he says.

Israelis do a lot of underground recharge because they have to, Wood says, but Tex-

ans are not that desperate. Among the problems in Texas were high costs for building canals, spreading facilities and wells; siltation; and a generally unaccommodating underground water system.

Colorado, on the other hand, has the right set of geologic circumstances, according to Qazi. It also has the canals, ditches and wells already in place that will make such a system pay.

"Use an existing structure," Qazi says. "Then it's simple. You just run extra water through a leaky ditch. That's all you do."

Qazi says that the ditch project experienced one of the other problems Wood mentioned — siltation. Fine particles suspended in flood waters plugged up the ditch the project was using to send water under-



THE SPONGE. Samples (left) and Dornfeld look out over the dry country that could soak up excess water from the South Platte.

ground. The project now scrapes the top inch or two of soil out of the ditch once a year to avoid this problem.

Ron Way, a special assistant to the assistant secretary for fish, wildlife and parks in the Interior Department, says that during the controversy over the Narrows dam in the last session of Congress, he was told about underground recharge. "I thought it was an excellent alternative. But in the heat of the battle, it was never seriously considered," he says.

Since then, Carter has adopted a water policy that urges consideration of "non-structural alternatives" to dam building.

"Underground recharge has to be considered, and it will be considered," says Keith Higginson, commissioner of reclamation. "But it takes a peculiar set of geologic circumstances." Higginson says he is not familiar with the Badger-Beaver project.

"Recharge is an alternative if there is sufficient water available, if that water can

be captured at the rate at which nature supplies it, and if the distance from the recharge site to the place where you want the water is reasonable," Higginson says.

"Some people in the Bureau of Reclamation would like to give the idea serious consideration," Way says, "but they are in the minority. This is not meant as criticism, but they've been schooled that the most effective way of irrigating the arid West is through structures. And they build good structures."

Despite bureaucratic inertia, the first big boost for Badger-Beaver came from a federal agency, the U.S. Fish and Wildlife Service, which supplied funds for the hydrologic feasibility study. Whooping cranes may determine the agency's final attitude toward Badger-Beaver, however.

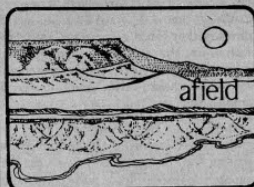
"We're not sure what effect Badger-Beaver and other projects like it will have on crane habitat along the Platte River in Nebraska," Dornfeld says. If the upcoming report shows it to be detrimental, the agency probably will oppose the project.

So while FWS biologist Dornfeld is fasci-

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nated by the concept of creating a wildlife mecca in the sandhills of northeastern Colorado, he has to remain officially neutral on Badger-Beaver for now.

But enthusiasm is spreading — in Colorado at least. If Samples' claims are true, the project could be the epitome of appropriate technology — it could meet local and regional needs with a minimum of waste and undesirable disturbance to the environment.



lars of light refracted by ice crystals, sometimes showing faint colors.

The talk runs to wood stoves and weather stories. Flocks of horned larks blow across the highway. Interstate 80 near Laramie (the "Snow Chi Minh" trail) closes whenever the wind comes up, just as the old-timers said it would.

Loosen your pack belt and tighten your snowshoe bindings if you're traveling in moose country now, says John Mionczynski. Rock Creek, which bisects the settlement of Atlantic City, Wyo., where John lives, has a colony of moose that ramble among the willows during the winter. They act as a barometer, warning of coming storms by their movement from the high country to the refuge of the creek bottoms. They ascend again if the weather clears and the snow starts to melt. John observes moose to be irritable and nervous while moving; they tend to run a lot. When you see a moose run in deep snow you gain a new appreciation for its stilt-legged and shambling gait, so effective in the snow that piles up in sheltered places.

Grizzly bears share the moose's irritability before a storm and should be avoided at that time. According to John, they den up before the snow stops falling to avoid leaving tracks to their havens.

Winter hasn't let up in this part of Wyoming since the first big storm. Three more waves of snow have passed through. When a low pressure system gets stuck over Denver it pulls warm, moist air out of the Gulf of Mexico. The air makes a counter-clockwise sweep and runs head on into the Wind River Range. So when the wind is out of the east and a paste-white overcast appears, we expect snow.

Temperatures have reached 30 below here. On so cold a day the air is full of tiny ice crystals and the snow sounds as dry as cornstarch. When the sun is near the horizon "sun dogs" may appear on either side of it — pil-



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Appropriate. . .

(continued from page 1)



budget so far has gone "into large, high-tech, centralized projects."

"If you take a conspiratorial view of things," he said, "which I don't, entirely, (these projects) are really going to prove that solar is uneconomic when compared with other sources."

If one doesn't take a conspiratorial view, one might conclude that big government and big business have focused solar research and development dollars on big, complex approaches because that's the way business is used to doing things and thinking — not because anyone is set to prove that solar won't work. But Van der Ryn's notion shows how determined and devious some ATers imagine the other side to be.

A more common AT view holds that in such promising areas as solar energy, commercial interests are bound to try to control and channel new technologies to their advantage — even if this does not mean the most effective use of resources. According to this view, existing utilities and manufacturers are predisposed to devoting research and development dollars, their own and the government's, to technologies that lend themselves to large-scale, centralized production and distribution systems.

Collecting sunpower by satellites, relaying the energy to earth through microwaves, transforming microwaves to electricity and using the electricity to heat a house: that's one form of exploiting solar energy. And a fair amount of thought and money is currently going into studying such an approach. But most AT-minded solar advocates are inclined to look at satellite solar systems as being aimed at keeping the utilities (who would end up distributing the solar energy in the form of electricity) in command of the sun as a marketable resource.

Steve Baer, one of the chief designers and advocates of using the sun's heat in direct, "passive" ways, is afraid that satellite-collected solar energy "will destroy all the advantages that power from the sun can offer. Rather than breaking the grip of big utilities and returning energy independence to the home-owner or to the community, (the utilities) see the possibility of solar energy becoming just another monopoly."

ATers are skeptical about centralized solar-powered generation of electricity by any means and while the general public may lump together, under the rubric of "solar," anything from home sun-powered hot water heaters to large steam-powered generators that use acres of focused sunshine, the latter approach is regarded by

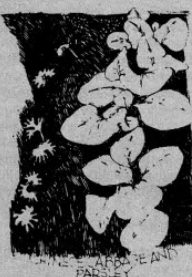
the counter-technologists as a subversion of the promise that decentralized sunshine carries.

Many AT pioneers feel that industry and government, where they are not inclined to subvert appropriate technologies, stand ready simply to take them over. What they imagine is that big business — in some cases aided by big government — is just waiting for appropriate technologists to prove the appropriateness of their technologies in market terms and then to leap in and absorb the technology or the whole field involved.

In a recent issue of *Rain* magazine, one of the major AT publications, an article entitled "Why Does Big Business Love AT?" describes a machinery manufacturer encouraging small businesses to develop a group of small-scale agricultural tools and machines. The company's marketing manager admitted, said the article, "that they were quite willing to let someone else do the hard and risky work of developing designs and production, demonstrating, testing, overcoming local inertia and developing markets for new products. They were confident that if demand for a product did develop, they could step in and gain dominance in the market through their economic and advertising power and ability to overwhelm, fairly and unfairly, the small producers."

Rain's Tom Bender writes: "What is at stake is not inventing the technology but paying the corporations to develop their capabilities to produce it and also to receive credit from the government for inventing it. So the government promotes and pays big business to take over a new field that is developing quite well without its assistance."

But does it matter who produces appropriate hardware, as long as the tools and systems are useful in appropriate ways? There appears to be little consensus among appropriate technologists. "Do we want



General Electric to produce (solar) collectors?" writes David Morris, head of the Institute for Local Self-Reliance.

Among the variety of answers to the question, which has philosophical as well as practical implications, is an outright "no" from one of the AT movement's more politically minded advocates, Philip Bereano, who runs a "Social Management of Technology" program at the University of Washington. Challenging a corporate speaker in a session at the annual meeting of the American Association for the Advancement of Science last winter, Bereano said: "I must be quite candid that students in my seminar really believe that there's no way a large corporation can be involved in the manufacture of any gadget, no matter how small the gadget is, that would be truly and alternative technology, because those institutions do not allow for worker control of the productive process and consumer control of the product."

On the other hand, the late E.F. Schumacher, generally regarded as the



chief philosopher of appropriate technology, felt that AT should make inroads wherever it can, and that if big corporations were inclined to develop AT tools, so much the better.

A similar viewpoint was expressed to me recently by Susan Yanda. She and her husband, Bill Yanda, are probably the foremost AT-minded promoters of greenhouses for both solar-heating purposes and for small-scale food growing. She thought it would be fine, she said, if Sears started making and distributing a solar greenhouse.

What some ATers fear most is not that particular technologies will be subverted or co-opted but that the movement's very core ideas will be. They are afraid that the enemy may be marching in AT uniforms and under AT's own banner. The term "appropriate technology" itself has been widely adopted and applied of late, and some ATers feel that, like the queen in Alice's Wonderland, people are making it mean what they want it to mean, including the opposite of what original counter-technology advocates had in mind.

At the AAAS meeting where Bereano spoke up, another young man rose to challenge a Dow speaker who had been talking, in the name of appropriate technology, about Dow's transplanting chemical plants to developing countries.

"I'm afraid we've got a misinterpretation of the meaning of appropriate technology here, at least as far as people I've talked to about it," the young man said. "Appropriate technology is supposed to relate to people who are going to use it. Almost without exception the examples you've given are extremely high technology. It wasn't appropriate technology. It had nothing to do with the capacity of the local people to understand, to need and to be involved with it. . . on a sort of gut basis involving the means of controlling and enhancing their own lives."

"What they are doing is making complex organic chemicals. I've got to admire the contributions Dow makes in controlling disease vectors, I'm not knocking that, but somehow we haven't communicated together on the whole purpose of AT. . . It's more to enhance the lives in a metaphysical sense almost. . ."

To which the Dow speaker answered, with what appeared to be equal frustration: "Why isn't it appropriate if it serves the health of the people? Why isn't it appropriate technology if it benefits the people?"

Because of what one ATer calls a "crisis of definition" — and because of a concern that appropriate technology is being taken over, or hopelessly beclouded, by inappropriate sources, a movement is under way within the movement to find a new, less pliable label. As Rep. George E. Brown, Jr. of California, who is considered one of AT's foremost friends in Congress, explained recently: "Those who have worked for years to build a strong base in support of a philosophy of appropriate technology are justifiably not prepared to allow the term 'appropriate' to be dismissed as a pure semantic exercise. It originally had a strong connotation of small-scale, ecologically based, human-oriented activity. To

preserve this notice, the term 'community technology' is frequently being used now, and some AT groups have decided never to use the term 'appropriate technology' again because it has become so bastardized."

