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High County News

February 10, 1992

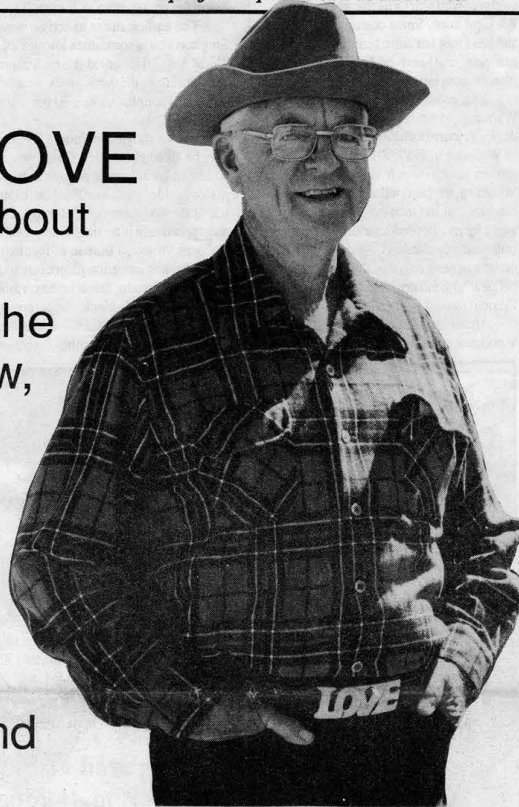
Vol. 24 No. 2

A Paper for People who Care about the West

One dollar

DAVID LOVE

His warnings about selenium in Wyoming and the West aren't new, but the trouble is few want to hear that thousands of acres are poisonous to plants, cows and people.



by Tom Harris

In 1949, J. David Love sent an astonishing "memorandum" about selenium poisoning to his superiors in the U.S. Geological Survey.

Love was — and is — one of the foremost western geologists of his time and one of the agency's two or three most prominent field geologists. In nine pages and accompanying maps, he outlined a program that would take geology to farmers, ranchers and other property owners throughout vast areas of the western United States.

"If this program is properly effected," Love said, "it will save these people millions of dollars by preventing livestock deaths, preventing livestock and human debility, preventing the raising of poisoned crops, eliminating poisoned pastures, and preventing unwise investments in land and livestock."

His branch chief at the time, Carl H. Dane, had directed Love to prepare such a proposal after a major international geological conference in Salt Lake City dealt, at length, with the threat of selenium and other poisonous trace elements.

But the proposal never surfaced again, officially or otherwise, and Love still is not certain how high up the USGS ladder it went.

"All I know for sure," he recalled during a November 1990 interview in his

office at the University of Wyoming in Laramie, "is that it was never acted upon and that its sequel has virtually disappeared from the face of the earth."

For Love followed up what certainly must have looked like a political bombshell to his superiors — and to theirs — with an even more explicit proposal in 1951. In it he urged the USGS to establish a new and separate section devoted entirely to the study of a wide range of impacts to public health from an even wider array of geological threats.

"That one just disappeared altogether. It has vanished entirely from the Survey files," said Love.

It's not surprising that someone might have gone a bit weak at the knees over Love's frank objectives.

In his stark fashion, Love wrote: "In Montana, approximately 30 percent of the state has, at the surface, seleniferous rocks that are actively or potentially poisonous. The figure for Wyoming is 20 percent, for Colorado 30 percent, for the northern half of Arizona 20 percent, for the northern half of New Mexico 40 percent, for Utah 25 percent. In short, thousands of square miles of land in these regions are now, or may become, poisonous to livestock that graze there and to human beings that live there, and crops that are raised there may be poisonous," Love wrote 43 years ago.

He recounted a threat of progressive debility for the regional economies involved and warned of acute cases of rapid poisoning that could cause "several

million dollars in livestock losses per year" in the Rocky Mountain region alone.

Nowhere, Love warned, was the threat greater than on the reservations of the Navajo, Hopi, Apache and Kaibab Indians in Arizona, 60 percent of whose lands he estimates are pocked with outcroppings of seleniferous formations that are "actively or potentially poisonous."

He said that the entire Navajo Reservation in New Mexico is similarly afflicted. And, now well beyond the tight parameters of the passionless geologist, he adds: "It is no wonder that the economy of these Indians is in terrible condition and their health and that of their livestock is poor. The government has poured hundreds of thousands of dollars into the support of these Indians, yet it has totally disregarded the fact that more than half of the land allocated to them is now or probably will become poisonous."

Love is retired now but remains active in his fieldwork, writing and lecturing. During the interview in his windowless, basement office he chuckled at the apparent brashness of his warnings. "You could say that the language was, oh, rather direct, I guess."

I asked whether he had any doubts about the accuracy of his selenium assessments, any frustrations at the lack of response to his warnings. The swivel chair in his Laramie office creaked as he

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 Nevada
 and Colorado
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You have the freedom to say
 what I allow you to say!

Smoke jumper-
 cartoonist takes
 on the
 Forest Service



When we want your opinion,
 we will give it to you!
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Dear friends,



HIGH COUNTRY NEWS

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Four new interns

The first intern to come from the neighborhood, so to speak, is Melinda Merriam, 26, who moved to Paonia in 1990 with her husband, Chris Nyikos, an engineer who works at the nearby West Elk Coal mine. Since coming to the area she has spent her time learning about and managing a 10-acre orchard, which she plans to turn into an organic operation.

After growing up in Laramie, Wyoming, Melinda graduated with a degree in journalism from the University of Wyoming in 1987. She worked as a reporter at the *Green River Star*, in Wyoming, for 18 months, then took her bike, her tent and then-boyfriend Chris along for an extended tour of Europe, Australia and New Zealand. After a stint of six months as news editor at the *Star*, she and her new husband decided rural western Colorado would be their new home.

After a long drive West, Heather Woodcock arrived to find *High Country*

at the social and environmental history of one line of the Denver and Rio Grande Western Railway. Built in the 1880s, the line wound through the barren country connecting Grand Junction, Colo., and Green River, Utah. Before hitting the libraries, Ann also took time for outdoor work as an instructor for the Colorado Outward Bound School river program in Jensen, Utah.

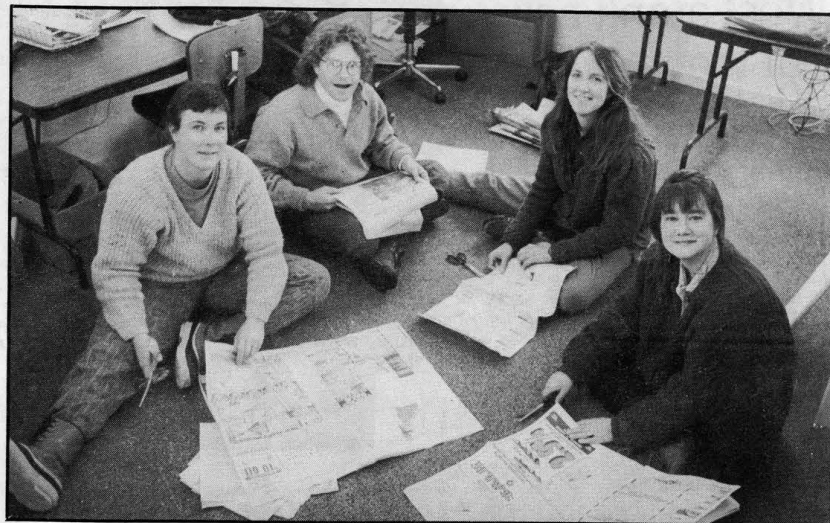
The earliest intern to arrive was Stephen Pettit, sometimes known as "Mad Dog." He earned the nickname through his enthusiastic work as a boatman for Humpback Chub River Tours in Dolores, Colo.

Before moving to Paonia in October, he lived in Boulder, Colo., where he has been completing a master's degree in history under Professor Patricia Limerick at the University of Colorado. His master's thesis is on the history of the Dolores Project, a Bureau of Reclamation dam and irrigation project in southwestern Colorado. Since he has a small degree of writer's block, the internship at *HCN* gives him a chance to divert his creative frustrations in other directions.

ation meets somewhere in the region to conduct business and to hold a potluck dinner to which all readers are invited.

The Jan. 25 meeting, just held in Boise, is the crucial meeting of the year because it reviews financial results for the preceding year, sets a budget and appoints new board members. This meeting went relatively smoothly because the paper had a strong year in 1991. Financially, *HCN* spent \$456,000, exceeding its 1991 budget of \$435,000. But it took in \$504,000 instead of the budgeted \$414,000. As a result, instead of a projected deficit of \$21,000, it showed a surplus (non-profits don't make profits) of \$48,000.

The financial strength was especially welcome because it came from a growth in subscriptions, rather than from grants or large donations. *HCN* ended the year with 11,066 subscribers instead of a projected 10,370 subscribers. Moreover, those subscribers were generated at a very low cost. *HCN's* renewal rate over 1991 was 70 percent, which meant we lost only 30 percent of those subscribers who were up for renewal (2,000 of our present subscribers are multi-year



New interns Melinda Merriam, Stephen Pettit, Ann Vileisis and Heather Woodcock in the new *HCN* editorial area

News' old office stacked high with boxes and back issues, and ready to move. Colorado was a change from Vermont, where Heather, 25, spent the past two years at the Putney School teaching English and women's issues and apple cider-making.

Heather spent much of her younger life living in Tokyo, Japan and Buenos Aires, Argentina. Her family then moved to Cleveland, Ohio, where she led "a more normal life," much to her dismay. She came West to attend Stanford University, where she wrote a thesis on the poet Wallace Stevens.

Heather has worked as an assistant in an organic vegetable garden and spent a month hiking in the Wind River region of Wyoming last summer. Most recently her interests have turned cerebral and she is now applying to graduate programs in English.

Two of the current crop of *HCN* interns are part-time, since each is working on a master's degree.

Ann Vileisis grew up in Connecticut, where she eventually studied environmental history at Yale. Her love of wilderness and rivers, however, drew her outdoors to work in Colorado as a raft guide summers during college.

Ann, 24, spent last winter in Logan, Utah, completing course work for her master's degree in history at Utah State University. During the past summer, she did research for her thesis, which looks

Once the thesis and the internship are out of the way, Steve plans to start a non-profit organization in the San Juan Mountains of Colorado and New Mexico. Called the Center for the San Juans, it will work for cooperative management of the natural and cultural resources of that region.

Things are looking up

Perhaps the most startling information to emerge from the recent *High Country* Foundation board meeting is that *High Country News* added 5,000 new subscribers during 1991. Not so long ago (1986), *HCN* had only 5,000 subscribers in toto. Now it is bumping 11,000.

Given the new readers, we should recite some history. *HCN* was founded in 1970 in Lander, Wyo., by a rancher and environmentalist named Tom Bell. Tom ran the paper for four years, before passing it on to another generation of staff, which passed it on to another generation. In 1980, more or less, Tom transferred *HCN* to a non-profit corporation, or charity, with a board of directors and a hired staff. After another few years and two generations of staff, the paper moved onto yet another generation, this one in Paonia.

The non-profit, 501(C)(3) corporation is named *High Country Foundation* which at present does only one thing: It owns and operates *High Country News*. Three times a year, the board of the *High Country* Foundation

subscribers, and won't come up for renewal next year).

In addition, the paper got a very strong response to the 140,000 samples and pieces of junk mail mailed in 1991. To be exact, we got a 1.2 percent return instead of the 1 percent return we'd gotten in the past. The strong renewal rate for existing subscribers and the 20 percent higher-than-expected response to direct mail, in addition to 960 subscriptions that dropped out of the sky, increased circulation income from a projected \$220,000 to \$278,000.

In addition, *HCN* received \$146,000 in Research Fund contributions instead of a projected \$140,000; grants from foundations totalled \$49,000 instead of an expected \$25,000. *High Country News*, as a policy, does not depend on grants to support its operations. All grant income goes to finance special projects. In 1991, grants made up about 10 percent of *HCN's* total income.

The one negative indicator was a drop from \$65 to \$55 of the average Research Fund contribution. But the number of contributors increased by approximately 400 persons, more than making up for the decrease. The decrease probably had two causes: the hard economic times and the fact that the building fund attracted \$120,000 in contributions, at least some of it from people

Continued on page 13

WESTERN ROUNDUP



F-16 "Aggressors" take off from Nellis Air Force Base

Kit Miller

Gulf peace leads to new war in Nevada

CARSON CITY, Nev. — Open skirmishes have broken out once again between the U.S. military and Nevada. The state whose motto is "All for our country" seems to be changing its tune to "Enough's enough." But it remains to be seen whether the new rhetoric will spur changes in Defense Department designs on Nevada, a state that has contributed more to the military than perhaps any other.