"There's a mushrooming interest in appropriate technology," Craig Decker, founder of the New England Appropriate Technology movement, says, "Particularly here in Washington. And that's sort of a double-edged sword. On the one hand, it seems that the grassroots AT people are going to have more clout, more credibility in the future. A lot of agencies will start to see that what was originally seen as an alternative to the existing system may be able to be fitted into the general pluralistic framework and become like another special-interest group. I think the question is now whether the movement will maintain an alternative perspective or whether it will fit into the existing framework."

Wade Greene is an Alicia Patterson Foundation fellow. His article was first published in *The APF Reporter*.



classifieds

POSITION ANNOUNCEMENT. A statewide citizens organization, the Environmental Information Center, is seeking applicants for a full time staff position. Primary skills needed are in community organizing, interpersonal relations, and in the research and investigation of issues of public concern. Experience helpful in land use policies, press relations, media communications, and personnel management. Applicants must be willing to travel and have own transportation. For a complete job description and application, write to Gary Matson, Box 308, Milltown, Montana 59851. Applications will be accepted until December 20, 1978.

UTAH WRITERS sought by HCN. We are interested in stories from Utah on air pollution, alternative energy innovations, coal development, and people making the news. Pay is two cents to four cents per word for fair, accurate news reporting. One-sided diatribes unacceptable. Contact Joan Nice, Box K, Lander, Wyo. 82520 with story ideas.

NATURALLY POWERED OLD TIME TOYS

by Marjorie Henderson and Elizabeth Wilkinson, J.B. Lippincott Company, Philadelphia, 1978. \$6.95 paper, \$12.95 cloth, 128 pages. Photographs and drawings.

Review by Peter Wild

Why is a book about making your own toys reviewed in an environmental publication? The answer comes by way of the attitude reflected in the opening chapter: "Solar energy seems like such a new idea, but of course it isn't." The authors go on to show how to harness natural powers—the sun, wind, gravity and something they mischievously call "mystery power"—to set a variety of toys to spinning, flying, floating and twirling before the eyes of delighted children. So this book should be a natural extension for people already leaning in the direction of windmills and solar collectors.

Teachers should take note. Besides en-

tertaining the neighborhood kids on rainy days, building the toys will furnish painless object lessons in environmental studies and elementary physics—as well as in history. The patterns are taken from the toys our grandparents played with in the last century. Some of them are traditional: the Cat That Runs Uphill and the Tin Steamboat. Others such as the Sun-Engine have a kooky Rube Goldberg quality guaranteed to mystify.

Their construction varies in complexity, but all, the authors assure us, can be built within one to five hours. And with few exceptions they use inexpensive materials and tools likely to be found around the home and classroom: cardboard, wire, glue, scissors, pliers. For each project the text includes a bit of historical background, clear instructions and a page or two of step-by-step illustrations.

One can't help but be a little amazed by

the glut of plastic rocket launchers and battery-operated machine guns that overflow the stores this Christmas. Some of my own most treasured memories are of handmade toys in the family for generations—of my father sawing out toy boats from scrap wood. After all, for thousands of years humanity has kept itself sane with such environmentally consistent playthings as bamboo kites and paper dolls—each bearing the creative stamp and love of its individual maker. *Old Time Toys* is a step toward that renewal.



Marjorie Henderson (left) and Elizabeth Wilkinson.

Photo by Tom Liden

Pull Strings on These Things



Rocky Flats weapons plant protesters found guilty of trespass

Ten people protesting the operation of the Rocky Flats nuclear weapons plant near Denver, Colo., have been convicted of trespassing by a county court judge. The violation carries a penalty of \$500 or six months in jail. Companion charges of obstructing the railroad leading to the plant were dropped.

Both sides expressed satisfaction with the outcome of the trial. The protesters had hoped to focus attention on the plant's operation, its close proximity to Denver, and the whole issue of nuclear armaments. Rocky Flats makes plutonium triggers for nuclear weapons 15 miles northwest of Denver.

Lawyers for the defense based their case on Colorado's "choice of evils" law, which excuses breaking a law if a larger harm threatens. Judge Kim Goldberger, however, ruled that the testimony lined up by the defense to demonstrate the dangers of plutonium could not be heard by the jury.

Although several jurors expressed sympathy with the protesters, they said they were unable to find them innocent based on the laws they were instructed to use in their decision.

A cloudy issue in the trial was whether or not the protesters had permission to trespass for the April 29 demonstration. Plant officials had consented to the demonstration, but ordered the protesters to leave the next day. The protest has been on-going ever since.

In his summation to the jury, chief defense counsel Edward Sherman said the protesters "were trying to help all of us, and we punish them by bringing them into court.... The real criminal in this action is probably Rocky Flats."

Co-prosecutor Steve Cantrell responded by quoting from Mahatma Gandhi: "There come occasions, generally rare, when the civil resister considers certain laws to be so unjust as to render obedience to them a

dishonor. He then openly and civilly breaks them and quietly suffers the penalty for their breach."

An appeal to the Colorado Supreme Court is planned by the protesters, according to the *Denver Post*.

In the aftermath of the trial, state Rep. Tom Tancredo has asked Gov. Dick Lamm to appropriate \$35,400 for a study to de-

termine if the plant has increased cancer in the area. Preliminary results from two studies show high levels of lung and bone marrow cancer in people living close to the plant. Autopsies of 92 former area residents found plutonium in the body tissue of nine.

Since the trial, plant operators have made plans for five miles of new security fences around the plant.



Eavesdropper

environmental news from around the world



LOONEY LIMERICKS

by Zane E. Cology

The dam project looked pretty grim
To an EIS reader named Jim
"Adversely affected"
Meant, when inspected,
That BuRec would inundate him.

1872 LAW ATTACKED. The 1872 Mining Law cheats both the public and the environment, according to a report by the General Accounting Office. The report says the claim-patent system set up by the law does not provide a fair market return for the use of public lands or consider environmental and social needs. A leasing system, though time consuming and expensive, would solve these problems, the report says. The Interior Department has also issued a report to Congress saying the 1872 law should be replaced.

CHANGE EIS'S. Few people choose environmental impact statements for bedtime reading. In fact, the documents generally are so boringly written that many officials involved in producing them find it

difficult to read them. The Carter administration, however, has proposed revising the statements so they would be shorter, more clearly written, and contain less technical jargon. The administration also reminds agencies that the statements must provide alternatives to a project that may harm the environment and suggests that the statements be prepared earlier in the decision-making process. Oliver Houck, counsel for the National Wildlife Federation, says the proposals should result in "much better decisions."

CREOSOTE SUSPECT. Several common wood preservatives have come under the scrutiny of the Environmental Protection Agency. The agency suspects that creosote, coal tar, neutral oil, inorganic arsenic and pentachlorophenol may cause cancer. EPA is giving makers and users of the substances 45 days to defend them in writing. Then, over an 18-month period, EPA will weigh the substances' benefits against the health risks involved and decide whether the substances should be controlled or eliminated.

PUBLIC NOTICE

Wyoming Department of Environmental Quality

The Wyoming Environmental Quality Council will hold a public hearing to consider a request for an exception from the State's Water Quality Standard for turbidity on the North Platte River from Guernsey Dam downstream to the Nebraska State Line at 7:00 P.M., Monday, January 15, 1979, at the Citizens National Bank, Torrington, Wyoming.

Several irrigation districts in southeastern Wyoming and in western Nebraska have requested the hearing, indicating that without the requested exception the method of operation of Guernsey Dam will have to be altered to eliminate the annual sluicing of silt from Guernsey Reservoir. The irrigators indicate that without the "silt run" there will be a loss of water due to increased seepage, damage to the irrigation canals, and a significant detrimental economic impact to the area.

Groups or individuals wishing to make statements may submit written comments on or before January 15, 1979, to:

Mr. David B. Park

Chairman

Wyoming Environmental Quality Council
Hathaway Office Building
Cheyenne, Wyoming 82002

Groups or individuals wishing to make oral statements may do so at the hearing, however, it is requested that a written copy of all oral statements be provided to the hearing officer. The hearing record will not be held open after January 15, 1979.

Questions or comments regarding this hearing should be directed to Mr. John Wagner, Water Quality Division, Hathaway Building, Cheyenne, Wyoming, telephone 307-777-7781.

ROUGHING IT

Mark Twain's guide to Western flora &

(Ed. note: In 1861, Samuel Clemens' older brother Orion was appointed secretary of state of the Nevada Territory. The younger Clemens went along as an unsalaried assistant for a "three month pleasure excursion" that lasted seven years. Ten years later, he began to write *ROUGHING IT*, a description of his travels across the plains and mountains. If some of his descriptions seem exaggerated, it should be remembered that Clemens was no fan of the truth.)

THE COYOTE

by Mark Twain

The coyote is a long, slim, sick and sorry-looking skeleton, with a gray wolfskin stretched over it, a tolerably bushy tail that forever sags down with a despairing expression of foresakenness and misery, a furtive and evil eye, and a long, sharp face with slightly lifted lip and exposed teeth. He has a general slinking expression all over. The coyote is a living, breathing allegory of want. He is *always* hungry. He is always poor, out of luck, and friendless. The meanest creatures despise him, and even the fleas would desert him for a velocipede. He is so spiritless and cowardly that even while his exposed teeth are pretending a threat, the rest of his face is

apologizing for it. And he is so homely!—so scrawny and ribby and coarse-haired and pitiful.

When he sees you he lifts his lip and lets a flash of his teeth out, and then turns a little out of the course he was pursuing, depresses his head a bit, and strikes a long, soft-footed trot through the sagebrush, glancing over his shoulder at you, from time to time, till he is about out of easy pistol range, and then he stops and takes a deliberate survey of you; he will trot fifty yards and stop again — another fifty and stop again; and finally the gray of his gliding body blends with the gray of the sagebrush, and he disappears.

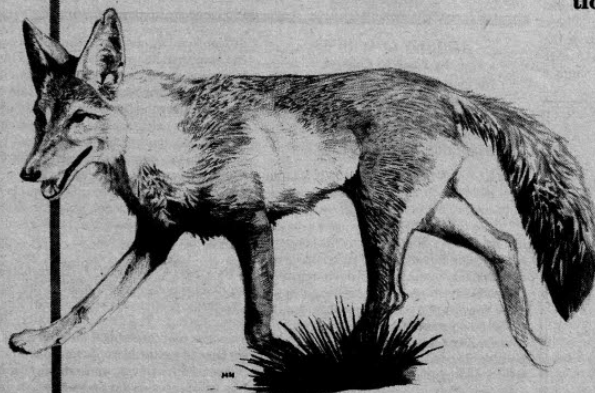
All this is when you make no demonstration against him; but if you do, he develops a livelier interest in his journey, and instantly electrifies his heels and puts such a deal of real estate between himself and your weapon that by the time you have raised the hammer you see that you need a Minie rifle, and by the time you have got him in line you need a rifled cannon, and by the time you have "drawn a bead" on him you see well enough that nothing but an unusually long-winded streak of lightning could reach him where he is now.

But if you start a swift-footed dog after him, you will enjoy it ever so much — especially if it is a dog that has a good opinion of himself, and has been brought up to think

he knows something about speed. The coyote will go swinging gently off on that deceitful trot of his, and every little while he will smile a fraudulent smile over his shoulder that will fill that dog entirely full of encouragement and worldly ambition, and make him lay his head still lower to the ground, and stretch his neck further to the front, and pant more fiercely, and stick his tail out straighter behind, and move his furious legs with yet a wilder frenzy, and leave a broader and broader, and higher and denser cloud of desert sand smoking behind and marking his long wake across the level plain!

And all this time the dog is only a short twenty feet behind the coyote, and to save the soul of him he cannot understand why it is that he cannot get perceptibly closer; and he begins to get aggravated, and it makes him madder and madder to see how gently the coyote glides along and never pants or sweats or ceases to smile; and he grows still more and more incensed to see how shamefully he has been taken in by an entire stranger, and what an ignoble swindle that long, calm, soft-footed trot is; and next he notices that he is getting fagged, and that the coyote actually has to slacken speed a little to keep from running away from him — and then that town dog begins to get mad in earnest, and he begins to strain and weep and swear, and paw the

The coyote will go swinging gently off on that deceitful trot of his, and every little while he will smile a fraudulent smile over his shoulder that will fill that dog entirely full of encouragement and worldly ambition.



& fauna

sand higher than ever, and reach for the coyote with concentrated and desperate energy.

This "spurt" finds him six feet behind the gliding enemy, and two miles from his friends. And then, in the instant that a wild new hope is lighting up his face, the coyote turns and smiles blandly upon him once more, and with a something about it which seems to say: "Well, I shall have to tear myself away from you, bub — business is business, and it will not do for me to be fooling along this way all day" — and forthwith there is a rushing sound and the sudden splitting of a long crack through the atmosphere, and behold that dog is solitary and alone in the midst of a vast solitude!

It makes his head swim. He stops, and looks all around; climbs the nearest sand mound, and gazes into the distance; shakes his head reflectively, and then, without a word, he turns and jogs along back to the train, and takes up a humble position under the hindmost wagon and feels unspeakably mean, and looks ashamed, and hangs his tail at half-mast for a week. And for as much as a year after that, whenever there is a great hue and cry after a coyote, that dog will merely glance in that direction without emotion, and apparently observe to himself, "I believe I do not wish any of the pie."



Photo by Mike McClure

THE EMIGRANT'S FRIEND

by Mark Twain

I do not remember where we first came across "sagebrush," but as I have been speaking of it I may as well describe it. This is easily done, for if the reader can imagine a gnarled and venerable live oak reduced to a little shrub two feet high, with its rough bark, its foliage, its twisted boughs, all complete, he can picture the "sagebrush" exactly. Often, on lazy afternoons in the mountains, I have lain on the ground with my face under the sagebrush, and entertained myself with fancying that the gnats among its foliage were Lilliputian birds, and that the ants marching and counter-marching about its base were Lilliputian flocks and herds, and myself some vast loafer from Brobdingnag waiting to catch a little citizen and eat him.

It is an imposing monarch of the forest in exquisite miniature, is the "sagebrush." Its foliage is a grayish green, and gives that tint to desert and mountain. It smells like our domestic sage, and "sage tea" made from it tastes like the sage tea which all boys are so well-acquainted with. The sagebrush is a singularly hardy plant, and grows right in the midst of deep sand, and among barren rocks, where nothing else in the vegetable world will grow, except "bunch grass." The sage bushes grow from three to six or seven feet apart, all over the mountains and deserts of the Far West, clear to the borders of California.

There is not a tree of any kind in the deserts, for hundreds of miles — there is no vegetation at all in the regular desert, except the sagebrush and its cousin the "greasewood," which is so much like the

Sagebrush is a very fair fuel, but as a vegetable it is a distinguished failure.

sagebrush that the difference amounts to little. Campfires and hot suppers in the deserts would be impossible but for the friendly sagebrush. It is as large as a boy's wrist (and from that up to a man's arm), and its crooked branches are half as large as its trunk — all good sound, hard wood, very like oak.

When a party camps, the first thing to be done is to cut sagebrush, and in a few minutes there is an opulent pile of it ready for use. A hole a foot wide, two feet deep, and two feet long is dug, and sagebrush chopped up and burned in it till it is full to the brim with glowing coals. Then the cooking begins and there is no smoke, and consequently no swearing. Such a fire will keep all night, with very little replenishing; and it makes a very sociable campfire, and one around which the most impossible reminiscences sound plausible, instructive and profoundly entertaining.

Sagebrush is a very fair fuel, but as a vegetable it is a distinguished failure. Nothing can abide the taste of it but the jackass and his illegitimate child, the mule. But their testimony to its nutritiousness is worth nothing for they will eat pine knots, or anthracite coal, or brass filings, or lead pipe, or old bottles, or anything that comes handy, and then go off looking as grateful as if they had had oysters for dinner. Mules and donkeys and camels have appetites that anything will relieve temporarily, but nothing will satisfy.

In Syria, once, at the headwaters of the Jordan, a camel took charge of my overcoat while the tents were being pitched and examined it with a critical eye, all over, with as much interest as if he had an idea of getting one made like it; and then, after he was done figuring on it as an article of apparel, he began to contemplate it as an article of diet. He put his foot on it, and

lifted one of the sleeves out with his teeth, and chewed and chewed at it, gradually taking it in, and all the while opening and closing his eyes in a kind of religious ecstasy, as if he had never tasted anything as good as an overcoat before in his life. Then he smacked his lips once or twice, and reached after the other sleeve. Next he tried the velvet collar, and smiled a smile of such contentment that it was plain to see that he regarded that as the daintiest thing about an overcoat. The tails went next, along with some percussion caps and cough candy, and some fig paste from Constantinople. And then my newspaper correspondence dropped out and he took a chance in that — manuscript letters written for the home papers. But he was treading on dangerous ground now. He began to come across solid wisdom in those documents that was rather weighty on his stomach; and occasionally he would take a joke that would shake him till it loosed his teeth; it was getting to be perilous times with him, but he held his grip with good courage and hopefully, till at last he began to stumble on statements that not even a camel could swallow with impunity. He began to gag and gasp, and his eyes to stand out, and his forelegs to spread, and in about a quarter of a minute, he fell over as stiff as a carpenter's workbench, and died a death of indescribable agony. I went and pulled the manuscript out of his mouth, and found that the sensitive creature had choked to death on one of the mildest and gentlest statements of fact that I ever laid before a trusting public.

I was about to say, when diverted from my subject, that occasionally one finds sage bushes five or six feet high, and with a spread of branch and foliage in proportion, but two or two and a half feet is the usual height.

(ROUGHING IT is available in paperback from the New American Library, Inc., 1301 Avenue of the Americas, New York, N.Y. 10019. A hardbound edition is published by Harper and Row, Publishers, Inc., 10 E. 53rd Street, New York, N.Y. 10022.)

10-High Country News — Dec. 15, 1978

Interior faults CEP coal lease study

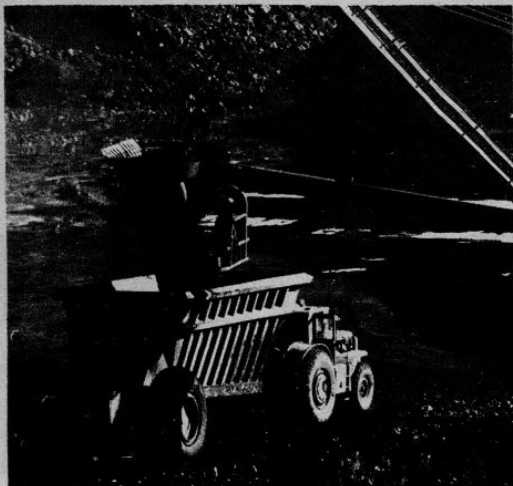


Photo courtesy of EPA

COAL LEASING in the Western states is a "giveaway," according to a study by the Council of Economic Priorities.

A report on Western coal leasing and development prepared by the Council on Economic Priorities has touched off a heated response from the U.S. Interior Department. In an agency memorandum, Interior official Joe Browder says, "The information in the report, the analysis, and the conclusions contradict each other so badly that, in addition to having no value as a review of present federal coal management policies and practices, the conclusions reached by the Council on Economic Priorities do not serve as a guide for more rational future decisions about federal coal."

The CEP report, *Mine Control*, reviews federal, state and tribal leasing practices and assesses the amount of coal and money that have been generated.

CEP found that, despite the federal moratorium on coal leasing, in effect in

various forms since 1971, Western coal production on federal lands tripled from 1973 to 1977. In addition, output from Indian lands doubled.

However, federal, state and Indian coal leasing procedures "have amounted to coal giveaways," CEP says. Leases have been sold at the first sign of interest, "long before demand for coal became competitive. The fee is usually a few dollars per acre."

CEP says that while the recent Carter administration efforts to reform federal leasing have been "encouraging," the current government program is incomplete and misguided. Interior still has not come to grips with several key issues. Among the issues CEP cites are: settlement of land use conflicts between private surface owners and subsurface lessees; lack of a clear government stance on pending preference right lease applications; the failure of cur-

rent leasing reforms to affect existing leases; and the government's failure to establish whether any further coal leasing is necessary.

In his memo, Interior's Browder says that, "The most obvious example of the report's inaccuracy is its failure to properly recognize the importance of the Coal Leasing Amendments Act of 1976, further amendments to the act in 1978, the Surface Mining Control and Reclamation Act of 1977, the Federal Land Policy and Management Act of 1976 and this department's work in 1977 and 1978 to carry out the laws." Browder says that many of the problems that *Mine Control* addresses have already been solved by this legislation.

For instance, Browder says, CEP charges that the availability of federal coal depends upon a system established by the Mineral Leasing Act of 1920. Browder says, "The Coal Leasing Amendments Act of 1976 eliminated the old 1920 leasing program and created an entirely new federal coal leasing program."

Browder also criticizes CEP for saying that Interior was using the Energy Minerals Activity Recommendation System, a lease program developed in the Ford administration, as its coal lease and land use vehicle for federal lands. Browder says Interior Secretary Cecil Andrus rejected EMARS in 1977. Browder himself frequently criticized previous administrations' leasing policies when he was a staff member of the Environmental Policy Center, a Washington, D.C., based environmental organization.

Browder's memo also charges that the CEP report ignores recent steps taken by the federal government to implement a new coal leasing policy, based on land use priorities instead of industry demand for resources.

A meeting is scheduled between the CEP staff and Interior officials to iron out the difficulties, according to Browder.