Relations between the Pentagon and Nevada were going from bad to worse when Operation Desert Storm silenced critics of the military and seemed to bring civilians and the armed services closer together.

"Anything the state can do to support our troops, we will do," an aide to Nevada Gov. Bob Miller declared when asked about military expansion plans a year ago during the Gulf War.

But with the confetti of Desert Storm parades long ago blown to the wind, the governor has complained anew of the federal government's "insatiable appetite" for land and airspace in Nevada.

"We increasingly believe that we have given enough of Nevada's land to support military and defense efforts," Miller told a gathering of Western governors in November.

The sheen was off the yellow ribbons by late summer, when thousands of wild horses were discovered dying of hunger and thirst on the vast Nellis Air Force Base bombing ranges north of Las Vegas. The Bureau of Land Management in Nevada complained of no access to a remote area the size of Kuwait.

The hardest blow to relations between the state and military occurred when a federal grand jury returned a criminal indictment against the Fallon Naval Air Station last fall. A subcontractor at the base was found to have covered up a 1988 jet fuel spill. If convicted, Systems Planning Corp. could face a \$7 million fine.

More than 50,000 gallons of highly toxic JP5 jet fuel are still unaccounted for, according to grand jury witnesses. The state has threatened to sue the Navy over another fuel spill at the base.

It was last September, while pilots from throughout the Air Force competed for "top gun" status in war games on the Nellis ranges, that the Defense Depart-

ment released the final version of the *Special Nevada Report*, an anxiously awaited study of the cumulative impact of military activities in the state.

Mandated by Congress in the Military Lands Withdrawal Act of 1986, the report is a phonebook-sized catalog of the bases, bombing ranges, and military flight routes that cover Nevada in a crazy quilt pattern.

The report also documents adverse effects of the military presence in the state — from low-level overflights and

economic opportunities foregone because of military activities.

The only suggestion that made the final draft was the creation of a Military Affairs Committee to improve communication and coordination of federal and state planning in Nevada.

No one seems to know who has the responsibility or authority to establish the planning committee. In recent interviews, many of those who advise state leaders on military issues could not even identify the senior ranking military officer in Nevada, who would serve as chair of the committee.

In fact, no sooner had the *Special Nevada Report* been released than it was back to "business as usual," said John Walker, former state administrator in charge of preparing the report. The different branches of the armed services are still moving ahead with expansion proposals, staying one step ahead of state officials.

"If we want this (coordinated planning) done, I guess we'll have to do it ourselves," Walker said. With the state paralyzed by a budget crisis, "the initiative will probably have to come from the environmental community," he added.

Activists were the first to discover a proposal before the Federal Aviation Administration last fall to expand the airspace around Bravo 16, a bombing range less than 10 miles from the town of Fallon. Other airspace expansions are planned.

The state of Nevada has objected officially to all of the proposed expansions. Citizen Alert and the Sierra Club Legal Defense Fund have threatened a lawsuit if the Navy does not prepare full environmental impact statements on its expansion plans.

"I don't have any problem with environmentalists taking the initiative," said Citizen Alert director Bob Fulkerson. "But we need support from the top, from the governor and congressional delegation on down."

To obtain a copy of the *Special Nevada Report*, contact Thomas L. Lord, Chief Engineering and Environmental Division, HQ TAC/DEE, Langley AFB, VA 23665-5001 (804/764-3024).

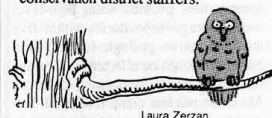
— Jon Christensen

Jon Christensen writes frequently for HCN from Nevada.

HOTLINE

Watt lambasts pagan conservationists

In a talk to the Greater Yellowstone Association of Conservation Districts in Idaho Falls, Idaho, former Interior Secretary James Watt warned members against the growing influence of environmentalists. "They stand for pantheistic socialized control of our well-being," he railed. "They are leftists who want to control your social behavior." Watt recommended that local ranchers, loggers and miners frame resource debates in their own terms, characterizing their conflict with environmentalists as "a religious struggle." Although the goal of the 500-member organization is to seek consensus on management issues, Watt received a standing ovation from the audience of ranchers and soil conservation district staffers.



Laura Zerzan

Owl's turf diminishes

After scaling down its proposed acreage twice, the U.S. Fish and Wildlife Service recently designated 6.88 million acres of old-growth forest as "critical habitat" for the northern spotted owl. The designation, which does not preclude logging, falls far short of the 11.6 million acres that the agency proposed last April. Environmental groups say the latest reduction threatens the survival of half the remaining 6,000 owls, which were first listed under the Endangered Species Act in June 1990. Larry Tuttle, regional director of The Wilderness Society, called the recent designation "risky" because it eliminates corridors that link areas where owls live in Oregon, Washington and California. However, Sen. Slade Gorton, R-Wash., said that the reduced acreage still costs the region too many timber industry jobs. U.S. Fish and Wildlife officials estimate that owl habitat could cost the region 33,000 jobs, but they also say these jobs are doomed anyway because of the nation's current economic slump. Concurrently, the federal Endangered Species Committee, known as the "God Squad" because of its authority to allow extinction of species for economic reasons, is hearing testimony on a BLM proposal to sell 4,000 acres of timber in western Oregon. The U.S. Fish and Wildlife Service opposes the sale because it will threaten more owl terrain. The "God Squad" is expected to make a decision by mid-March.

GE backs out

General Electric is pulling its sponsorship of the National Audubon Society's environmental television documentaries. Since the airing of programs about the impacts of grazing and logging on public lands, the corporation has been besieged by protests from organizations representing cattlemen, loggers and second-home owners on public land. GE officials said they were not influenced by the protests and that a need to cut advertising costs led to the decision. But the National Inholders Association and the Multiple-Use Land Alliance took credit for GE's pull-out. Inholders director Charles Cushman told AP that his group generated 35,000 letters to GE threatening a boycott. GE will continue to fund four Audubon specials in 1992, including programs on the Great Plains and eco-terrorism.

HOTLINE

Casino opposes dump

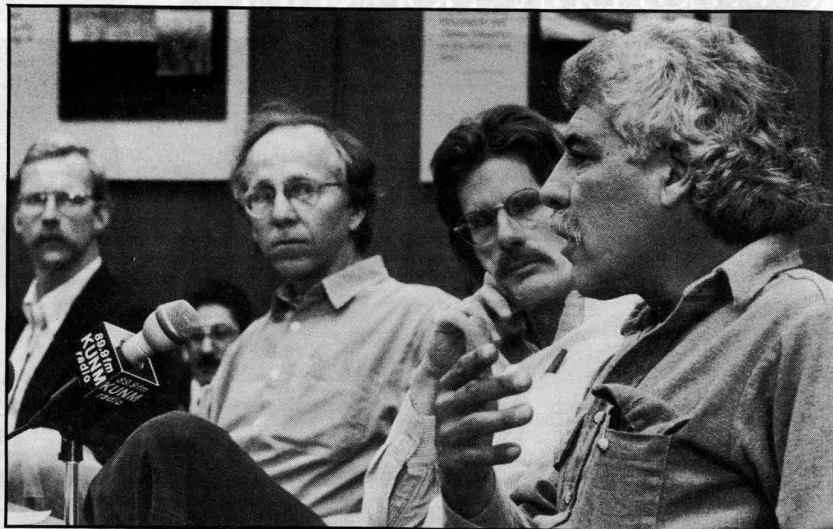
Circus Circus, one of the giant casinos on the Las Vegas strip, recently donated \$100,000 to combat the Department of Energy's proposed Yucca Mountain radioactive waste dump. Only 100 miles north of Las Vegas, Yucca Mountain would store over 77,000 tons of high level nuclear wastes — mostly spent nuclear fuel rods from the nation's power plants — in tunnels 1,000 feet underground (HCN, 11/4/91). Circus Circus's donation was welcomed by Nevada's Agency for Nuclear Projects, which conducts research to support the state's resistance to the Energy Department. Most recently, scientists hired by Nevada charged that the DOE and Nuclear Regulatory Commission allowed less stringent earthquake protection for Yucca Mountain. Current federal rules prohibit siting high-level waste storage repositories within five miles of active geologic faults. Yucca Mountain could be affected by 32 active faults. However, opposition to Yucca Mountain nuclear dump is an uphill battle. Associated General Contractors, which represents over 600 companies employing 15,000 people, recently announced its support for Yucca Mountain. Furthermore, the American Nuclear Energy Council, the commercial nuclear energy industry's trade organization, recently blitzed Nevadans with an expensive \$800,000 television campaign. The council says it will spend nearly \$8 million more over three years to sell nuclear waste to Nevadans, reports the *Reno Gazette-Journal*.

Cuddy Mountain appeal succeeds

The proposed Grade/Dukes Timber sale in western Idaho's Cuddy Mountain Roadless Area has been put on hold (HCN, 1/27/92). Deputy Regional Forester Robert C. Joslin says the Payette National Forest will be required to supplement its environmental impact statement with specific information regarding "old growth fragmentation, biodiversity, pileated woodpecker and raptor surveys, sensitive plant and animal species, and future-sale cumulative effects." The proposed Cuddy Mountain cut was appealed in December by a grass-roots citizens' coalition, including several Idaho and Oregon environmental groups, and Neighbors of Cuddy Mountain, which represents over 2,300 local ranchers, irrigators and farmers. The Boulder, Colo.-based Land and Water Fund referred the coalition to Moscow, Idaho, attorney Hoyey Graham, who volunteered time to pull the citizens' appeal together.

One for the sting

Federal prosecutors reached a plea bargain in December with a Pueblo, Colo., man accused of illegally manufacturing chemicals used to poison eagles. Last September, agents of the U.S. Fish and Wildlife Service and the Environmental Protection Agency raided Raymond Hall's company, Humane Coyote Getters Inc., as part of an 18-month sting operation (HCN, 10/21/91). Hall's company manufactured gunpowder-charged cyanide shells for sale in foreign countries but allegedly sold them in the United States. The device, originally intended for coyotes, was banned in this country in the 1970s.



A meeting about logging near Carson National Forest included, from left, David Henderson (Audubon Society of Santa Fe), Sam Hitt (Forest Guardians), Grove Burnett (environmental lawyer) and Ikie DeVargas (logger)

Coalition seeks to stop over-cutting

VALLECITOS, N.M. — For 24 of his 48 years, Cloveo Rael has supported himself and his family by working at a small sawmill near this logging community in the southern Rockies, 75 miles north of Santa Fe.

Through the years, Rael, a mill supervisor, and other millworkers and loggers have often been at odds with environmentalists. But now, the small, largely Hispanic timber industry in Vallecitos has joined forces with them. A mill needs logs, and the new coalition hopes to halt what they charge is excessive logging in the nearby Carson National Forest.

The local logging company and five environmental groups say the U.S. Forest Service has mismanaged a 73,400-acre area in the forest that was set aside by Congress to provide employment and timber to nearby communities.

The new coalition includes representatives of the local logging company, La Compania de Ocho, National Audubon Society, Forest Guardians, Carson Forest Watch, The Wilderness Society and Sierra Club.

The coalition points out that the area, called the Vallecitos Federal Sustained Yield Unit, was established by Congress in 1948 to provide steady employment to surrounding communities. By law, the unit is mandated to provide trees only to the local mill.

One goal of the coalition is the withdrawal from timber production of a pristine, 13,000-acre area within the unit. The group suggests cutting less environmentally sensitive timber instead. The coalition says the proposed Filpito Timber Sale contains some of the oldest trees left in the region, as well as several rare species of plants and animals.

Currently, the Forest Service cuts 5.5 million board-feet of timber a year from the Carson National Forest. A million board-feet is roughly equivalent to the amount of timber that can be carried by 200 logging trucks. The coalition says that no more than 3.5 million to 4 million board-feet should be taken each year. Forest Service officials are completing a study to determine whether the current harvest is sustainable over the long haul.

Carson timber manager Stet

Edmonds says the current harvest is sustainable ecologically but may not provide enough large logs to make the local sawmill economically viable in the future.

"We are doing an analysis to ensure their concerns are met. If not, we'll probably lower the cut," says Edmonds.

The coalition has been hailed as a breakthrough by northern New Mexico environmentalists, who have come under criticism from the state's congressional delegation for being insensitive to the economic impacts of their legal challenges to timber sales.

"We have agreed to set aside our differences and seek a new direction in the management of national forest lands in New Mexico," says Sam Hitt of Forest Guardians.

Antonio "Ikie" DeVargas of La Compania says he had two goals: ensuring that the community receives 3.5 million to 4 million board-feet of timber annually, and protecting the sustained yield unit on which Vallecitos and other small communities in the area depend.