STATES CRITICIZED

The CEP report saves its heaviest criticism for state coal leasing policies. *Mine Control* says, "The tragic mismanagement of land and resource development responsibilities so characteristic of Western leasing programs in general is most

graphically demonstrated at the state level."

CEP says the failure of state leasing programs can be traced to the "beneficiary institutions system." Under this system, revenue from state lands are applied to assist public institutions, usually schools. Consequently, the state agencies responsible for leasing attempt to maximize commercial activity on the land, rather than to practice sound resource management.

Of the six Western coal states the report examines — Colorado, Montana, New Mexico, North Dakota, Utah and Wyoming — only Montana and North Dakota "have substantially improved their programs from the abysmally designed and administered systems historically employed." Utah and Wyoming, the report says, "operate the worst systems and have made no attempts to correct them. Furthermore, these states have leased virtually all their coal land. Neither (state) expressed to CEP any intention of reforming its program."

CEP says that in the face of this failure to put their own houses in order, state requests for federal assistance "must be viewed with skepticism."

The report also says that leases within states tend to become concentrated in the hands of large corporate lease holders. CEP says, "The top five leaseholders in each of the Western states control an average of 45 percent of the land under lease."

The largest Western leaseholder is Mapco, Inc., which CEP calls "a fast growing energy conglomerate with coal, oil and other energy resource holdings." Mapco has 168,257 acres of coal land under lease. Following Mapco are: Carter Oil Co., a subsidiary of Exxon, 165,786 acres; Ark Land Co., a wholly-owned subsidiary of Arch Minerals, which is in turn a joint venture of Ashland Oil and Hunt Enterprises, 98,124 acres; Coastal States Energy Co., 92,277 acres; and R.A. Haynesworth, a Cheyenne, Wyo., land speculator, 82,059 acres. CEP "questions whether Haynesworth or his elusive co-lessees will ever initiate a mining venture on Wyoming land," implying they are holding the coal for speculative purposes.

Mine Control, authored by James S. Cannon, is available from CEP, 84 Fifth Ave., New York, N.Y. 10011.



energy news of the Rockies and Great Plains

ST. VRAIN TESTS HALTED. Federal inspectors have ordered a halt to special temperature testing at Colorado's Fort St. Vrain nuclear power plant, according to the *Denver Post*. The testing would have attempted to determine the reasons for fluctuations in temperature of the helium gas, which cools the radioactive center. The gas temperature is supposed to remain fairly constant, at about 1,200 degrees Fahrenheit, but has not stayed at the constant level over the past year. The Nuclear Regulatory Commission, which licenses all nuclear power plants, says that it will not permit further tests until the plant owner,

Public Service Co. of Colorado, can demonstrate that it fully understands and can control the unexpectedly high temperatures recorded at the plant. The test must be successfully completed before the plant's output (of a potential 330 megawatts) can be exceeded. The plant has never operated at full power.

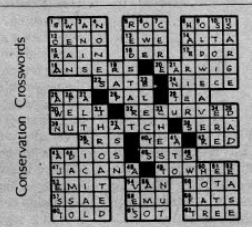
SITING ACT THREAT. The president of Basin Electric Cooperative said that if the Montana siting act isn't changed, the cooperative won't build two proposed power plants in the state. Basin says other states have made offers to take the 440-megawatt coal-fired plants if the Montana Legislature isn't able to simplify the siting process. The plants were planned in conjunction with a Burlington Northern project at either Circle, Mont., or at the Glasgow Air Force Base.

USGS WILL ASSESS OIL WELL'S IMPACT. The U.S. Geological Survey says it will prepare detailed environmental analysis of an oil well proposed for the federal Cache Creek unit in Jackson Hole, Wyo. The well, which would be drilled by

the National Cooperative Refinery Association, provoked considerable controversy from residents of Jackson Hole when it was first proposed last year. Most of the comment received on the well opposed oil exploration in the area. The Forest Service, which administers the site on the Bridger-Teton Forest, had requested that USGS complete a full environmental impact statement. However, USGS opted for a "more detailed environmental study than it usually does for proposed wells on federal lands."

FEDERAL AGENCIES "CLEAR" NORTHERN TIER PIPELINE. The U.S. Forest Service and the U.S. Bureau of Land Management say that they have found no environmental problems serious enough to block approval of the proposed Northern Tier Pipeline, according to the *Missoulian*. The pipeline is designed to carry crude oil from the coast of Washington state to refineries in the West and Midwest. The *Missoulian* editorialized that, though environmental problems don't seem to be a major constraint, other factors may work against construction.

Editorial page editor Sam Reynolds wrote that Montana refineries don't need the crude oil from the pipeline; residents of Port Angeles, Wash., the proposed starting point for the pipeline, don't want an oil terminal in their town; and the \$1 billion cost of the pipeline appears to be excessive. A draft environmental statement on the pipeline is due on Jan. 3.



THE SOLUTION to the "Feathered Friends" crossword published in our last issue is shown above.



The HCN Hot Line

energy news from across the country

SOLAR POWER BREAKTHROUGH?
An unorthodox Michigan inventor, Stanford Ovshinsky, says that he has developed

a system that would convert sunlight to electricity at a 10 percent efficiency, which the Department of Energy says would make solar electric cells economically competitive. The *New York Times* reports that Ovshinsky has constructed his cells of silicon tetrafluoride. He says that fluorine is the secret ingredient which makes his system better than those being pursued by competitors. However, Ovshinsky has not built any prototypes of the solar cells and says he needs at least \$10 million more to finish development work. Scientists are taking Ovshinsky seriously, the *Times*

says. He made a similar boast 10 years ago, claiming a major breakthrough in the construction of semiconductors — a boast that proved true and revolutionized the field of microelectronics. One scientist said, "He's so clever, he's been right so many times, that I've got to listen." Ovshinsky says that the first of his new solar cells could be installed in homes within five years and provide power for a cost of 5 cents per kilowatt hour — roughly the national average for power.
PLASTICS TO POWER. The U.S. Department of Energy and Proceyde Corp. of

Dec. 15, 1978 — High Country News-11

New Brunswick, N.J., have announced a new process that converts plastic-manufacturing wastes into fuel oil. A DOE spokesman says that if all of the companies manufacturing polypropylene used the process to convert their wastes to fuel oil, there would be a savings of about 1.3 million barrels of oil annually.



Utilities' fund to watch over whoopers forever

by Marjane Ambler

The Missouri Basin Power Project has become the reluctant father of a child that it must provide for in perpetuity. As part of the settlement of a long court battle over its coal-fired power plant near Wheatland, Wyo., MBPP has agreed to set up a \$7.5 million trust fund, the income from which is to protect whooping cranes.

MBPP signed the agreement after U.S. District Court Judge Warren Urbom had ruled against the project in October. In agreeing to establish the fund, MBPP took what looked to be the least expensive of its options. When negotiations began for the settlement, MBPP faced the possibility of being forced to reduce the size of its power plant from three to two units, to change the design of its plant, and/or to shut down construction for as long as a year while a supplemental environmental impact statement was prepared. The year delay itself could have cost \$160 million, according to one of the MBPP participants, Tri-State Generation and Transmission Association Inc.

By October, when Urbom temporarily halted construction of the dam, it was 25 percent complete. Construction had been completed on 50 percent of the first 500 megawatt unit of the power plant, 30 percent of the second and five percent of the third.

Urbom said the federal agencies that approved the reservoir and power plant failed to fulfill requirements of the National Environmental Policy Act and the Endangered Species Act. Grayrocks would reduce the flow of the Platte River, which flows into Nebraska, and that would have a

detrimental effect on whooping cranes, an endangered species, he said.

The suit was filed by the state of Nebraska, the National Wildlife Federation, the Nebraska Wildlife Federation and the National Audubon Society.

Win Curtiss of Basin Electric, one of the MBPP participants, says MBPP feels that the negotiations were extremely difficult because of the two states' war over water rights. "Our feeling was that we were caught in the middle. When we would accommodate the plaintiff Nebraska and the plaintiff Wyoming, we still wouldn't have accommodated the wildlife federation."

Curtiss says MBPP thought it had reached an agreement with the state of Nebraska in June 1977, but the state later asked for more concessions.

However, not everyone is happy with the settlement. A former governor in Lincoln, Neb., Robert Crosby, says putting \$7.5 million into a fund for wildlife habitat cranes is ridiculous, immoral and nearly obscene, according to Associated Press. "I have listened in vain for anyone to explain how whooping cranes in any way contribute to the welfare of human beings," he says.

Tom Brown, a Nebraska farmer and a member of the Sierra Club, says the only people who are upset are the "hammerheads like Crosby who have development schemes in the back of their minds." Crosby has been the attorney for a group that wants to divert water from the Platte River Basin into the Blue River Basin. "The average irrigator-farmer thought this was a stroke for the people — the average guy doesn't mind seeing a little water in the stream," Brown says.

Pat Parenteau, attorney for the National Wildlife Federation and chief architect of the crane trust fund, says the fund will benefit not only cranes but also a multitude of wildlife that depends on the same habitat. It also will guarantee water flowing through the Platte that will benefit downstream users, such as the cities of Lincoln and Omaha, Parenteau says.

HALF MILLION A YEAR

The trust fund money will be invested and the trustees will use income from the fund, which is expected to be about \$500,000 per year. Three trustees will administer the fund — one designated by MBPP, one by the governor of Nebraska and one by the National Wildlife Federation. The money can be used to manage the critical crane habitat, acquire land, conduct scientific studies, acquire water rights, or to take other actions agreed upon by the trustees. The principal can't be used without the consent of all three trustees.

Parenteau says the fund will be used to get a minimum flow in the Platte when the cranes need it. "If we can't get that, then we will be battling continuously as new agricultural or industrial projects are proposed, to make sure they comply with the endangered species act," he says.

He points out that if MBPP had been forced to go out and buy the water to replace what the power plant will be using, there would have been no guarantee that the water would have reached the cranes' critical habitat downstream.

MBPP was unwilling to guarantee flows below Lake McConaughy, on the Platte in Nebraska, because it has no control over the amount of water released from the dam.

If the Corn Creek Irrigation Project goes through in Wyoming, MBPP will be required to replace 11,250 acre-feet of water. Corn Creek would draw from the same water supply as the power plant, and the two projects have been linked throughout the negotiations. MBPP can purchase the water in either Wyoming or Nebraska. The trustees will be responsible for finding ways to get water to the habitat area.

Brown isn't particularly happy with the Corn Creek decision because he thinks it will probably mean water will be bought from Nebraska irrigators to satisfy MBPP's obligation. The only water that is potentially available between Grayrocks and the habitat area is agricultural water. "They may be taking water off of land that is equally or more productive," he says, explaining that climate and elevation reduce Wyoming agricultural productivity.

MBPP's power plant will be restricted to 23,250 acre-feet of water per year, which is 85 percent of what it had asked for. "This will be a real challenge for our engineers," Curtiss says. MBPP was reluctant to try dry cooling methods, which would use much less water, because he says the technology is still being proven. Only one

power plant in the region uses this method. Curtiss says a reduction of efficiency would be "terribly expensive" over the 35 year life of the plant.

MBPP is also required to release a certain minimum amount of water from Grayrocks.

Tyler Dodge of the Laramie River Conservation Council says he is particularly pleased with the requirement that none of the utilities involved in MBPP can build any more water-cooled generating units in the Laramie River Basin for 13 years without LRCC's consent. Tri-State Generation and Transmission Association was considering a site in the area for a new coal-fired power plant, and MBPP had considered a fourth unit at its plant near Wheatland.

LRCC members had spent thousands of dollars fighting MBPP over the past several years, and they had anticipated similar fights if other units were proposed. "This will give them 10 years of peace," David Palmerlee, attorney for LRCC, says.

Dodge is also pleased that the MBPP participants agreed to actively support legislation in Wyoming that would, in effect, discourage transfers of water from agricultural use to industrial use. If this law had been passed a few years ago, much of LRCC's battle would have been unnecessary, he says.

MBPP has also agreed to pay all legal fees incurred by the plaintiffs, which total \$135,000.

MUST BE APPROVED

The settlement must still be approved by the circuit court of appeals. An endangered species committee set up by Congress must also study what harm the project would cause to the whooping crane and require modifications of the project, if necessary to protect the species. The committee will use a report from the U.S. Fish and Wildlife Service, which has determined that the project likely will have an adverse impact on the cranes' critical habitat. However, FWS has said that the trust fund could offset that impact by providing money to improve the habitat.

Pat Parenteau isn't sure the trust fund should be copied elsewhere to protect other species. He says people should wait and see how the idea works first.

He hopes, however, that conservationists' victory might have an effect on industries' attitudes in the future. "They're ready to spend oodles of money on anything but fish or wildlife. . . . It took nothing short of an injunction to bring them to the negotiating table with serious intentions," he says.

Dodge of LRCC hopes the results will also force federal agencies to be more careful when they evaluate impacts of such projects in the future. "I hope it will make bureaucrats more nervous. . . . But maybe I'm dreaming," he says.



Photo courtesy of Tri-State Generation
GRAYROCKS DAM and reservoir were about 25 percent complete when the judge issued his injunction to stop construction. Plaintiffs have now agreed not to erect further legal barriers to its completion.

12-High Country News — Dec. 15, 1978

Audubon Camp West, not just for the birds

by Randy Hyman

Buzzing a beeline along Highway 287, swarms of Winnebagos, automobiles and hitchhikers descend upon the Tetons and Yellowstone National Park in an annual, summer-long migration. Few people notice the sign eight miles east of Dubois, Wyo., that marks the road to Audubon Camp. The 200 people who follow the bumpy, dirt road to attend the Audubon Ecology Camp in the West each summer have a mission. Generally, they are after a fresh understanding of the word "ecology" and a renewed commitment to preserve the natural environment.

Consider the blue-green algae. The camp botany instructor may ask you to do just that while you sit on a house-sized slab of Bighorn Dolomite your first morning of class. Surrounded by 12 strangers, including a schoolteacher, a park ranger, a student and a corporate executive—and awed by the towering flanks of the Wind River Mountains—you find your instructor's request peculiar. But consider it.

Some 2.7 billion years ago, blue-green algae was one of the first forms of life to extract itself from the simmering, volcanic

"I was feeling so burnt out and helpless before I came. Now I feel full of energy and ideas."

soup of young planet Earth. Simplicity spelled survival for the algae. This very primitive life form is still around, stoically tolerating the behavior of Earth's most recent guest, man.

As the camp's mammal instructor may explain in an evening lecture, until man's arrival, the average rate of extinction was one species every 3,000 years. In the past 300 years, more than 800 forms of life have become extinct.

"Torrey Valley is our giant classroom," explains cherub-faced, red-haired Jay Reed, director of Audubon Camp. "It's a perfect setting for people to learn about man's place in nature. From botany to ecology, mammalogy to ornithology, and entomology to geology, our six instructors have plenty of space and material here to work with."

Reed pauses to greet a brightly-dressed camper from New York City, late for her morning class, weighted down with binoculars, camera and writing materials. He continues, "We've rounded up our instructors not only for their knowledge, but also for their ability to work outdoors and informally with all kinds of people. More than anything else, we teach how to think ecologically, not just specifics of Torrey Valley. That way, a teacher from Ohio, let's say, can go back with something to teach and apply in her own area, instead of a lot of facts about Torrey Valley."

Ecology instructor Ed Brady, after one of his many classes last summer, said, "What

a great crew this morning. One of them is a naturalist from California, and he came up with some excellent comparisons between the ecology of these sagebrush-juniper communities and the chaparral communities of California. It's great to teach when people are involved and able to add from their own experiences."

This sort of give-and-take approach has been the teaching philosophy of the Audubon Camp since its start in 1963. The camp is one of four across the country. The others are in Maine, Wisconsin and Connecticut.

All of the camps are operated by the National Audubon Society, an environmental-conservation organization with headquarters in New York City. Each camp offers four, two-week nature study sessions in the summer. Scholarships are awarded to the most needy applicants.

Joan Tabachnik, a young professional environmentalist from New Jersey, says, "What a relief to get back to the basics again. People get so wrapped up in the issues that we forget what we're fighting for. We need to stop and feel nature's beauty once in awhile, just to remember what the battles are all about. I really needed this breather. I was feeling so burnt out and hopeless before I came. Now I feel full of energy and ideas."

Each day of camp offers morning and afternoon classes, evening programs and sing-alongs, all-day field trips, early-morning bird hikes and late-night mammal walks. The schedule also leaves time for campers to share their own slides, music or special interests.

The spirit of camp runs high from the very start of each session, and reaches a feverish pitch in the last days.

The fever takes on strange forms. Stories circulate about the business executive who was so affected by his Audubon experience that he returned to his home town, quit his job and enrolled in a university to study natural sciences. Or about the 85-year-old man who refused to be left behind during the final, all-day hike up Arrow Mountain. Cane in hand, he stayed with the group all the way up.

Then, a torrent of rain turned trails into mudslides, but the aged camper never complained. Still hot with Torrey Valley Fever, he joked all the way down, "Life is hardship; life is hardship."

"There's no better way to teach about nature than to get the folks out into it," director Jay Reed said one nippy morning. "The campers joke about having to get up early or wade in the cold ponds, but they really love it. Then the pond creatures they look at under the microscope take on a personal meaning. They can really understand what they're looking at and talking about because they've experienced something about it. We don't just talk about nature here; we touch it, smell it, taste it, hear it and see it. What we teach about nature here is something these people will never forget because it has become a part of them."

Randy Hyman worked at Audubon Ecology Camp of the West last summer. He is a free-lance writer and photographer.



Photo by Randy Hyman

ABOVE
Audubon campers are after a fresh understanding of the word "ecology" and a renewed commitment to preserve the natural environment.



Photo by Randy Hyman

LEFT
Audubon Camp instructor Bob Clover points out some bird life to a class. The idea is to teach people how to think ecologically, not just present facts about the Torrey Valley.

BELOW
Consider the blue-green algae. The camp botany instructor may ask you to do just that your first morning of class. It was one of the first forms of life to extract itself from the simmering, volcanic soup of young planet Earth.



Photo by Randy Hyman

FAMILY CAMP, TOO

Next year Audubon will offer a "family ecology ranch experience" at the T-Cross Ranch in Wyoming's Absarokas, in addition to its adult ecology camp in the Torrey Valley. The new program is designed to teach nature awareness to both adults and children (age 10 and up) through daily field trips. Child care will be available for children under age 10.

For information on either program write the Rocky Mountain office of the Audubon Society, Box 3557, Boulder, Colo. 80307.



Western Roundup



13

Carter boldly safeguards Alaska wildlands, wildlife

On Dec. 1 President Carter took a series of bold actions to protect over 100 million acres of wild lands in Alaska. Carter signed a proclamation designating 17 new national monuments, totaling about 56 million acres. In addition, Carter directed Secretary of the Interior Cecil Andrus to designate 40 million acres of new national wildlife refuges in 12 areas. On the same day, Agriculture Secretary Robert Bergland signed an order withdrawing 11 million acres in the national forests of Southeast Alaska for two years.

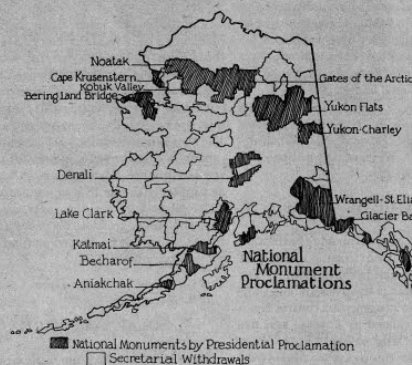
"This series of proclamations to protect the national interest lands is the greatest single act by a president of the United States in defense of our wildlands and wildlife," says Chuck Clusen, chairman of the Alaska Coalition. The Alaska Coalition is a conservationist lobby that has sought passage of a federal bill to protect certain Alaska lands. The administration actions protect most of the lands that were in the bills that failed to pass Congress last session.

"Carter's action forestalls attempts by special interests to exploit Alaska's federal lands," says Clusen. "The president has made sure that Congress will have a fresh opportunity to enact comprehensive legislation next year." In his statement Carter called on Congress to act promptly next year to pass Alaska lands legislation. The executive actions will hold, however, unless Congress takes specific action to change them.

Sen. Mike Gravel (D-Alaska), one of the primary opponents of the conservationist's Alaska lands bill condemned Carter's action to create national monuments. "I think it is clear that the administration has overstepped the bounds of the law," he says. Gravel says the legislative history of the Antiquities Act — the law that allows a president to create national monuments by proclamation — makes it clear that it was not intended for huge withdrawals of this kind. "I feel quite sure that these withdrawals will not hold up under a court test," he says.

Gravel called Carter's actions "totally unnecessary" but still "less harmful to Alaska" than the Alaska lands bill Congress nearly passed this year. Gravel's threat of a filibuster was the main reason a bill didn't pass.

On Nov. 16 Andrus made an emergency withdrawal of 110 million acres in Alaska. "Carter's actions guarantee an even greater degree of protection than the



Gravel: 'Oversteps the bounds of law'

Clusen: 'The greatest single act by a president'

emergency withdrawals," says Clusen. However, the emergency withdrawals will also remain in effect.

The boundaries of the new national monuments generally conform to the administration's legislative proposals. All valid existing rights within the areas will continue to be honored. Subsistence hunt-

ing in the areas will be allowed to continue. Mineral entry and leasing is prohibited, and all monuments are closed to oil and gas exploration.