"My main concern is with the people of my community," says DeVargas. "We don't want to let the unit get over-cut because that would mean there wouldn't be anything here for people 10 or 30 years from now."

Hitt and DeVargas also agree that the Duke City Lumber Co. of Albuquerque, the only company allowed to bid on logging contracts in the sustained yield unit, should be doing more to support the people of Vallecitos. For example, they say, Duke City should be required to build a mill in Vallecitos to provide more local jobs. The company has one mill in Española, 35 miles away. La Compania is only one of several Duke City lumber contractors.

Despite the current goodwill between members of the coalition, DeVargas says his decision to side with environmentalists on the Filpito sale is conditioned on the Forest Service making other areas available for logging.

"We have to have 3.5 million board-feet a year or people won't make it up here," says DeVargas.

Hitt, of Forest Guardians, says he has doubts as to whether even harvesting 3.5 million board-feet is sustainable. But he

says he recognizes that this is the minimum that La Compania would agree to.

"We're sensitive to their economic concerns," says Hitt. "This is a compromise agreement."

It is not the first time that northern New Mexico environmentalists have agreed to compromise in order to save logging jobs. Last spring they dropped a legal challenge to a logging operation on the Santa Fe National Forest that would have impacted jobs at a Duke City sawmill in Cuba, on the west side of the Jemez Mountains. Environmentalists also agreed not to object to six other cuts on the Santa Fe.

The unlikely coalition was not expected by Duke City Lumber officials. "I'm surprised that La Compania would be siding with environmentalists," says company president Tom Lapinski.

As for the Filpito sale, the agency says it is currently weighing public comment on a draft environmental impact statement.

—Keith Easthouse

Keith Easthouse is a reporter for the *New Mexican* in Santa Fe.

HOTLINE

Grand Canyon cleanup challenged

Officials at the Central Arizona Water Conservancy District are challenging a ground-breaking plan to clean up polluted air over the Grand Canyon. The water district, which would bear some of the cost, filed a lawsuit in federal court against the Environmental Protection Agency. In September the EPA, conservationists and the Navajo Generating Station power plant agreed to install pollution scrubbers at the facility for \$1.8 billion (HCN, 8/26/91). Environmentalists, federal agencies and independent scientists have traced pollution directly to the coal-fired power plant, located 15 miles from the canyon's rim. The president of the water district, which operates a 336-mile canal through Arizona, told AP that the canyon's dirty air is caused by smog from Los Angeles.

Smoke jumper leaps into cartooning

The cartoons below are by Joseph Fox of McCall, Idaho, who has spent the last 14 fire seasons in the West as a "smoke jumper."

That means he routinely bails out of small planes onto remote mountains while loaded down with fire-fighting equipment and wearing a crash helmet that encloses his face in a metal cage.

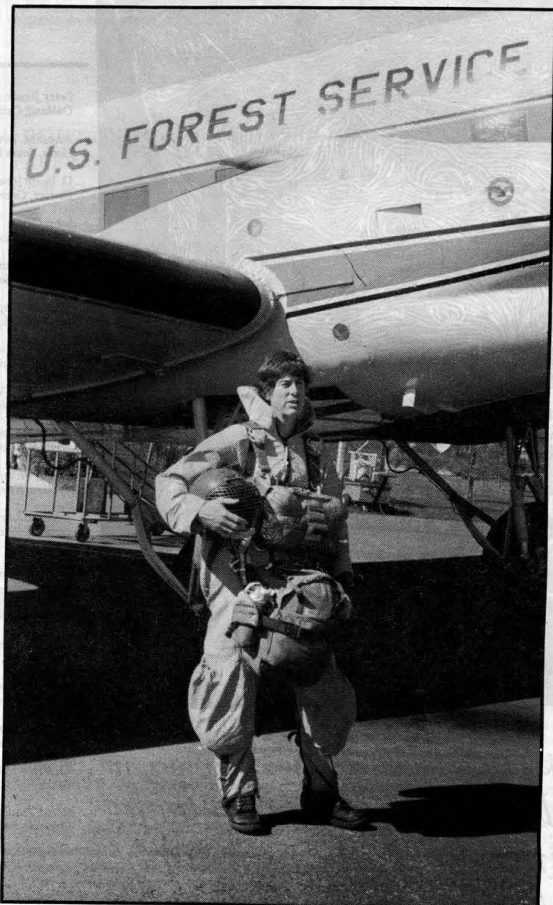
Fox, 37, enjoys his unusual work, though not necessarily the swirling smoke, heat or the odds: In 100 jumps you are likely to suffer one injury, he says.

Smoke jumping was not exactly a career goal. Fox earned a master's degree in zoology from the University of California at Davis, followed by two years in the Fiji Islands as a teacher for the Peace Corps. But science was his first love, and he went on to earn a PhD. in forest entomology from the University of California, Berkeley. It was at Berkeley where Fox began cartooning - drawing bugs that weren't part of his research on bark beetles.

A year ago Fox ventured into political cartoons, creating satirical portraits of the Forest Service for the *Inner Voice*, a newspaper published by Jeff DeBonis' Association of Forest Service Employees for Environmental Ethics. Some of his work has also appeared in the environmental newspaper, *Citizen Alert*, of Nevada.

Besides his steady job as a smoke jumper, Fox occasionally works for the Payette National Forest in Idaho as a writer-editor. He is there now on a limited contract, and so far, he says, no one has objected to his — or his cartoon characters' — tilts at bureaucratic windmills.

— Betsy Marston HCN editor



Smoke jumper-cartoonist Joseph Fox

Diane Evans

HOTLINE

Tucson pumps too much

A scientist reports that groundwater pumping seriously threatens the water supply in Tucson, Ariz. Increasingly, water is being extracted from a fragile clay layer at the bottom of the water table rather than from sand above, says Mark Hatch, a geophysicist at the University of Arizona. He told the *Arizona Republic* that the water table has dropped faster since 1987 than ever before, resulting in water coming out of deeply buried clay layers. Once water has been removed from these layers, many partially collapse, which can reduce future storage capacity by up to 15 percent. Hatch's study, presented to the Geological Society of America in late October, came just after Tucson decided to take 48,000 acre-feet of water each year from the Central Arizona Project. The CAP now draws 1.5 million acre-feet of water annually from the Colorado River and transports it 320 miles to central Arizona. Hatch said the question for Tucson is whether CAP water is going to be available "at the levels we need for the rest of time." Each year, Arizonans consume 2 million acre-feet of water more than rain restores. Without conservation efforts and CAP water, Hatch's study projects that groundwater pumping could cause land surfaces to drop by 12 inches over the next 40 years. But Hatch said Arizona still has choices: "We're right on the cusp. If we've done damage, we haven't done much yet."

BARBS

One of the first benefits was smallpox.

Without the "enormous, undreamed-of benefits of western culture, most of today's Indians would be infinitely poorer or not even alive," said Michael S. Berlin, executive director of the Ayn Rand Institute, in the Idaho Falls *Post-Register*.

FOREST BARE



THE HIGH-POWERED EXECUTIVE BEAR STRIDES INTO THE GLITTERING FOREST CORPORATION BUILDING.



IN HIS SPACIOUS OFFICE, FOREST BEAR INSPECTS THE ROAD CONSTRUCTION, TIMBER HARVEST, MINING, AND OIL PRODUCTION.



SUDDENLY, THE OLD STUFFED DEER SLIPS FROM THE WALL AND STRIKES HIM ON THE HEAD!



KNOCKED UNCONSCIOUS, FOREST BEAR BEGINS TO DREAM....



FOREST BEAR DREAMS OF THE FOREST FIRE WHEN HE WAS A CUB, AND HOW HE BECAME A SYMBOL TO PROTECT FORESTS....



SOON HE WAS JUST A FACADE PROTECTING ACTIVITIES WHICH WERE RUINOUS TO THE FORESTS....



FOREST BEAR HAD BECOME A COLLABORATOR WITH FOREST DESTRUCTION!!!



HE AWAKENS, BUT THE BLOW ON THE HEAD HAS GIVEN HIM AMNESIA! NOW HE MUST SEARCH FOR HIS TRUE IDENTITY!

by JOE FOX

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LETTERS

REPORTER TELLS HIS SIDE

Dear HCN,

Lori Potter's letter to the editor, "Name Your Sources" (HCN, 1/17/92) commenting on my Dec. 2 story "Water Fight Sinks Wilderness Bill" strikes me as both naive and insincere. Ms. Potter should know by now that reporters sometimes have to hide the identity of their sources, although they would prefer not to, in order to get valid information into print. It is one of the less-happy trade-offs of the news business.

But what I find most disingenuous about her response is her statement, "Debate on the point (the Sierra Club Legal Defense Fund's lawsuit) is valid, and I welcome it." She knows I tried for several weeks to contact her by telephone to discuss that point, for stories I was preparing both for HCN and *The Economist* magazine. But during that period she never returned my telephone calls. Indeed, that is still the case. I think this reveals more about her sensitivity to the criticism in the environmental community over her organization's controversial lawsuit than how "dismayed" she

was because this newspaper "stooped" to quote an unidentified source.

Larry Mosher
Crawford, Colorado

POLITICAL TRANSFERS ARE NOTHING NEW

Dear HCN,

John Mumma appears to be Rep. Ron Marlenee's latest conquest (HCN, 10/7/91). I relate well to the current pathetic situation. In the early 1980s, I was manager of the Charles M. Russell National Wildlife Refuge surrounding Fort Peck Reservoir. I was charged with completing an environmental impact statement (EIS) for the management of the refuge. The EIS recommendation was for a 32.8 percent reduction in live-stock grazing for the benefit of wildlife.

As a result, Marlenee met with Assistant Secretary of the Interior Ray Arnett on Dec. 1, 1983. Marlenee said he "... stopped short of calling for the resignation of the manager ..." (*Billings Gazette*, 12/2/91). Yet I was called into the U.S. Fish and Wildlife regional office in Denver and told Marlenee

wanted me out of Montana. I was offered a position in Oregon.

In the same newspaper article, it says, "But I (Marlenee) seem to get the impression" that the area is being managed for wildlife more than for other uses, Marlenee went on. To me, and many others, managing for wildlife on a national wildlife refuge seemed an appropriate objective.

My wife and I decided to fight the forced transfer. With the help of local, state and national organizations and individuals concerned about wildlife, Marlenee's office received more than 200 phone calls supporting the new refuge concept.

It was a trying time for myself, my family and other government employees — many could visualize the same thing happening to them. Should they make the correct resource decision or bow to the wrath of Marlenee?

Marlenee finally realized he was on the wrong side of the "wildlife fence." He backed off from demanding my transfer or resignation.

But now it's John Mumma's turn. What government employee will be next? Some sportsmen hang antlered trophies on their walls. Marlenee hangs

government employees' heads on his.

Ralph Rises
Billings, Montana

"EVERY AGENCY NEEDS A WHACK"

Dear HCN,

In its Dec. 2, 1991 issue, HCN inadvertently attributed to Lori Bodi of the National Marine Fisheries Service a statement I made to your reporter. As the statement indicates my attitude toward environmental protection generally and FERC's obligations specifically, I ask for a correction. The statement referred to the 1983 *Yakima* court decision holding that FERC failed to properly carry out its environmental analysis obligations in that case. My words, attributed to Ms. Bodi, were "(e)very agency needs a whack on the head now and then to keep on the straight and narrow." I also stated that *Yakima* was a good decision. Thank you for setting the record straight.

John H. Clements
Washington, D.C.

John Clements is deputy director of the Office of Hydropower Licensing for the Federal Energy Regulatory Commission.

UNCLASSIFIEDS

TROUT UNLIMITED and the Colorado Environmental Caucus maintain a free Environmental Bulletin Board named TUBB, phone 303/440-5842. TUBB serves Colorado environmentalists interested in the legislative process at the State House. Important bills, analyses, amendments, alerts will be displayed as they become available, plus how and why to contact legislators, plus their committee memberships and schedules.

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JOB OPENING, OIL AND GAS ISSUES STAFF. Colorado Environmental Coalition — Denver. Half-time for six months, with possible extension. Monitor all phases of public lands' oil and gas management to ensure development complies with environmental laws and sensitive areas are protected. Call 303/837-8707 for position description and to apply. Deadline Feb. 21, 1992. (1x2p)

CEDAREIDGE, COLO. 8 acres, 2 homes — low maintenance, attached greenhouse, gardens, fruit trees, hay, barn/loft, root cellar, outbuildings, irrigation, creek, views, quiet. \$128,000. 303/856-6362. (3x1p)

EXECUTIVE DIRECTOR. Environmental Fund of Washington, Seattle, Wash. The Environmental Fund of Washington (EFW) is a federation of groups working to protect and enhance our environment for future generations. EFW raises funds collaboratively primarily through payroll deductions. Responsible for promoting workplace giving options, enhancing public relations, diversifying our fundraising efforts and overseeing administration. Salary \$26,000 to \$28,000 (DOO). Closes Friday, March 13, 1992 close of business; send letter of interest, resume and list of three references, in confidence, to: Environmental Fund of Washington Search Committee, c/o J. Milligan, Washington Trails Association, 1305 Fourth Ave., Suite 512, Seattle, WA 98101-2401. (1x2b)

GREATER ECOSYSTEM ALLIANCE seeks full-time office coordinator beginning February 17, 1992. Responsibilities include bookkeeping, fundraising, database management and administrative support. Preferable qualifications: excellent computer and communication skills and previous office management experience. Commitment to environmental protection. Salary: \$12,000 + benefits. Location: Bellingham, Wash. Send resume to Mary Cutbill, GEA, P.O. Box 2813, Bellingham, WA 98227. (1x2b)

FREE BOOK CATALOG: Pioneers, cowboys, settlers of the West. Non-fiction, true stories for men, women and children. Send 29¢ postage. Maverick Publications (HCN), 10245 West 14th Ave., Denver, CO 80215.

EXECUTIVE DIRECTOR. Regional conservation alliance seeks experienced chief executive to lead and manage organization with 100 member groups, 1,000 individual members and \$150,000 annual budget. Responsibilities include: 1) Management and administration duties, including budgeting, financial management, staff supervision; 2) Organizational development and fundraising, including grant-writing, membership development, planning board development; 3) Projects and issues, including hazardous wastes, mining, water pollution control, instream flows and watershed protection. Required skills include: Leadership and management of non-profit organizations; fundraising; speaking and writing; policy and technical; coalition building and advocacy. \$22,000-24,000 DOE. Contact Tim Williamson, President, Clark Fork - Pend Oreille Coalition, P.O. Box 7593, Missoula, MT 59807. To apply submit resume, three references and at least one writing sample by Feb. 28, 1992. (1x2p)

ALTERNATIVE ENERGY CATALOG for remote homes. Solar electric, wind, hydro-electric generators, wood-fired hot tubs, composting toilets and more. \$2.50, refundable with order. Yellow Jacket Solar, Box 60H, Lewis, CO 81327. (6x1p)

WANTED: RAFTING CHAPTER MANAGER FOR FRIENDS OF THE RIVER, a grass-roots environmental organization devoted to saving rivers. Manage daily operations and programs, particularly on-river fundraising and public education. Requires coordinating volunteers and equipment on/off river and bookkeeping, writing and communication skills. Season position (3/15/92 to 10/31/92), with full-year potential, based on northern California's South Fork American River. Monthly salary \$1,500 to \$1,800 and generous bonus program. Apply before Feb. 22, 1992 by calling Jeff, 916/928-6262, or Suzy, 408/727-7174. (1x2b)

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OUTDOOR SINGLES NETWORK, bi-monthly newsletter, ages 19-90, no forwarding fees. \$18/1-year, \$4/trial issue-information. OSN-HCN, P.O. Box 2031, McCall, ID 83638. (9x21p)

LAND LETTER ... the newsletter for natural resource professionals. Special introductory offer. Write 1800 North Kent St., Suite 1120, Arlington, VA 22209 or call 703/525-6300. (24x1p)

11 NATURALIST INTERN POSITIONS. The Aspen Center for Environmental Studies, Aspen, Colo. Responsibilities: Provide natural history and interpretive programs for children and adults; wildlife rehabilitation; manage visitor's center; special exhibits; natural history writing; maintenance projects. Qualifications: Educational background in natural sciences, environmental education or related; knowledge of Rocky Mountain flora/fauna helpful. June-August, 1992. Stipend, housing and Naturalist Field School Course(s). Send resume, creative writing sample and 3 references to Laura Struempfer by March 2, ACES, Box 8777, Aspen, CO 81612. Call Laura Struempfer for more information at 303/925-5756. (3x1p)

DIRECTOR POSITION OPENING: The Montana Wilderness Association announces a new position to help guide MWA through a period of expansion. Tasks: coordinate organization activities, financial management, personnel supervision, development, and diversified funding. Experience required: working knowledge of non-profit advocacy organizations, staff management, fundraising skills, consensus building, grass-roots development and a reverence for the land. \$26,400/yr. Application deadline: Feb. 21, 1992. Starting date: June 1992. Send cover letter, resume, three references to: Search Committee, MWA, Box 635, Helena, MT 59624. (2x1p)

NATIONAL AUDUBON will host an ecology workshop on the Platte River of Nebraska, March 15-22, 1992. Eighty percent of the world's population of lesser sandhill cranes (nearly 500,000 birds) gathers here — a magnificent wildlife spectacle seen by few. Participants will investigate crane biology in detail, and discuss their predicament of survival amid complex water policies and declining flows on the Platte. The workshop includes three days at National Audubon's SPRING RIVER CONFERENCE, featuring Audubon's president, Peter A.A. Berle, as keynote speaker and presentations by Platte River authorities, combined with daily field trips. \$995.00. For information contact: National Audubon, 613 Riversville Rd. Box H, Greenwich, CT 06831 (203/869-5222).

STUDENT INTERNSHIPS: Would you like to live on the edge of Glacier National Park, Montana, for a season and help run an outdoor education program? The Glacier Institute offers outdoor classes for all ages and interests, including 1-5 day residential environmental programs for 1st-9th grade students. 3 interns spring, 2 summer, 3 fall. Write: Glacier Institute, PO Box 1457, Kalispell, MT 59903. (2x1p)

LEGAL NOTICE: The U.S. Department of the Interior, Fish and Wildlife Service, announced a proposal to list the Mexican spotted owl as a threatened species in order to give them the protection of the Endangered Species Act of 1973 (Act), as amended. The proposed action, published in the *Federal Register* of November 4, 1991, follows a review of all available information on the species. This medium-sized bird is found from parts of central Colorado and Utah south through Arizona, New Mexico, and western Texas, then south through northwestern Mexico to the state of Michoacan. It commonly inhabits mountains and canyons containing dense, uneven-aged forests with a closed canopy. The Mexican spotted owl is threatened by habitat loss caused by logging and fires, increased predation associated with habitat fragmentation, and lack of adequate protective regulations. Comments from the public on the proposed rule should be submitted by March 3, 1992, to the Field Supervisor, U.S. Fish and Wildlife Service, Ecological Services Field Office, 3530 Pan American Highway NE, Suite D, Albuquerque, NM 87107. Additional information may be obtained from the Field Office at the above address, or by calling (505) 883-7877. (1x2b)

SUMMER/AUTUMN 1992 RENTALS. Newly restored log house with all amenities. Very private location bordering National Forest, 300 yds. from Gallatin River, near Big Sky, Montana. Available by the week or month. Hope Stevens, Box 459, Bozeman, MT 59715 (406/586-1182, 406/995-4268). (2x1p)



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HOW SELENIUM WORMS ITS WAY ONTO THE RANGE ...

(Continued from page 1)

tilted back and ran a hand through richly textured, snow-white hair.

DOUBTS, NO; FRUSTRATION, YES

"Doubts? Do I have any doubts about the toxicity of selenium to cattle and other livestock, or even to people in the West?" he repeated. "No. I don't have any at all, especially about the validity of the mass of anecdotal information about it in the historical literature. There is just too much of it to be ignored, even though that is what many in Wyoming still want to do.

"Politically, we are still ignoring the whole problem. Sooner or later we are going to have to face up to the fact that we have poisoned ground in our state ... and many others," Love said.

"Do I feel frustrated by the lack of response to these warnings? Oh, my, yes. You try to impress the importance of vision on these young people today, some sense of long-range impacts, and it just doesn't take. I have given lectures on this subject and on this need all over the West, on the relationship of geology to human health and disease. There has to be an interrelationship of the sciences.

'Sooner or later we are going to have to face up to the fact that we have poisoned ground in our state ... and many others.'

— J. David Love

No one person can know it all. It is too complex for that."

J. David Love should know. His connections to selenium go way, way back ... to some of his first recollections, stories told around the roaring hearth of the Love Ranch, 12 miles from the exact geographical center of Wyoming and 13 miles from the nearest neighbor.

"No one knew what it was back then, as far as the name goes, but they sure knew its effects. I remember the ranchers talking about the Lysite Buttes. As a youngster, I remember hearing them talk about having to put range riders out there all the time, on patrol, to keep the sheep and cattle away from the poisonous grass. And that was only 25 miles from our place.

"It was in the 1890s, at the peak of the Mormon persecutions, and a couple of Mormon shepherders came through with 4,000 sheep and found this huge range and camped there to graze. Some cowboys just happened to ride through and see them and warned them about the poisoned ground. Unfortunately, the drovers took it as just more anti-Mormon bias and insisted they had a right to use it as free range.

"The next morning, when they awoke, 2,800 of the sheep were dead," Love said. "And in the next few days, as they trailed what was left of them out of there, another 800 died, leaving them with only 400 of the 4,000 they came with. That was a terrible tragedy for them."

About every generation or so, he

added, someone goes back in there. "They see all that grazing land and just can't resist. I guess they figure the old stories are just a myth."

Love's selenium schooling may have started at the fireplace, but it didn't begin to bud until he enrolled at the University of Wyoming. There he had the respected head of geology, Dr. Samuel Howell Knight, as his mentor. Knight was close, personally and professionally, to Orville A. Beath, the school's chief research chemist and also one of the world's foremost selenium researchers. It wasn't long before Love was hired by Beath to do "odd jobs" in the summer. One of them was to journey to Jackson Hole in 1934, when Love was just 19.

There he looked for *Astragalus* plants, the aboveground "flags" of the belowground presence of selenium. In the shadow of the Grand Tetons, Love's curiosity about the "freaky" trace element and quirky *Astragalus* would take on new dimensions.

He remembers the experience and its significance well. "We camped out for about a week — you can imagine what Jackson Hole looked like back then, absolutely magnificent country — and found one area with a few *bisulcatus*," said Love. "But there were no woody aster at all. Today," said Love, speaking of his most recent visit there in the summer of 1990, "there are hundreds of thousands of asters all over that area and a lot more *bisulcatus*, too." The daisylike woody asters, or *Xylorrhiza*, resemble, but are shorter than, the common oxeye daisy. They require high levels of soil selenium to grow.

But these unusual plants are more than warning indicators of the danger below. Their deep taproot systems, perhaps aided by distinctive soil microbes, are uniquely able to absorb from the surrounding soil the elemental form of selenium that is apparently essential to their growth but otherwise unavailable to other plants and grasses.

Once taken up into the plant, the metalloids is metabolized into water-soluble selenate — so that when the converter plants die, they deposit an enriched halo of water-soluble organic selenium around them that can be readily taken up by nearly all other forms of vegetation. And, as so often happens with other hazardous elements, the methylated daughter compounds often are more potent than the parents.

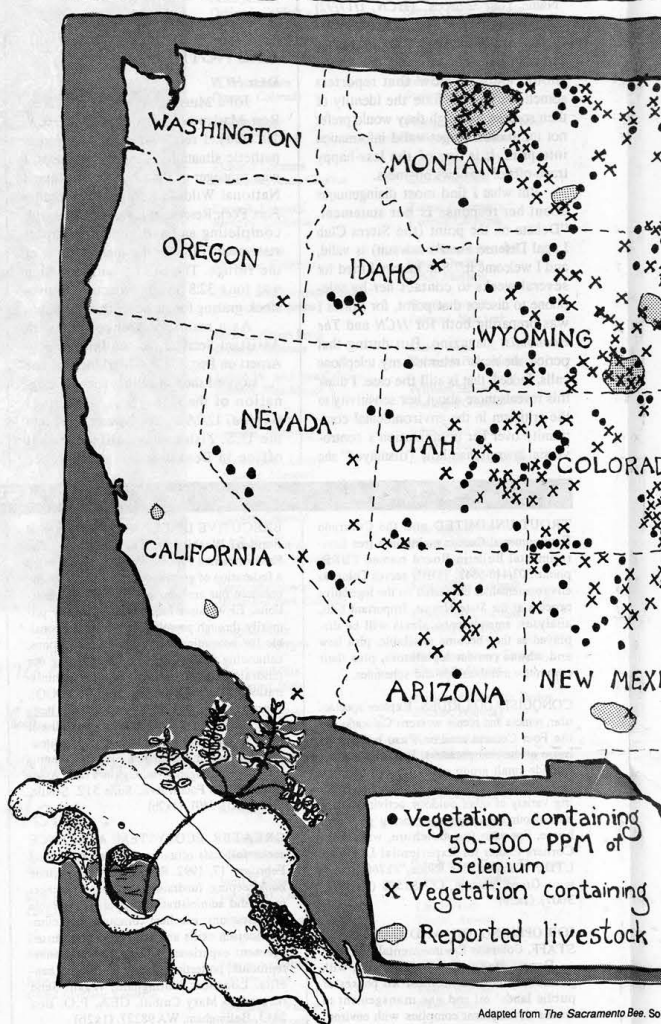
PLANTS ARE EXPANDING THEIR RANGE

The passage of time and Love's astute powers of observation in the rich Teton meadows near his summer home have revealed a chilling but little understood role that unwitting human endeavors may have played in spreading the impact of selenium toxicity.