In announcing his decision, Carter pointed out that the new national monuments include the nation's largest pristine river valley (the Noatak), the area where

man may have first crossed into the New World (Bering Land Bridge), a glacier as large as Rhode Island and the largest group of mountain peaks over 15,000 feet in North America (Wrangell-St. Elias), an area around the nation's highest (Denali), one of the world's largest dry volcanoes (Aniakchak), an area containing over 500 bald eagle nests and a huge bear population (Admiralty Island), an area where the archeological record of man's past goes back at least 4,000 years (Cape Krusenstern), and an area where 2.1 million waterfowl migrate each year (Yukon Flats).

Other areas of note are the new Gates of the Arctic National Monument in the Brooks Range (8,220,000 acres) and the new Misty Fjords National Monument in Southeast Alaska (2,285,000 acres).

In a related development, Assistant Secretary of Agriculture Rupert Cutler has cancelled a permit that would have allowed U.S. Borax to build an 11.5 mile access road to a proposed mine in the Misty Fjords area.

Extensions to the existing Arctic Wildlife Range, an area of prime interest to the oil industry because of its proximity to the Prudhoe Bay oil field, were not included in the monument proclamation. However, Andrus' proposal for new wildlife refuges includes a 9,900,000 acre addition to the range.

Hart urges Western water offensive

In a speech to the meeting of the Colorado River Water Users Association, Sen. Gary Hart (D-Colo.) called on Western states to form a regional water policy and "go on the offensive" against President Carter's water policy. Some of Hart's suggestions, however, are similar to the administration's, such as clarification of benefit-cost calculations; participation by states in the funding of water projects, so

states can help prioritize them; recognition of "legitimate environmental goals" in water development; and stressing of water conservation practices. Four elements Hart said must be considered in a Western water policy are planning and financing water projects, maintaining agriculture, making water use more efficient, and removing uncertainties regarding Indian and federal water rights.

Bobcats cornered, collared & counted

A Utah Division of Wildlife Resources biologist is conducting a study in Diamond Fork Canyon near Provo to assess the bobcat population. Jim Karpowitz will live-trap 20 bobcats and fit them with radio collars to monitor their travels. Karpowitz

hopes studies in other parts of Utah, including alpine and desert habitats, will be made to determine how bobcats should be managed in the state. Trapping is not allowed in Utah, but pelts taken elsewhere are bringing around \$450 each.



Melcher: 'Nobody wants those dams'

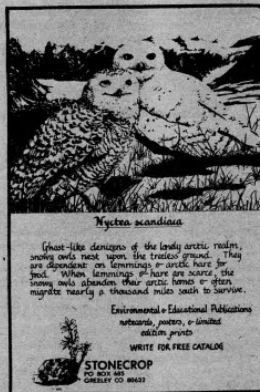
Sen. John Melcher (D-Mont.) says that if the Corps of Engineers won't stop studying dam sites on the lower Flathead River and Clark Fork River in Montana he will cut off funding for the study in Congress. "Nobody wants those dams and the Corps is wasting time and money studying them when their efforts could be directed to more useful purposes elsewhere," Melcher says.

The Corps initiated its study of six potential hydroelectric dam sites in 1977 and is scheduled to make a recommendation to Congress in 1980. The Corps study was authorized in 1964 following destructive spring flooding in the area. Now, most area residents appear opposed to the dams. At public meetings in September about 275 persons attended and only three expressed

support for the dams.

The Confederated Salish and Kootenai Tribal Council has joined in the controversy, since the dams would affect tribal land. The council has passed a resolution stating that no dams can be built on the lower Flathead without tribal authorization.

The Corps must submit its budget request for the project annually. A spokesman for the Corps told *The Missoulian* that a decision will be made in January on whether or not to seek funds for the Flathead-Clark Fork River study. Melcher says if the Corps won't terminate the study on its own he will "get together with the rest of the Montana delegation to cut off its appropriations for the study."



Court says Carter exempt from NEPA

A district court judge in Alaska has ruled that the National Environmental Policy Act applies to actions taken by federal agencies — but not by the president.

The judge refused to grant a preliminary injunction to the state of Alaska that would have prevented the Carter administration from taking action to protect Alaskan lands from development. In denying the state's motion, the court said that since the president's withdrawal authority under the Antiquities Act is exempt from NEPA, he would not need to prepare an environmental impact statement on his action on Alaska.

The court also said that the Secretary of Interior's withdrawal authority under Section 204 (c) of the Federal Land Policy and Management Act is exempt from NEPA.

Dec. 15, 1978



HCN Bulletin Board



WYOMING WATER HEARING

The draft Wyoming Water Pollution Control Program Plan for fiscal year 1979 will be presented at a public hearing at the Natrona County Library, 307 East 2nd, Casper, Wyo. The hearing will be held on Jan. 10 at 1 p.m. The plan outlines the priorities and activities of the water quality division for the year. Copies are available at the county clerk's office in each county and at the libraries in several Wyoming towns.

FOREST SERVICE JOBS

Applications for seasonal Forest Service jobs are being accepted until Jan. 15 at regional offices. Contact a local Forest Service office.

SOLAR LAW MAGAZINE

The Department of Energy's Solar Energy Research Institute will publish a new bimonthly periodical, the **Solar Law Reporter**. It will be aimed at sharing information among lawyers and with others interested in solar energy. To subscribe, contact the Solar Law Reporter, SERI, 1536 Cole Blvd., Golden, Colo. 80401 or call (303) 231-1270.

RECREATION RULES

The Bureau of Land Management is now considering ways to avoid overcrowding on popular or fragile river areas. A short discussion paper lists several kinds of permit systems that could be used including advance reservations, lottery, fees, or merit. The discussion paper is available from BLM field offices or by writing Director (370), 18th and C Streets, NW, Washington, D.C. 20240. Written suggestions will be accepted until Feb. 8.

PREDATOR HEARINGS

Public comment is being sought through Jan. 12 on a draft environmental impact statement on predator management. The statement examines the present policy and operation of the program to control livestock damages caused by coyotes and five other species of wild animals in the West. Copies of the statement are available from the U.S. Fish and Wildlife Service, Washington, D.C. 20240, (202) 632-7463 or from the FWS regional offices. A public hearing will be held on Jan. 10 in Salt Lake City at the Tri-Arc Travelodge, 161 West 600 South. The hearing will open at 8 a.m. for people who want to give oral testimony.

NEW WESTERN ENERGY FILM

New residents of Wyoming, Colorado, Utah, Idaho and other states can bring Montana's New Western Energy Show into their own classrooms, meetings or city parks. Albert Chaney has filmed the theatrical troupe as it traveled from town to town last year presenting skits and songs that make renewable energy come alive. The film is available for \$40 for a three-day rental. It sells for \$475, and rental may be applied toward the purchase. A script is available with the film or separately for \$2.75 plus \$.50 mailing costs. Included with the script are ideas for props and costumes. It can be performed or read to improve your energy I.Q.

SOLAR SYMPOSIUM

A grassroots symposium is planned Jan. 10 in San Jose, Calif., as part of the National Passive Solar Energy Conference. The symposium will be designed to bring together people who are working toward local energy self-reliance. For more information, write Anne Cicero at the New Mexico Solar Energy Association, Box 2004, Santa Fe, N.M. 87501.

FAMILY FARM COALITION

Consumer, farm, religious, environmental, rural, appropriate technology and public interest organizations across the country are helping to organize the National Family Farm Coalition. The coalition believes that the most effective way to create a self-sustaining, environmentally sound, economically stable food system is to protect family farms. For more information, write to the coalition at 1346 Connecticut Ave., NW, Washington, D.C. 20036 or call (202) 483-1116.

SECOND TO LAST

Great Plains and Rocky Mountain states senators scored second to last in the League of Conservation Voters' 1977-78 Senate ratings. New England's senators scored the highest, with an 81 percent average score. Next was the Mid-Atlantic region, with 66 percent, the Midwest, with 52 percent; the Far West with 51 percent; the Great Plains and Mountain states, with 42 percent each; and the Southeast, with 36 percent. The chart, which lists each senator's vote on 34 environmental issues, is available from the League of Conservation Voters, 317 Pennsylvania Ave., S.E., Washington D.C. 20003.

State of Wyoming Public Notice

December 15, 1978.

PURPOSE OF PUBLIC NOTICE

THE PURPOSE OF THIS PUBLIC NOTICE IS TO STATE THE STATE OF WYOMING'S INTENTION TO ISSUE WASTEWATER DISCHARGE PERMITS UNDER THE FEDERAL WATER POLLUTION CONTROL ACT AMENDMENTS OF 1972 (FWPCA), P.L. 92-500 AND THE WYOMING ENVIRONMENTAL QUALITY ACT (35-11-101 et. seq., WYOMING STATUTES 1967, CUMULATIVE SUPPLEMENT 1973).

IT IS THE STATE OF WYOMING'S INTENTION TO ISSUE WASTEWATER DISCHARGE PERMITS TO (1) ONE OIL TREATER FACILITY, TO RENEW (2) TWO INDUSTRIAL, (2) TWO OIL TREATER AND (2) TWO MUNICIPAL DISCHARGE PERMITS, AND TO MODIFY (1) ONE COMMERCIAL AND (1) ONE MUNICIPAL DISCHARGE PERMIT WITHIN THE STATE OF WYOMING.

APPLICANT INFORMATION

(1) APPLICANT NAME: CORK PETROLEUM
C/O AGNEW SULLIVAN, INC.
MAILING ADDRESS: P.O. BOX 1152
THERMOPOLIS, WYOMING 82443
FACILITY LOCATION: FREUDENTHAL LEASE, SW¼,
SECTION ¼, T43N, R94W,
APPLICATION NUMBER: HOT SPRINGS COUNTY, WYOMING
WY-0028070

Facility is a typical oil treater located in Hot Springs County, Wyoming. The produced water is separated from the petroleum product through the use of heater treaters and skim ponds. The discharge is to Warm Springs Creek (Class IV stream) via an unnamed drainage.

The discharge must meet Wyoming's Produced Water Criteria effective immediately. Chapter VII of the Wyoming Water Quality Rules and Regulations infers that as long as the Produced Water Criteria is met, the water is suitable for beneficial use. Because the discharge is to a Class IV stream, limitations more stringent than those indicated in the Produced Water Criteria are not necessary to insure compliance with Wyoming's Surface Water Quality Standards.

Semi-annual self-monitoring is required for all parameters with the exception of oil and grease which must be monitored quarterly. The proposed expiration date is December 31, 1980.

(2) PERMIT NAME: BASIN ELECTRIC POWER COOPERATIVE

MAILING ADDRESS: C/O BANNER ASSOCIATES, INC.
P.O. BOX 560
LARAMIE, WYOMING 82070
FACILITY LOCATION: GRAYROCKS DAM CONSTRUCTION
PHASE I, PLATTE COUNTY, WYOMING
PERMIT NUMBER: WY-0027821
FACILITY LOCATION: GRAYROCK DAM CONSTRUCTION
PHASE II, PLATTE COUNTY, WYOMING
PERMIT NUMBER: WY-0027936

The Basin Electric Power Cooperative is in the process of constructing the Grayrocks Dam on the Laramie River. In order to construct the dam it is necessary to dewater the area at the base of the dam to allow heavy equipment to operate.