The virtual explosion — Love calls it an invasion — of primary indicator and converter plants is slowly turning the Upper Gros Ventre Basin (pronounced "gro-vaunt" from the French name "Big Gut" for the Sheepherder Indians of that region) into a very real selenium threat. On the southern doorstep of Yellowstone National Park, the basin is a popular summer range for 6,000 head of Wyoming cattle and 15,000 elk.

Love grew clearly agitated as he recalled the scene and thumped the top of his ancient oak desk with a thick, weathered palm.

S·E·L·E·N·I·U·M P·O·I· IN THE WEST



Adapted from The Sacramento Bee. So

"Many of those cattle now come out of that range with the distinctive 'paddle hooves,' low birth rates, and low fat content common to selenium-poisoned livestock — despite grazing on what used to be some of the most nutritious grass on God's green earth," he said. "And they are up there for only a few months of the year.

"But that's only half the story. The Gros Ventre is the year-round range for the Yellowstone elk herd and the Gros Ventre mountain sheep herd, the largest mountain sheep herd in the North America. They are increasingly in danger of being wiped out by selenium. But it won't be anything dramatic. They will just fail to reproduce successfully and, slowly, the herds will die out.

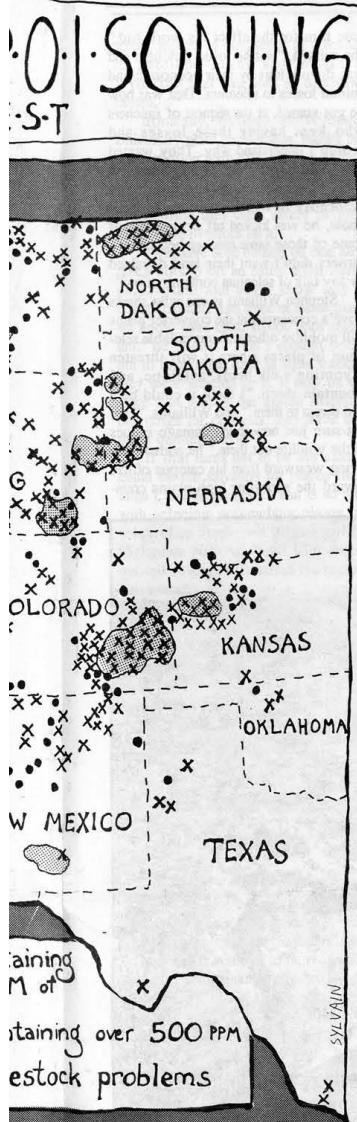
"The plants are expanding all over that country, year after year," added Love. "I can't prove how it happened but I strongly suspect it is the result of trucking cattle in from areas where the indicator plants were common and from this relatively recent practice of trucking hay all over hell and gone. Those big hay trucks are going up and down those highways all the time, carrying cut-up *Astragalus* plants — and their seeds — along with the hay. I think that is how they have been spread."

Love was eager to go on: "The ques-

tion, now," he said, "is at what point does that process convert and mobilize enough of the native selenium so that it becomes toxic to those animals? I don't know the answer to that and I don't think we can afford to wait any longer to find it. I have taken U.S. senators, governors, cattlemen, and three different heads of the U.S. Forest Service through there and showed them the problem during the last 30 years. It keeps getting worse but nothing ever gets done."

But how did the selenium get there in the first place? And how did it spread over hundreds of thousands of square miles of the rest of the West and so many other parts of the world, too?

Love said the process started millions of years ago with volcanic eruptions associated with formation of the earth's crust. The gaseous emissions of selenium eventually were scrubbed from the atmosphere by rain and snowfall, concentrating wherever the downwind plumes took them. The rest spewed out in volcanic ash, some of which straddled the globe and left volcanic selenium in places where no volcanism occurred.



sacramento Bee. Source: U.S. Department of Agriculture and Bee interviews

Love believes the remainder was brought to the surface by flows and surges of superheated lava.

What didn't reach the surface then has emerged since. Erosion and weathering carried selenium-laced sediments into the beds of ancient lakes and seas, especially over much of the West. There, layer upon compressed layer, concentrated in the remains of billions of aquatic organisms, selenium was incorporated in shales that are present at the surface.

Those same seleniferous outcroppings are present throughout much of the West today, and many of them contain enough of the element to produce toxic vegetation.

But there is more to the selenium distribution than marine shale formations. Dozens of researchers the world over have reported extremely high concentrations of the poison in everything from deeply buried coal seams and oil formations to limestone, sandstone, and especially, sulfide ore bodies, some of which contain so much of the element that concentrations are expressed as percentages — up to 23 percent in some cases — rather than mere parts per billion or even million.

By comparison, 1 percent is 1 part per hundred — four orders of magnitude

greater than a 1 ppm level. Even the wintertime snowfall over Cambridge, Massachusetts, in 1964 contained 270 ppb, according to a report by USGS researcher Hubert W. Lakin. The selenium fallout from the area's coal smoke in 1964-65 was almost as high as the selenium load flowing into Kesterson Wildlife Refuge in California, where agricultural runoff concentrated the element in such density that it deformed or killed waterfowl (HCN, 11/20/89).

Love had at least three firsthand experiences with selenium cropping up in ore bodies and other rock formations, and two of them have serious public health implications today. One was selenium's almost constant presence in uranium ore formations. Another case of guilt by metallic association was selenium's combination with vanadium.

During World War II, Love supervised government efforts to mine and mill vanadium from organic-rich black shale formations at eight different sites in the West because the Department of Defense needed the element as an alloy to strengthen the armor on U.S. tanks. Those same vanadium-rich shales held selenium levels of from 20 to 119 ppm — and it still taints mine tailings decades later.

Love talked also of reports written about health dangers to uranium miners and millers constantly exposed to both the toxic and radioactive effects of the uranium. "But," he added, "they almost never mention selenium, even though it is probably more dangerous." One of those documents made only a one-paragraph mention of the potential health effects of incorporated selenium dust, although others often refer to common occurrences of a "red slime" on the surface of spent uranium ore tailings. That, said Love, is the reddish-colored elemental selenium.

The veteran geologist also spent years studying the West's prolific phosphate formations, from which some of the nation's largest firms now mine phosphate rock for fertilizer.

"We know that selenium is present in most of that formation," said Love, "sometimes at hundreds of parts per million." Its presence, he believes, is related to the high organic content of phosphate deposits from marine organisms that would have concentrated the selenium from the water around them.

The geologist cautioned: "I worry about whether we are spreading selenium all over our lands in this country, today, from the use of phosphate fertilizer. We are spreading millions of tons of phosphate on our farmlands every year and most of it has at least some selenium."

"This absolutely needs to be looked into," said Love. "I have screamed and yelled about this for years because we need to know the risks. But, I warn you that if you do raise this issue, you will run into an industrial roadblock from people who mine and process it here in the West."

Love's third concern, about selenium leaching from the uranium tailings and other mine waste deposits with which it is often associated, is not being ignored, however. The federal Office of Surface Mining has commissioned studies of abandoned mine wastes and their selenium potential and also is funding recovery and archival preservation, in the University of Wyoming Library, of volumes of early and unpublished selenium research by Love's mentor, Orville Beath, and his colleagues.

Some historical research has already documented especially high levels of selenium in the outwash of old silver, gold, lead and zinc milling operations at Park City, Utah. Some ore samples there held as much as 540 ppm selenium, and the Weber River carries elevated seleni-

Selenium research is ignored again and again

"This is the strangest story I've ever done in nearly 40 years."

That is how *Sacramento Bee* reporter Tom Harris sums up his eight-year investigation into the effects of the trace element selenium on the West.

"The deeper I got," he says, "the more I discovered the research about it (selenium) had been around 20, 30, 40, even 50 years ... It just keeps getting stuffed back in the closet."

Harris, who won the national George Polk Award for reporting about selenium in 1984, focused at first on the effect of selenium on animals at Kesterson National Wildlife Refuge in California. In the early 1980s, government officials decided to discharge drainage water from irrigated agricultural fields in the San Joaquin Valley into manmade ponds at the refuge.

What no one counted on was that selenium, which is essential for animals in microscopic doses, would accumulate in the refuge until it killed plants, poisoned water and caused waterfowl to cease reproducing or bear gruesomely deformed young.

The death toll led to government scientists asking the Interior Department in 1984 to look for selenium poisoning at other wildlife refuges in the West. Their hypothesis was that federal water projects, which made irrigation possible in arid areas, might be implicated in the buildup of selenium.

But a plan to check 427 Bureau of Reclamation water projects disappeared into a "black hole," Harris says. Smelling a hot story, Harris convinced his newspaper to pay for an investigation of 23 sites at or near Western wildlife refuges.

The results, based on tests conducted at a federally approved lab, showed widespread and increasing selenium contamination. The stories triggered hearings and a congressional order to the Interior Department to investigate further. The government's audit confirmed the newspaper's analysis.

The Interior Department, however, took no position on whether Bureau of Reclamation water projects caused selenium to build up to poisonous quantities. A plan to search for selenium and other toxic trace elements from as many as 470 of its projects was again stalled by the Bureau of Reclamation, Harris adds.

Sensing that the story was bigger than water contamination, Harris and *Bee* colleague Jim Morris went on the road to interview ranchers, farmers, doctors and researchers such as geologist David Love in Wyoming. They also dug into scholarly research, and when they put together the picture they found that:

- Veterinarians often misdiagnose the effects of selenium poisoning, assuming livestock suffer from a defi-

ciency of the element.

- Doctors often misdiagnose selenium poisoning in rural patients, not understanding the cause of their rheumatoid arthritis, broken or brittle toe- and fingernails, muscle degeneration, "garlic" breath odor, accelerated tooth decay, discolored skin and excessive fatigue.

- Ranchers often add unneeded selenium to cattle feed, which can increase its buildup in cattle that have already ingested it on the range.

- The Agriculture Department's "safe and adequate" listing for daily human intake of selenium is no lower than 50 micrograms and no higher than 200 micrograms. But tests Harris made at supermarkets and on soil, water and food revealed that most people routinely receive more than the minimum.

The most tainted food sample, a serving of mutton, taken at Montrose, Colo., yielded 1,088 micrograms. The most toxic of six soil samples came from a newly planted alfalfa field, also near Montrose. It was so loaded with selenium at 5.57 parts per million, Harris reported, that it would be considered a hazardous waste site in California. That concentration also surpassed the 4 ppm level required for removal or isolation at Kesterson National Wildlife Refuge.

- Finally, although the medical world has documented that high doses of selenium can cause death to humans, Harris says, no agency is now studying the toxic effect of selenium on people. More important, he adds, no one knows the effects of chronic, long-term exposure to selenium.

What agonizes him most, Harris says, is that ranchers sell out when their cattle fail to thrive, but never know why.

"The government has known for 50 years. The research is all there. But this is the fourth cycle of rediscovering what government scientists knew."

Harris says the entrenched culture of hay-growing and ranching in the West makes it hard to confront the danger of selenium.

"When government scientists make it known, their careers go down in flames," Harris says. "Some poor courageous guy gets shot down every 20 years."

The trouble with ignoring history, Harris adds, is that you are bound to repeat it. When we told Harris we would talk about selenium with people in Wyoming who are in touch with ranchers and farmers, he predicted two reactions. "A, they won't know what you're talking about or B, they will deny it's a problem. They'll say it's just a California pipe dream." *HCN's* report is on page 12.

— Betsy Marston, *HCN* editor

Death in the Marsh by Tom Harris was published in December 1991 by Island Press, Box 7, Covelo, CA 95428.

um levels today.

Beath and noted Columbia University botanist Samuel F. Trelease, co-authors of the first selenium textbook in 1949, discovered similar problems in the southwestern corner of Idaho.

Of a mining district which once produced large quantities of silver and gold,

not far from where the Jordan River flows through Owyhee County, the authors stated: "One of the most abundant of the silver ores in the district was naumannite (Ag₂Se) containing 23 percent selenium."

That is a remarkable 23 parts per hun-

Continued on next page

SELENIUM IN THE WEST...

(Continued from page 9)

dred, or 230,000 parts per million. Beath and Trelease say the selenium moved into the downslope grasslands, where flood-plain silts were found to contain from traces to 25 ppm selenium — and the grass growing in them up to 116 ppm.

For comparison, the highest level found so far in the alluvial outwash of California's San Joaquin Valley is 4.5 ppm selenium in the soil and some edible crops with levels from 10 to 12 ppm.

Beath became the pre-eminent selenium researcher of his time, though there were dozens of others probing into its unique properties in the 1930s and 1940s. Beath was especially interested in persistent reports of mass sheep deaths on the high plains of Wyoming and some ranchers' claims that the cause was some kind of toxic agent in the vegetation.

The most dramatic of those events was the loss of more than 15,000 sheep in the summers of 1907 and 1908 north of Medicine Bow, Wyo., where the animals grazed an area profuse with woody aster and what the ranchers then called Gray's vetch (later identified by Beath as *Astragalus bisulcatus*).

SELENIUM WAS FOUND IN WHEAT

Other researchers, including Dr. K.W. Franke and coworkers at the South Dakota Experiment Station, found toxic levels of selenium in wheat and other grains grown in high-selenium soils as early as 1929. Franke's report was considered highly controversial by his superiors and it was withheld from publication until 1934 because of the same kind of economic and political pressures commonly experienced by current selenium researchers.

Love said he had heard Beath agonize about Franke's problems with reports censored or withheld because of their economic and political implications, a quandary he was not altogether unfamiliar with himself. Concentrations in some grain samples were as high as 12 ppm, high enough to be toxic to humans, and the gluten contained up to 90 ppm.

But Beath, moved by the tragedies of area ranchers whose livestock continued to suffer inexplicable death on the open range, concentrated on the unique native plants suspected as the cause. Before his work was over, he had combed known and suspected selenium host-rock formations throughout the West and closely studied the work of other researchers in nearly every western state and the prairie provinces of Canada. Thousands of samples of both the host-soil formations and the vegetation growing on them were col-

lected and analyzed. Sam Trelease, the biochemist, conducted detailed research on the internal chemistry and metabolic functions and properties of the plants.

Beath separated the samples into three categories: *primary selenium indicators*, plants that accumulate (and need) high concentrations from high-selenium soils; *secondary selenium absorbers*, plants that take up only moderate concentrations from highly seleniferous land; and *nonindicator species*, those plants which grow in the presence of selenium but absorb only tiny amounts, less than 1 ppm.

Beath prospected an overwhelming number of selenium leads during nearly 40 years of active research on the topic, ranging from scientific reports to personal and historical accounts, news stories, tales of the Old West, and the unpub-

lished findings of others. He faced were tremendous, but he just pushed ahead anyway. He showed true courage.

Many of the ranchers he tried so hard to help wound up hating him, sometimes ordering him off their land at gunpoint. That part of Beath's legacy has been passed on to others.

Stephen E. Williams, one of the new generation of selenium researchers and a plant physiologist at the University of Wyoming, recounted the story of how he and his colleagues were digging a series of pits beside selenium indicator plants that virtually covered parts of a ranch, northwest of Laramie.

"It was this spring," said Williams, "We were digging pits, next to *Astragalus* plants, so we could examine the root structure and its interface with the underlying soil. We got the permission

hate him for the effect his work had," she related. "But he loved ranchers and was deeply hurt by their economic and animal losses to selenium. That was how he got started, at the request of ranchers who kept having these losses and couldn't understand why. They wanted him to do the chemical work to find out what was causing all the death and deformity in their livestock. Later, I know, he was kicked off or ordered off some of those same ranches because the owners didn't want their land devalued by any talk of selenium contamination."

Stephen Williams is one who shares Love's concerns that the converter plants will mobilize otherwise unavailable selenium in places where it will threaten Wyoming's elk herds, antelope, and mountain sheep. "I think it could be a real threat to them," said Williams. "I am not sure just how much damage it does to the wildlife out there," he added, gesturing westward from his campus office, toward the sprawling high plains coun-



© The Sacramento Bee

Selenium poisoning may have killed these antelope found outside Laramie, Wyo., according to researcher Arthur Kilness

lished findings of others.

His work triggered great controversy — and still does in Wyoming because of its obvious potential impact on property and livestock values. The university was supportive of some of his work but, especially toward the end, in the 1960s, he had to fund much of it himself. Outside help was almost nonexistent. In fact, Beath and Trelease, the respected chief of Columbia University's botanical department, had to pay for publication of their first text. And Beath himself had to publish a pamphlet for circulation among Wyoming ranchers and others threatened with selenium's toxic impact.

"No one — around here, especially — was interested in what he was finding out," said Love. "The more evidence he collected, the more people worried about the economic impact. No one would touch that first book. He had to pay to get it published himself. The obstacles

of the owner's son, who managed the place, and were out digging when the owner came by and asked, 'What the hell are you guys doing?'

"We told him we had received permission from his son to be there and that we were trying to authenticate some of the early Beath work on selenium. Well, he ordered us off the place, right then. He didn't do it at the point of a gun, exactly, but there was a rifle in his cab and his hand was uncomfortably close to it. He was really angry. He gave us an hour to pack up our stuff and get off. Someone asked him whether he had ever heard of Beath and the research he had done with selenium and he replied: 'Oh, I remember, all right. I really hated that Beath.'"

Beath's daughter, a retired art teacher, lives only half a block from the campus where her father spent most of his academic life. Mary Elizabeth Beath was rummaging through scrapbooks and a growing file on her father's selenium work. She had heard many stories like the one told by Williams.

ANGER AT THE MESSENGER

"I have heard that some of the ranchers Dad helped actually grew to

try. "But I would really like to see some research which addresses what happens to people who eat the antelope that graze on these ranges constantly. We don't know whether the antelope have built up a resistance to selenium or whether they avoid selenium-bearing plants, but clearly they have high potential exposure."

Wyoming wildlife biologist Bill Hepworth had expressed similar concerns two years earlier, in 1988, when I talked to him about a state study for which he was the research director in 1976.

"Frankly, I am concerned about hunters who eat antelope," said Hepworth. "Those animals live out there and graze the land continuously. They could have high levels of selenium." The possibility of tainted big game is an issue he raised with some trepidation. "They make a lot of money in Wyoming from antelope hunters," he volunteered, "so it will not be a very popular idea to test some animals and, if necessary, warn hunters of any risks."

Researcher Arthur Kilness, a South Dakota physician, always thought antelope either had a built-in distaste for seleniferous vegetation or had developed resistance to its toxic effects over generations of genetic coding. But he kept



STYLUM

seeing reports of high levels of selenium in antelope fawns and moose in Wyoming that had died of unknown causes.

Ironically, Williams, the Wyoming University plant physiologist, thinks that one returning form of Wyoming wildlife — buffalo — may hold at least a partial answer to ranchers whose land is so high in selenium they can't safely or profitably raise livestock on it.

"We have seen buffalo on one large ranch chomp off an entire adult *Astragalus* plant and never show any ill effects from it. And some of those plants we know have up to 10,000 ppm selenium," he related. "That's enough selenium to drop them dead in their tracks if they were affected by it. It may be that since that species has grazed seleniferous range for centuries, they have built up an immunity to it."

If that turns out to be the case, it could be the salvation for places like a large Laramie-area ranch that is so thick with selenium accumulator plants that researcher Stephen Williams calls it "Selenium National Park." High-selenium soil covers nearly half of the massive cattle ranch.

"There is a small herd of buffalo there now, and we've seen them eat the *Astragalus* plants with apparently no ill

den. Some of it on purpose by those who really do fear the consequences but most of it by accident because they just don't know all that is involved. If people in this state are ignoring the selenium problem or even trying to sweep it under the rug, it's because they fear that solution of the problem will require that we abandon grazing use of some rangelands and farming of some irrigated land. The state certainly is not eager to tackle the problem."

Then he added: "Ultimately, it involves abandoning some range and farmland in the state. That's what it all comes down to."

W yoming officials recently conceded there is any evidence at all of selenium's toxic effects in their state. And all of that, so far, has been supplied by the U.S. Fish and Wildlife Service and U.S. Geological Survey in a 1987 reconnaissance study of fish and waterfowl in the Kendrick Project, a federally funded irrigation system near Casper, to the north of Laramie.

Selenium levels in water, waterfowl, fish, and other parts of the food-predator web are much higher there than those at the Kesterson refuge.

Even so, some members of the governor's Selenium Task Force in Wyoming continue to insist that neither Beath nor any of the scores of other selenium researchers have delivered "actual hard evidence" that selenium has killed or harmed any livestock in their state.

That recent assertion, by Wyoming Geological Survey geologist James Case of the task force, prompted this measured reply from Williams: "The only way for Jim Case and I to agree on this subject is not to talk about it. He prefers to doubt there is any evidence that selenium has or continues to harm livestock. I am not convinced that is the case yet. But there is clearly something going on, something we have to come to grips with. I am not a doubter, but neither am I a convert. I am just a very, very curious and interested scientist looking for answers."

Love grimaced when he was asked why he thought that some members of the governor's task force claim there is no hard evidence of livestock impact. Neither rudeness nor contempt is part of his personality.

"The trouble with people like that," he said gently, "is that they just won't take the time to read all they should on the subject, even just the work on this campus. If they did, they would know there is ample evidence, and most of it from highly respected scientists." Nevertheless, Love believes that one member of the task force, Case, has helped advance selenium research in Wyoming by mapping potentially seleniferous ranch lands in the state and by what Love called "the even-handed way he chaired the governor's task force on selenium, before that was taken away from him."

THE DANGER IS ON THE RECORD

But to deny there is evidence in the historical literature of livestock poisoning is to ignore or reject not only the scores of anecdotal accounts listed in study after study but dozens of livestock feed tests in which animals were fed both artificially added selenium and selenium-tainted *Astragalus* plants of known concentration.

Those same peer-reviewed studies, many by some of the leading researchers

Continued on next page

How a high plains ranch poisoned people, livestock

Almost everywhere it outcropped, on the farms or sprawling cattle ranches of the West, selenium wrote a painful chapter of human misery.

For Sam Bennett and his family, the tale of frustration and failure started almost the moment they set foot on their new sheep ranch on the border of North and South Dakota, near the tiny farming village of Watauga, in 1957. On the second day, one of his four pregnant brood sows died. Next, it was the bait minnows he kept in the stock watering tank for when he wanted to go fishing.

The deaths kept happening all through the first year. In the second year, 65 ewes died. Lambs and calves were stillborn. Lambs and chickens were born with abnormalities. Neither cats nor dogs could reproduce. Everywhere livestock were dropping dead. Sam didn't know it then, but his pasture grass, hay and grain were loaded with lethal levels of selenium.

Nothing had been said about selenium when he bought the remote ranch on the rolling, windswept prairie, about halfway between the Grand River National Grassland and the massive Lake Oahe on opposite sides of the Standing Rock Indian Reservation. He had sunk everything they had, every penny of their life's savings, and mortgaged as much as he could to leverage some revenue for stock and equipment.

He could take the losses, frustrating though they were. What he couldn't take was the "dumb farmer" label that went with them.

"Oh, it was pretty subtle at first," he said in 1988 when recounting those tough, early days on the lonely land. "The neighbors would shake their heads and say, 'Tough luck, Sam.' But you could see it in their eyes. They thought I was just a bad farmer, a dumb rancher who couldn't look after his stock." Before the family nightmare ended in 1961, Bennett had lost more than \$40,000 worth of livestock, including 1,100 sheep ... and, finally, his ranch.

He didn't take it lying down. He turned to almost every government agency for assistance, even the governor of South Dakota. Finally, university researchers pinpointed the cause of the death and deformity: selenium. "It was a new word to me," said Bennett, "and no one else around here seemed to know anything about it. But I think most of them did. They knew all about what it did, at least — that there was something wrong with the land — if not what was causing it."

However frustrating and painful the inexplicable stock losses and the murmuring of their neighbors, these were not the worst things that happened, either to the Bennetts or to many others like them throughout the West.

"It was bad enough to lose everything like that," said Bennett decades later, while resting at his new home in Sturgis, nearly 200 miles away in southwestern South Dakota. "But when it started ruining our health, that was real spooky."

Bennett's skirmish with selenium struck his family hard. "There were constant skin rashes, especially for Loretta and the kids," said Bennett. "And we had stomach and indigestion problems all the time." Those problems were worse — and apparently permanent —

for their youngest daughter, Sandra, who was conceived on the ranch.