Dam construction will be carried out in three phases, however, discharge permits have been issued only for the first two phases. Effluent water falls into three basic classes:

1. Drilling muds and fluids — These liquids will be completely contained in "drilling pits" and there will be no discharge of this material.
2. Water which is brought to the surface immediately upon completion of the well — this water tends to be turbid and will be discharged to a complete containment pond.
3. Water which is pumped to the surface after "clean-up" of the well is completed — this water will constitute the permitted discharges and will be released directly to the Laramie River (Class II stream).

The proposed permits require that any discharge to the River have a turbidity of less than 10 NTU's to insure compliance with Wyoming's surface water quality standards. Because the chemical quality of the water being pumped is virtually identical to that of the River, no other effluent limitations were judged applicable.

In Phase I there are two discharge points, 001 is the combined discharge from wells 1, 2, and 3 and 002 is the discharge from well 4. In Phase II there will be four discharge points, 003 is the southernmost outfall from standby well 1, 004 is the combined outfall of standby well 1 and well 5, 005 is the outfall from well 6 and 006 is the outfall from well 7.

The proposed permit requires the permittee to monitor the turbidity of the discharges twice per day and to report results monthly. Due to uncertainties concerning the scheduled completion of this project, full five year permits proposed.

(3) PERMIT NAME: W.N. McMURRAY

MAILING ADDRESS: P.O. BOX 220
CASPER, WYOMING 82602
FACILITY LOCATION: WAGNER-FREDRICKS NO. 24-1, NW ¼,
SE¼, SECTION 24, T57N, R98W,
PARK COUNTY, WYOMING
PERMIT NUMBER: WY-0023311

FACILITY LOCATION: BRABEC NO. 24-1, NE¼, SW¼, SEC-
TION 24, T57N, R98W, PARK
COUNTY, WYOMING

PERMIT NUMBER: WY-0023329

Both facilities are typical oil treaters located in Park County, Wyoming. The produced water is separated from the petroleum product through the use of heater treaters and skim ponds. The discharges are both to Sage Creek (Class II stream) via unnamed irrigation drains.

The discharges must meet Wyoming's Produced Water Criteria effective immediately. Chapter VII of the Wyoming Water Quality Rules and Regulations infers that as long as the Produced Water Criteria is met, the water is suitable for beneficial use. There is no evidence to indicate that limitations more stringent than the Produced Water Criteria are needed to meet Wyoming's Water Quality Standards. The Department will continue to evaluate this discharge and, if necessary, will modify the permit if evidence indicates that more stringent limitations are needed.

Semi-annual self-monitoring is required for all parameters with the exception of oil and grease which must be monitored quarterly. The proposed expiration date is December 31, 1983.

(4) PERMIT NAME: TOWN OF EVANSVILLE, WYOMING

MAILING ADDRESS: DRAWER 158
580 IRON STREET
EVANSVILLE, WYOMING 82636
PERMIT NUMBER: WY-0021881

The wastewater treatment facilities serving the Town of Evansville, Wyoming, consist of a three cell non-aerated lagoon with no disinfection equipment. An aerator has recently been installed at the lift station wet well. The facility discharges to the North Platte River (Class II stream).

The proposed permit requires only that the existing facilities be operated at maximum efficiency during calendar year 1979. The permit will expire December 31, 1979, and will have to be rewritten at that time. The reasons for this approach are: (1) the Town of Mills, Wyoming has recently been offered Federal construction grant funds for the planning, design and upgrading of their wastewater treatment plant. As part of the Phase I (planning portion) of that grant, this Department will require assessment of the possibility of regionalization of the various wastewater treatment plants (including Evansville's) in the Casper area; (2) until the Casper area Phase I study is completed, it is not possible to calculate effluent limitations for Evansville because of lack of knowledge about the projected location, quality and quantity of upstream discharges; (3) until the Casper area Phase I study is completed, it is not certain whether or not Evansville will continue to operate a wastewater treatment facility; (4) the Casper area Phase I is not expected to be completed until late in calendar year 1979, at which time the Evansville permit will expire and be rewritten using the information contained in the study; (5) for any reason it becomes necessary to issue a permit to Evansville with definite effluent limitations, the proposed permit may be modified prior to its expiration date.



BEARDING THE LION

by Myra Connell

When my present home in a central Wyoming town was built during the late '40s it was out on the edge of town, practically in the country. A dirt track wandered past. It had once been the main road to the fort that protected white settlers from hostile Indians. A sagging barbed wire fence bordered the road, furnishing support for wild clematis vines, which in turn sheltered a flock of meadow larks, summer and winter. Beyond the fence, open fields invited kids with kites.

As the years fled, the vacant lots filled with houses. An iron mine brought workers; workers' families demanded houses. The fields became subdivisions. The road widened into a street. The fence, the vines and the larks vanished. Like a great many other people in other towns, I found my home almost surrounded by people-hutches.

With growth of population, traffic increased, of course. So citizens soon demanded paved streets. During the paving process, the city acquired two small parcels of vacant land on opposite sides of a street near my home. All surrounding land was privately owned, most of it developed.

For several years the plots were put to various uses: children's feet wore a short-cut to school, old ladies took short walks,

and some people walked their dogs. Birds and fishermen competed for the grasshoppers.

In winter the city trucks dumped huge piles of snow scooped off the streets. The extra moisture helped the coarse grass stay green all summer.

About that time I observed some "vest-pocket" parks in other towns, so I thought it would be a fine thing if our town were to dedicate a few plots of open ground to the park system since open areas were becoming more scarce almost hourly.

I laid a careful strategy for attempting to persuade our city council to do this.

First, I approached the city parks and recreation supervisor who was very much in favor of the idea. I obtained letters from the parks and recreation board and the town planning commission recommending that the two parcels be retained by the city for future use as "vest-pocket" parks.

Further, about 45 environmentally-minded neighbors and citizens signed a petition requesting the council to designate the land as part of the parks system.

Armed with this persuasive arsenal, I approached the mayor and council at a regular meeting and presented "the case for breathing space" within neighborhoods.

I was astounded when I met virtually no opposition. The council voted unanimously to add both parcels of land to the park system. There were two reservations: first the parks director said that no money was available for development at that time, and second, the mayor stated that the areas had to be used for disposal of snow, as the city had no other place for it. For my part I

wasn't pressing for a developed park — I was happy with just a little open space.

I really thought I "had it in the bag," especially since the city attorney took pains to point out that land once designated as park could not be UN-designated after 10 years had elapsed.

Alas for the best laid plans of mice and men.

(To be continued in my next column.)

SERVICE DIRECTORY

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Dec. 15, 1978 — High Country News-15

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T-shirt: Eagle, Whale, Dolphin
Wilderness Polar Bear
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Wilderness shirts ask
support for Alaska Wilderness
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plexiglas acrylic sheet
for storm doors, windows
do it yourself and save.
Plasticraft's 2800 N. Speer Blvd.
Denver Co. 80211 303-433-9801

The proposed permit requires monitoring of effluent quality (including the parameter ammonia) with reporting of results quarterly.

(5) PERMIT NAME: TOWN OF FORT LARAMIE, WYOMING

MAILING ADDRESS: P.O. BOX 177
FORT LARAMIE, WYOMING 82212

PERMIT NUMBER: WY-0020567

The wastewater treatment facilities serving the Town of Fort Laramie, Wyoming, consist of a single cell non-aerated lagoon with no disinfection equipment. Under existing conditions there is usually no discharge, however, when a discharge does occur, the effluent enters the North Platte River (Class II stream) via an unnamed slough.

When the present facility discharges it does not meet National Secondary Treatment Standards, therefore, the proposed permit simply requires that the existing lagoon be operated at maximum efficiency until Federal construction grant funds are offered to the Town. Upon notification of the offer of Federal grant funds, the Town is required to submit a schedule of compliance for achievement of Secondary Treatment Standards.

Because of the extremely high dilution factor in this case (year 2,000 design flow of .05 MGD and an in-stream Q710 of 73 MGD) the permit limitations on fecal coliform bacteria (50,000 per 100 ml) and total residual chlorine (2.0 per 1) are more than adequate to insure compliance with Wyoming's in-stream water quality standards. Also, because of this high dilution factor, no limitations on ammonia are required to meet State standards for that parameter.

The proposed permit requires monitoring of effluent quality on a regular basis and increases the reporting frequency from semi-annually to quarterly. The permit is scheduled to expire December 31, 1983.

(6) PERMIT NAME: AMAX COAL COMPANY
"PROSPECTOR VILLAGE"

MAILING ADDRESS: 205 SOUTH ROSS AVENUE
GILLETTE, WYOMING 82716

PERMIT NUMBER: WY-0026433

Prospector Village is a mobile home park with 300 units located north of Gillette, Wyoming. The Wastewater Treatment Facilities consist of two cell lagoon in which the first cell is aerated. The discharge is to Little Rawhide Creek (Class IV Stream) via an unnamed drainage.

Effluent monitoring indicates that the treatment facility cannot meet the discharge permit conditions for the parameter total suspended solids and the owner has requested less stringent limitations authorized under recently adopted federal regulations.

The Department agrees that the existing facility will be unable to consistently meet the total suspended solids limitations of the permit. Also, since the discharge is to a Class IV Stream there would be no adverse environmental effects from allowing the higher level of total suspended solids discharge. Therefore, the Department proposes to grant the requested increase in the total suspended solids limitations (the design capacity is well under the 2.0 MGD upper limit for this exemption).

In addition, it is proposed that the expiration date of this permit be extended to November 30, 1983, and that instantaneous maximum limitations be added to the permit. All other permit conditions and requirements are retained as in the original permit.

(7) PERMIT NAME: TOWN OF JACKSON

MAILING ADDRESS: P.O. BOX 1687
181 KING STREET
JACKSON, WYOMING 83001

PERMIT NUMBER: WY-0021458

The wastewater treatment system serving the Town of Jackson, Wyoming consists of an extended aeration activated sludge plant followed by a polishing pond. No disinfection is practiced. The discharge is to Flat Creek (a Class II Stream).

A Section 201 facility plan for treatment plant upgrading is currently under preparation for the City. It is anticipated that the outcome of this facility plan will be the selection of a system comprised of aerated lagoons followed by infiltration-percolation ponds. This system would be constructed in the South Park area adjacent to Flat Creek.

The immediate limits require that the existing facility be operated at its maximum capability and efficiency until completion of the upgraded system.

No dissolved oxygen waste load analysis has been performed for Jackson. Considering the amount of dilution flow, the stream temperature, and the short distance from the proposed site to the Snake River, it would appear that secondary treatment limits would be adequate to prevent violation of the instream standard for dissolved oxygen.