"I can't recall Sandra getting any normal sleep for the first six months. She cried every day until we took her off our own cow milk and put her on storebought," said her father. "She had colic constantly and when her teeth came in, there were black rings around where they came out of the gums and the teeth were spotted black, just like an overripe banana." Dental studies have detected similar symptoms among people known to have high levels of selenium in their system.

Later studies by South Dakota's Dr. Raymond Lemley, who almost single-handedly pioneered the field of diagnosing and treating cases of human selenium poisoning, confirmed in both blood and urine tests that most of the Bennett family had sharply elevated levels of selenium. Most of the selenium poisoning came from the milk, meat and eggs they ate.

"We were so full of selenium that our breath was just awful with garlic odor. We had so much in us we were exhaling the stuff," said Bennett three decades later. And the after effects of selenium still lingered. "Sandra still has a little of what we call the nerves," said her father. "She is very high-strung. Things upset her pretty quick. And the older girl, Sharrey, still has a lot of stomach trouble." Most of the worst symptoms disappeared not long after Bennett's doctor diagnosed the problem and urged the family to leave the ranch and its tainted food.

Bennett worries about the legacy the land passes from owner to owner. "That ground should go out of private ownership," he says now. "The problem won't change. It's in the soil. I was told not to eat the livestock because they had too much selenium and not to sell grain locally but to a terminal from where it could be shipped to Chicago."

The ranch has changed hands five times since then. Each successive owner has suffered similar problems. No one lives on the lonely, isolated spread now, but Stanley Rye, who owned it in 1988, still grazed his own livestock there, and harvested hay grain for his dairy herd at a headquarters ranch about 17 miles away. He, too, was losing cattle — 10 or 12 every year — but didn't know why. Despite the tainted hay and silage the herd's milk still was being shipped to commercial dairies. Attempts to obtain samples for selenium analysis were unsuccessful.

"Selenium? I've only heard the word," said Rye at the tiny general store he operated with his wife in Watauga. "Nobody will tell us anything about it. Is it some kind of plant?"

The answer is more than academic. Rye had had increasing indigestion himself, as well as other — and more painful — stomach problems. "It has been a chronic problem for the past five years, along with general tiredness and muscle weakness, which have been getting worse every year," he said. He is not alone in his suffering, though virtually nothing has been done to pin down the cause of such general malaise throughout the selenium belt. He and the Bennetts are only two of hundreds of known farm families who have suffered hardship and heartache from similar exposures.

— Tom Harris

SELENIUM IN THE WEST ...

(Continued from page 11)

in the Department of Agriculture at the time, reported on the pathology of the poisoned animals along with graphic descriptions of the symptoms they suffered at each successional stage.

The historical accounts are highlighted on the opening pages of Beath's first text on selenium with Columbia botanist Sam Trelease, published in 1949.

That was the same year that Love proposed his major selenium project to the USGS. In addition to the Wyoming State Board of Sheep Commissioners report of 15,000 sheep lost near Medicine Bow, in 1907-1908, the book cites reports of the overnight death of 275 sheep that grazed on poisonous *Astragalus* (then called "two-grooved milk vetch" because of the obvious indentations in the seed-pod) near Rock River, Wyoming, in 1919.

Other tragedies were recounted as well: the 1930 loss of 340 sheep near Elk Mountain, for example, and the death of all but three of a flock of 200 sheep in an

Astragalus-laced gulch near Pueblo, Colo., where 71 more died the next year after a similar episode with the vetch. There are references, as well, to the "poison strips" near the Book Cliffs town of Thompson, Utah, where losses of sheep and cattle "ran into the hundreds ... on numerous occasions."

But all of those cases were identified, then, as victims of "alkali disease." It wasn't until the early 1930s that researchers began to pin down the evidence that it was not the mineral salts associated with the prairie's ubiquitous alkali crust that were doing the poisoning, but selenium. Thereafter, the noose of responsibility was drawn tighter and tighter around selenium. That was true not just in the texts by Beath and cohorts, but in pioneering work by Franke at the South Dakota Experiment Station, and others.

Beath reported the surprising discovery that the chronic "alkali disease" resulted when livestock ate selenium-contaminated grains and grasses. The acute "blind staggers" ailment was more often the result of consumption of the

wild *Astragalus* and other indicator plants. South Dakota feeding tests with toxic grain from seleniferous areas confirmed that "alkali disease" and "blind staggers" were, in fact, cases of chronic and acute selenium poisoning, respectively.

Franke, Beath and Kilness each warned repeatedly that not just cattle but humans, too, were at risk from selenium toxicity. Ironically, each of them died during or just after intensive investigations of selenium toxicity.

Franke's death, in the summer of 1936, was the result of a secondary infection while being treated for bovine undulant fever he contracted while studying poisoned cattle in seleniferous areas of South Dakota. Beath died less than a year after completing his second and more definitive text with colleague Irene Rosenfield in 1964. Kilness was stricken with leukemia just months after completing his last selenium swing through the West in 1988 and died in March 1989.

Some of those familiar with Beath's work think that selenium played more

than an ironic role in his death. "Beath almost died from it once," said one former colleague. "He had been up in the Lysite Buttes, getting samples for his second book, and brought two fist-sized rocks home from there with him. He took them to the lab and ground them down to the consistency of a fine powder. But he didn't wear a mask or anything and he must have inhaled some of the dust because he got terribly sick and had to be taken to the hospital."

Years earlier Beath had experienced a brief but virulent bout of stomach problems from a meal of duck livers later found to be high in selenium. This time, however, according to associates, he suffered major liver and kidney problems and never fully recovered. Those rocks were loaded with water-soluble selenium. The dust poisoned him and he never got over the exposure. He was never healthy again.

Tom Harris is a reporter for the *Sacramento Bee* in California. This story is adapted from his book, *Death in the Marsh*, published by Island Press in 1991.

In Wyoming, concern about selenium is mild

Tom Harris writes with urgency about selenium, but his urgency is not shared.

High Country News surveyed 14 agricultural advisors or experts in Wyoming. Some either were not concerned or said selenium was low on their list of priorities. Some wanted selenium added to animal feed. All urged more research.

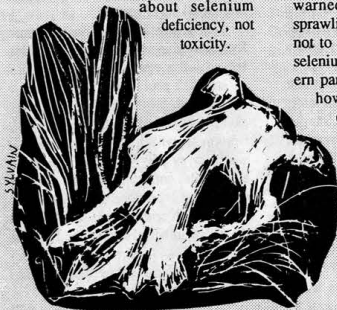
Tom Thorne, a wildlife research veterinarian at Wyoming's Game and Fish Department, said there are more pressing things to worry about than selenium.

"We don't have evidence it is a big problem," he said. No statewide survey on selenium in wildlife has been done in Wyoming, although he said he'd like to be part of such a study. "We don't even know the effects of selenium on wildlife," Thorne said.

Both Steve Williams, a professor of soil biology at the University of Wyoming, and Jim Case, head of the geological hazards study for the state's Geological Survey, criticized Harris' work.

"This is not as straightforward as Tom Harris has presented it," Case said. "I think there's a lot of sensationalism (in the book). We're not even sure if selenium is toxic to humans," Williams said.

A spokesman for the National Cattlemen's Association said its members are concerned about selenium. But Mike Smith, who coordinates research and technical services for the Denver, Colo.-based group, said the concern is about selenium deficiency, not toxicity.



"I don't get phone calls saying there's a problem ... because there's too much selenium in the soil. If anything it's more of the opposite," he said. At first, Smith was reluctant to talk about selenium although the group recently passed a resolution on the issue. The resolution asked the Agriculture Department to continue to allow ranchers to add selenium supplements to feed. Some environmentalists oppose additives, explained Roger Berglund, who works in the group's communication office.

Extension agents of the U.S. Department of Agriculture work with farmers and ranchers every day. The agents *HCN* surveyed in Wyoming said they don't hear much concern about selenium.

Jerry Buk is the extension agent in Wyoming's Natrona County, home to the 25,000-acre Kendrick Project irrigation system. Beginning in 1986, U.S. Geological Survey scientists discovered selenium in toxic levels in the soil and in birds. Nonetheless, very few people have asked him about selenium, Buk said.

"Ranchers have kind of avoided certain areas in certain times of year," he explained. "That's just long-term savvy on the part of the ranching community."

Buk wonders, though, if more people are having problems with selenium but keeping quiet about it. "I've wondered if they weren't worried about property values. That mentality makes sense to me. On the one hand we're environmentalists, but on the other hand we've got to make a living."

In the early 1980s, extension agents warned people in western Casper, a sprawling city of about 46,000 people, not to grow vegetable gardens because selenium was found in soils in the western part of the city. When questioned, however, George Davis, a district conservationist with the state Soil Conservation Service who lives in western Casper, said he never heard about the warnings.

He grows a large garden, eats the produce and hasn't heard of anybody suffering ill effects. "My opinion is that we have a problem," Davis said, "but

it's not that serious."

Phil Derr, at the state Soil Conservation Service office in Casper, has a friend who lives on land irrigated by the Kendrick Project. He said the family doesn't drink water from their well because of selenium in the water. But they grow a large garden and eat their harvest. "They seem to have no problem with the stuff they grow out there," he said.

Ken Hoff, assistant director of the Casper-Natrona County health department, tested 48 wells in the area and found 27 had selenium levels higher than the EPA's safe drinking water standard for 1988. When federal standards were made less stringent in 1991, 20 wells were still unable to meet the requirement. However, most of the wells water gardens or livestock and do not provide drinking water for people.

When a well is contaminated, Hoff said, all he can do is report the results to the well owners. "We don't have authority to tell people they can't use their private wells," he said. "We can't go out and turn off the tap."

Doug Reynolds, extension agent in Carbon County, south of Natrona County, said he has not heard of a single problem of selenium toxicity there, although two-grooved milk vetch, a selenium indicator plant, grows abundantly in the area.

Before working in Carbon County, Reynolds worked in Niobrara County, where animals did seem to be affected by selenium. Several times he was tempted to submit samples taken from cattle to the state lab, Reynolds said. But "something put a question in my mind if it was even worth pursuing."

Dan Rogers, extension specialist at the University of Wyoming in Albany County, said people in the Laramie Basin aren't concerned about the element. "Generally it's so well-known; people that have a problem pretty well know it." Two ranchers west of Laramie have horses whose hooves deteriorated and peeled, one of the symptoms of selenium poisoning in cattle. Rogers said the women have ranches there for 20 years and only recently noticed anything wrong.

Case, with the state Geological Sur-

vey, said he knows firsthand of a case of selenium poisoning in the Laramie Basin. A man who worked with him at the state Geological Survey pastured his horse near the Laramie Airport, about five miles west of the high plains town of 25,000. The horse contracted alkali disease, which is now known to be caused by selenium, he said. Other horses in the area, however, did not contract the disease. He speculated whether a genetic predisposition existed.

"I'm still questioning selenium," he said. "The truth is slowly coming out. Farmers and ranchers seem to know what it is. If they have selenium problems, are they pursuing it? I don't know." The state veterinary lab offers free testing for selenium to anyone who thinks animals may be affected, he said, but very few animals have been tested.

"What more can you do beyond that?" Case asked. "If you feel you have a problem, by God, get it tested. Because then we have something to sink our teeth into. It's a very frustrating issue."

The federal government is doing the most to increase knowledge about selenium toxicity in Wyoming. A U.S. Geological Survey study based on three years of field work in the Kendrick Project area will be published soon, according to Dave Naftz, a research hydrologist with the USGS.

Once the USGS defines the scope of the problem, the federal Bureau of Reclamation is supposed to come up with solutions, beginning this year. "There aren't going to be any easy solutions," said Pete Ramirez, an environmental contaminants specialist with the U.S. Fish and Wildlife Service, who worked with the USGS on the study.

The state's Selenium Task Force has suggested follow-up studies, Case said, but none have been funded.

Nearly everyone surveyed said more research must be done in all the areas selenium affects: water, soil, fish, birds, wildlife, livestock and humans. "We need additional research on this to find the answers," Case said. "It's extremely complex. It's a nasty element to try to get a handle on."

—Melinda Merriam, *HCN* intern

Dear friends,

Continued from page 2

who might have made larger-than-average contributions to the Research Fund.

Board members got to see the new HCN offices, by the way, thanks to a videotaped tour.

Counting the costs

On the expense side, salaries for six full-time and four part-time employees totaled \$179,000; promoting the paper (direct mail) cost \$41,000; we paid the Post Office \$45,000; we paid paid non-staff writers and photographers \$43,000; and we paid our printer and paper newsprint supplier \$47,000. That was up \$15,000 from projections because of the higher cost of the recycled newsprint. The impact was reduced, however, by almost \$7,000 in reader contributions to help pay for the recycled stock.