A waste load allocation was performed for ammonia nitrogen, based upon preventing toxicity to aquatic organisms. The year was broken into two periods based on stream temperature. The discharge flow appeared to change abruptly at approximately the same dates used for stream temperature change. This supports the selection of the periods. Separate toxicity-based limits were determined for each period and inserted in the permit as future limits.

In addition to ammonia concentration limits, poundage values were also included in the permit. This was done to prevent a large unprojected flow increase from causing toxicity problems while still meeting the concentration limits.

Since it appears that infiltration-percolation ponds will be used as the means of effluent disposal, some additional clauses were included in the permit. To help insure that infiltration-percolation ponds built with federal funds receive maximum usage, statements were included which allow no direct discharge to the stream during the summer and only in the winter when the infiltration-percolation ponds cannot be utilized because of climatic conditions. There is concern that the cold climate in the Jackson area will freeze the infiltration-percolation ponds and prevent them from being used in the winter months. If this does occur, a discharge will be allowed.

A request was made that the total suspended solids value for the winter time discharge be adjusted upwards from the 30 mg per l value for secondary treatment to 100 mg per l. The October 7, 1977 Federal Register authorizes the Regional Administrator to adjust upward the TSS limitation contained in the definition of secondary treatment to conform to the suspended solids concentration achievable with "best waste stabilization pond technology" (BWSPT) for treatment systems consisting solely of waste stabilization ponds with design flows of less than 2.0 mgd per d. Although the design flow during periods of the year is greater than 2.0 mgd, the flow during the period of the year when a discharge would be allowed is less than 2.0 mgd. If the infiltration-percolation ponds are constructed, the treatment facility can be considered as two separate systems — a non-discharging system with a design flow greater than 2.0 mgd and a discharging system with flows less than 2.0 mgd. It was, therefore, determined to adjust the TSS limit upward to 100 per 150.

In the event that a system other than infiltration-percolation ponds is selected, limits on fecal coliform and total residual chlorine were inserted in the permit to prevent water quality standards violation of these parameters.

The monitoring requirements for a system discharging directly to the receiving stream are essentially the same as those contained in the previous permit. They are considered appropriate for the proposed system.

During periods of application to the infiltration-percolation ponds, monitoring will be required of the lagoon discharge and groundwater monitoring wells. This is being done to determine the removal achieved through the infiltration-percolation ponds, any groundwater pollution, and the lagoon BOD 5 and TSS effluent which will produce the maximum nitrogen removal in the infiltration-percolation ponds.

The proposed expiration date for the permit is September 30, 1983.

STATE EPA TENTATIVE DETERMINATIONS

Tentative determinations have been made by the State of Wyoming in cooperation with the EPA staff relative to effluent limitations and conditions to be imposed on the permits. These limitations and conditions will assure that State water quality standards and applicable provisions of the FWPCA will be protected.

PUBLIC COMMENTS

Public comments are invited any time prior to January 2, 1979. Comments may be directed to the Wyoming Department of Environmental Quality, Water Quality Division, Permits Section, Hathaway Building, Cheyenne, Wyoming 82002, or the U.S. Environmental Protection Agency, Region VII, Enforcement Division, Permits Administration and Compliance Branch, 1860 Lincoln Street, Denver, Colorado 80203. All comments received prior to January 2, 1979, will be considered in the formulation of final determinations to be imposed on the permits.

ADDITIONAL INFORMATION

Additional information may be obtained upon request by calling the State of Wyoming, (307) 777-7781, or EPA, (303) 327-3874, or by writing to the aforementioned addresses.

The complete applications, draft permits, and related documents are available for review and reproduction at the aforementioned addresses.

Public Notice No: WY-78-013

John Wegel Yellowstone Park's most devoted geyser gazer

by Philip White

The river chuckles as it moves, perhaps from the tickle of the warm, algae-frescoed runoff waters of the earth's grandest collection of geysers and hot springs. A spike bull elk wades the river toward taller forage below Spa and Grotto Geysers. Two dozen geese whirl overhead, conversing, slipping downstream to a meadow roost. In the chilly September dusk, no tourists are present to hear the preparatory rumbles and splashes from a large, toilet-shaped mound of sinter on the east bank of the Firehole River in Yellowstone National Park.

Riverside Geyser will not be performing alone, however. Fifteen yards above it, a solitary figure in a down parka sits on a rock ledge. His legs are wrapped with ponchos and a headlamp is strapped to his forehead. The beam jumps from the overflowing bowl, to other vents on the upper sides, to the river at the base of the mound.

Then the beam moves up the bank to light up the man's notebook. A coyote howls from the forest 100 yards above the river, then emerges and barks, seemingly perturbed by the geyser man. Unconscious of the coyote, the observer checks his watch, makes a few notes and resumes his study.

For three months and 380 consecutive eruptions, John Wegel has been present to watch Riverside arch its plume 80 feet high out over the river. He watches either alone in the middle of the night or among a hundred spectators awed by Riverside's rainbows painted in the spray by day. Since June 21, his self-imposed, uncompensated mission to record the exact times of Riverside's initial overflows and eventual eruption has allowed him only three hours of sleep at any one stretch.

Wegel is a member of a select group of people smitten with an odd Yellowstone vocation: exploring the gestalt of geysers. In the summer of 1978, his chief compatriots were Herbert Warren, a retired De-

Wegel is a member of a select group of people who are smitten with an odd Yellowstone vocation: exploring the gestalt of geysers.

nver businessman; Marie Wolf, who works at the Old Faithful Inn and concentrates on the Daisy Geyser group during off hours; and John Railey, a retired Los Angeles draftsman.

It has been a momentous year for geysers. The world's largest geyser, Steamboat, erupted for the first time in nine years on March 28. On August 23, the Norris Geyser Basin again resounded, blasting its 300-foot water column aloft. The dramatic Morning Geyser ended a dormant cycle with several ebullitions at the end of August. Then Giant Geyser, just upstream from Riverside, provided a powerful, climactic eruption on Sept. 9, its first since 1955.

Warren first visited Yellowstone in a Model-T during the 1920s. "We had to fix three or four tires every day," he says. His

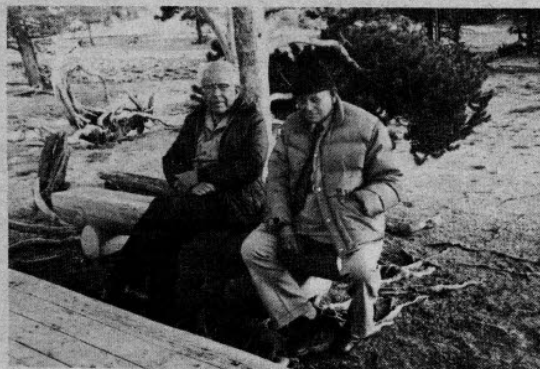


Photo by Phil White

ON THE BENCH AT GRAND GEYSER. Herbert Warren (left) and John Railey spend most of summer and fall watching geysers along the Firehole River in Yellowstone National Park.

back each summer except one since then to study geysers, especially the world's largest predictable geyser, the Grand.

Geyser gazers Warren and Railey pay a daily rate at the Old Faithful Inn while they indulge their habits.

Wolf has combined summer employment at the inn with geyser-gazing for several years. According to Wegel, "Marie has stacks of notebooks and drawings on the geysers. She's one of the real experts on the Upper Geyser Basin."

Wegel, in his early 40s, was born in New York City's upper East Side. His father was a research physicist at Bell Telephone Laboratories. Wegel earned bachelor's degrees in French literature and mathematics from Montana University and in mechanical engineering from Montana State. He obtained a master's in mechanical engineering from the University of New Hampshire.

At New Hampshire, Wegel says, "I grew tired of living in the dorm so I moved out into the parking lot. I rigged up my Volkswagen beetle with a stove and refrigerator and a sleeping spot. My car has been my home for 10 years."

In 1974, Wegel stopped at Yellowstone after a hiking expedition in Grand Canyon, met the park geologist, Rick Hutchinson, and began taking times on Old Faithful and Beehive. "I slept in my car in the corner of the inn's parking lot, and Beehive would wake me up when it erupted," he says.

Wegel returned to the park in March of 1975 and stayed for nearly a year. He put up a height scale on the window of his room at the Visitors' Center and put an infrared machine into operation which would detect and record Old Faithful's eruptions. To be safe, he devised a power alarm to wake him if the power failed.

Wegel's curiosity about geyser behavior frequently took him out on a cone to observe pre-eruptive activity. Three times, he was burned on the feet and legs. A hospital stay of several weeks resulted when he accidentally stepped into a shallow, 188 degree pool on Old Faithful's cone. After these incidents, some park administrators were reluctant to allow Wegel to continue

To confirm his discovery, Wegel spent two weeks with the geyser, sleeping nearby.

sion, handgun target shooting. "It satisfies my Lone Ranger complex," he says.

In 1977, Wegel was again drawn toward geysers. "I was sitting here feeling depressed because I wasn't a part of things at Old Faithful anymore. Riverside began overflowing and my automatic response was to record the times. I almost threw the figures away. A few days later in Bozeman I plotted up the times and noted an interesting pattern," he says.

Hutchinson says, "Wegel discovered that the intervals between eruptions cluster around two time periods: at five and three-fourths hours and at a little over six and one-quarter hours. Rarely does it erupt at six hours. It is like Old Faithful, where we have many intervals of 50-55 minutes and even more intervals of 70-85 minutes, but rarely an interval of 60 minutes between eruptions."

Wegel's observation was quite significant for predicting the times of eruptions, according to Hutchinson. To confirm his discovery, Wegel spent two weeks continuously with the geyser, sleeping nearby. "I recorded everything during 58 cycles," he says. He returned to Bozeman where he lived in his car behind a sporting goods store. "The owners were very kind to me. When it was real cold, they let me stay in the basement," he says.

He spent most of the winter in the Montana State University library. "I found a book called 'Time Series Analysis' in the statistics section. I studied that, along with

matrix algebra and real variables. Then I got the idea of a stochastic model for Riverside."

The word comes from a Greek root meaning "skillful at aiming." A stochastic model is a complicated mathematical formula that could be used to predict eruptions. "Things in nature don't change suddenly," Wegel says. "The formula, which requires a computer, is an attempt to boil down all the data and make a reasonable analysis without too many parameters."

Hutchinson admires Wegel's tenacity: "He goes out there no matter what the weather. It has snowed a few times, and it's been down to seven degrees above zero. I feel certain that no person has ever shown such continuous dedication to a particular geyser."



Photo by Phil White

GEYSER GAZING. By mid-October, John Wegel had studied more than 450 consecutive eruptions of Riverside Geyser in Yellowstone National Park in a self-initiated research project that allowed him only three hours of sleep at a stretch. The photo shows him with his calculator in one hand and notebook in the other.

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