In the nuts-and-bolts arena, rent for two buildings (the old one and the new one) cost \$12,000; supplies cost \$10,000; the telephone cost \$10,000; and capital equipment (computers, a new program to track subscriptions, chairs, et al) cost \$9,000; health insurance was \$6,000 and payroll taxes were \$12,000.

The new budget looks remarkably like the old with a few exceptions. The free-lance budget has been raised 20 percent, so that we can pay writers better. Part-time staff members will now have health insurance and paid vacations and holidays, on a pro-rated basis, and staff will receive 5-to-10 percent salary increases. Health insurance will almost double, to \$12,000, both because more people will be insured and because costs are going way up. "Rent" will drop slightly because we will stop paying two rents and pay only one mortgage on the new building. Total 1992 expenses are projected at \$530,000.

A conservative budget

The income is budgeted relatively conservatively. We expect subscriptions to bring in \$306,000, the Research Fund \$171,000, and grants \$25,000; interest, special projects, advertising, T-shirts and the rest bring total projected revenue to \$540,000, for a \$10,000 surplus.

As for HCN's fund balance, the paper had \$220,000 in the bank at the end of 1991. This is misleading, because we are richest at year end. Over the next nine months, we will draw that bulge

down, ending up with perhaps \$50,000, or less than a month's worth of expenses, during the driest part of the summer.

The board has been long concerned about HCN's thin reserve, and has mandated the deposit of five percent of unrestricted income into a contingency fund that can only be used in an emergency. At present, that fund totals \$37,000, with an additional \$23,000 from 1991's budget due to be deposited as soon as the new building is financed through a mortgage. That will total \$60,000. The board's goal is to establish a six-month reserve. Another \$39,000 of the \$220,000 consists of foundation grants dedicated to specific projects.

One wild card remains that makes the 1992 budget difficult to determine — the Combined Federal Campaign. That is the United Way-type campaign that federal employees contribute to. While we have heard from a few federal CFC campaigns outside of the West (Kentucky and Georgia, for example), we have yet to hear from Denver or Salt Lake City or other large centers of federal employment. And because this is HCN's first year in the CFC, we have no idea how much money to expect. We've assumed it will be relatively small, as part of our conservative approach to finances, but are willing to be happily surprised.

Relying on HCN readers

On another fiscal matter, the board approved a staff recommendation raising one-year subscription prices to \$28 for individuals and \$38 for institutions (except libraries, which pay the individual rate). We are always nervous about raising rates, but it has been more than three years since the last rate increase. In those three years, postal costs jumped and we switched to a higher quality, more expensive paper.

So while we are nervous about raising rates, we are even more nervous about not keeping up with costs.

To cushion the impact of the increase, there will be a Renew Early campaign two months before the new rates take effect. Readers will be able to renew at the present rates for up to three years. We hope this accommodates those for whom the new rates would be a burden.

Finally, the board authorized staff to apply for a property tax exemption for the new HCN building, which is owned

by a non-profit corporation. The Delta County commissioners will be thrilled.

Other matters

While finances took up a fair amount of time, the 11 board members (five couldn't attend) found time to take up other matters. The morning staff report on content and appearance provoked a wide-ranging discussion. Some board members took exception to a recent article critical of the Sierra Club, while another board member objected to being misquoted in an HCN story. That led to a general philosophical discussion about how "right" the paper should be.

Staff suggested the paper be seen as a decentralized operation, only loosely controlled from Paonia, with free-lancers given as much freedom as possible. A paper that was too "right," staff suggested, would inevitably become centralized, safe and dull. Staff also said that letters to the editor and guest essays give those who disagreed the opportunity to correct errors or present alternate interpretations. But at least one board member felt that corrections never catch up with errors, and that greater care was called for.

There was also discussion about the paper's geographic balance. As always, those parts of HCN's territory that have energetic free-lance writers get more coverage — much more coverage — than areas in which we lack free-lancers.

The board expands

The board also found time to expand its potential size from 16 to a maximum of 20, and to appoint four new board members. Two of the new board members dropped in on the Boise meeting. They are Diane Peavy of Hailey, Idaho, who is a rancher, conservationist and free-lance writer, and Maggie Coon of Seattle, who is a field representative for the Nature Conservancy, and who formerly worked for the Idaho Conservation League. Also added to the board was Farwell Smith of Bozeman, who is a past director of the Energy Conservation Fund. He also serves on the boards of the Environmental Defense Fund and American Rivers and is a fundraiser for the Wilderness Society. The fourth new member, Judy Jacobsen of Boulder, is a geographer, an assistant professor at the University of Wyoming, an attorney, and a specialist in Indian water.

The board also voted to appoint four incumbent board members to new three-year terms: Lynda Taylor of Albu-

querque, Tom France of Missoula, Sally Gordon of Buffalo, Wyo., and Bill Hedden of Moab, Utah. The new board has 18 members.

The enlargement of the board provoked discussion on how large the board should be (no more than 20, was the decision), and the balance needed between experience and new blood. The board will discuss reimposing a two-term, six-year limit at the June board meeting.

Two board members chose to leave the board. Jeff Fereday, a natural resources attorney from Boise, has been a board member since late 1986. Jeff chose to go out with a bang. He and spouse Kay Hummel imposed on friends and relations in Boise to accommodate staff and board; they entertained 30 or so staff, board and visitors at an intimate dinner at their home the night before the board meeting; and they arranged the joint potluck at Le Poulet Rouge Restaurant in Boise with Idaho Rivers United for HCN readers on Saturday night. The only thing Jeff couldn't do was duplicate himself. He missed the first hour of the Saturday board meeting to give a talk on water rights at the Idaho Rivers United meeting also being held in Boise.

Herman Warsh of Santa Barbara, Calif., and Emigrant, Mont., leaves the board as a three-term veteran who attended almost every meeting during his eight years. Herman was helpful to HCN in many ways, but his genius became apparent when board meetings got hot. Herman has the ability to state his position in so reasonable, calm and respectful a way that he set a standard for the discussion by staff and board.

Other board members who attended were president Michael Ehlers of Boulder, Karl Frohboese of Park City, Utah, Dan Luecke of Boulder, Lynda Taylor of Albuquerque, Judy Donald of Washington, D.C., Tom France of Missoula, Sally Gordon of Buffalo, Geoff O'Gara of Lander, Wyo., and Emily Swanson of Bozeman.

The board re-elected Michael Ehlers president, Andy Wiessner of Denver and Karl Frohboese as vice presidents, Dan Luecke as Treasurer and Lynda Taylor as Secretary.

Finally, two HCN free-lancers attended the board meeting: Pat Ford, who lives in Boise, and Jon Christensen, who wandered his way to Boise from his home in Carson City, Nevada, with spouse Kit Miller, a photographer, and daughter Annika.

—Ed Marston for the staff



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BULLETIN BOARD



DESERT ECOLOGY CONFERENCE

Desert wilderness advocates from the West will gather for the 14th Desert Conference at the Malheur Field Station in Oregon, April 24-26. The meeting will explore threats to the desert and examine how to protect its distinct ecosystems. Events during the conference include field trips, panels and discussions; the registration fee is \$25, not including the cost of meals and lodging. For more information, write Desert Conference XIV, c/o The Wilderness Society, 610 SW Alder, Suite 915, Portland, OR 97205 (503/248-0452). Registration materials will also include information about a one-day program on Oregon's High Desert that will be offered at Portland State University, April 4.

A HEALTHY ECONOMY NEEDS A HEALTHY ENVIRONMENT

"The Greater Yellowstone Ecosystem is a seamless, intricate web of life ... Pull a string on one end of the web and you will find it attached to everything else," says the Greater Yellowstone Coalition in its recently published profile of the region. The group says its 132-page report is the first attempt at a comprehensive analysis of the 28,000 square-mile ecosystem, an area larger than the state of West Virginia. The document gives a detailed portrait of a region that was once relatively undisturbed by human development. But "current trends and the future plans of federal agencies portend continued degradation of the ecosystem's spectacular landscapes and biological diversity," the report warns. Editors Dennis Glick, Mary Carr and Bert Harting say traditional activities such as mining and logging interfere with local tourist economies, which now depend on the area's scenic beauty and abundant wildlife. An *Environmental Profile of the Greater Yellowstone Ecosystem* is \$17 from Greater Yellowstone Tomorrow, P.O. Box 1874, Bozeman, MT 59771 (406/586-1593).



Leontine Nappe

NEVADA ACTIVIST AWARDED \$10,000

The High Desert Museum of Bend, Ore., awarded Leontine Nappe of Reno its \$10,000 Earl A. Chiles Award for 1991. Nappe built an unusual consensus between conservation and sports groups, creating an effective coalition that secured water rights for wildlife on 25,000 acres of wetlands in the Lahontan Valley of western Nevada. The area supports 70 percent of the state's waterfowl and has been the center of almost a century of water rights conflicts. The Chiles Award, named after an Oregon businessman and philanthropist, was established by the museum in 1983. It recognizes individuals whose accomplishments lead to a better understanding of the high desert region and the management of its resources.

DEPARTMENT FINDS ITSELF WANTING

The Department of Interior employs 77,000 full-time people and administers 500 million acres of federal lands with a \$7 billion annual budget. When the Interior Department recently took one of its periodic looks at the work of its agencies, it found serious shortcomings in the Bureau of Indian Affairs and the Bureau of Land Management. As a result of BIA blunders, for example, auditors discovered that the Jicarilla Apache, Mescalero Apache and the Southern Ute tribes failed to receive \$12.5 million in potential timber-sale revenues. At the BLM, auditors found managers doing nothing to prevent or remedy over 1,000 illegal dumpsites on public lands — some containing toxic wastes. These and other problems are identified in the *October 1991 Semiannual Report of the Inspector General of the Interior Department*. The 79-page report documents numerous problems in 11 Department of Interior agencies, offers recommendations and updates progress made. Readers can obtain the report by calling the Interior Department's public relations office at 202/208-4356.



A DIMINUTIVE MONSTER

The gila monster, an animal with the head of a snake and body of a lizard, is described in detail in David E. Brown and Neil B. Carmo's entertaining *Gila Monster — Facts and Folklore of America's Aztec Lizard*. This so-called monster weighs less than two pounds and its body is about 16 inches long, but its reputation as a fierce reptile has spawned tales of seven-foot-long, 300-pound beasts — perhaps because its bite is poisonous. The authors include hilarious newspaper accounts, many from the 19th century, that suggest the lizard's bite is always fatal and its "very breath ... could cause death." However, Brown, a wildlife biologist, and Carmo, a former chemist, conclude the victims were killed by an intended cure or an existing condition, usually alcoholism. The orange-and-black, slow-moving reptile spends more than 99 percent of its life in burrows in the Sonoran, Chihuahuan and Mojave deserts. It is now a protected reptile and cannot be killed or captured without a permit.

High-Lonesome Books of Silver City, NM 88062. Paperback: \$8.95. 127 pages. Illustrated with black-and-white photographs, drawings and maps.

—Melinda Merriam

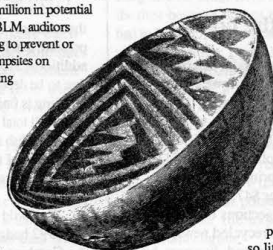
FOR GREENER PARKS

Writer Michael Frome, who has been studying our national parks for more than 40 years, is not a fan of today's National Park Service. In his new book, *Regreening the National Parks*, Frome says the agency has been politicized and bureaucratized to the point where it is no longer capable of doing its job. "Regreening" the National Park System, he writes, can only happen if the Park Service is removed from the Department of the Interior and allowed to operate as a professional, rather than as a political, agency. The present course emphasizes recreation rather than preservation, he says, and is a disservice to all Americans who "own" the national parks. Frome proposes a 10-step program to take back the parks, including limiting the number of visitors at overcrowded parks and ridding parks of their ubiquitous souvenir shops that hawk wares from around the world.

The University of Arizona Press, 1230 N. Park Ave., Suite 102, Tucson, AZ 85719-4140. Clothbound: \$19.95. 232 pages.

THE SPIRIT IS IN THE CLAY

Some Pueblo potters believe the spirit within clay influences both the form of vessels and the designs painted on them. In his book, *Earth, Water, and Fire: The Prehistoric Pottery of Mesa Verde*, Norman T. Oppelt speculates that ancient Anasazi potters likely shared a similar attitude. Oppelt weaves together artistic and scientific approaches to understanding the pottery of



Mesa Verde National Park. The park, located in southwestern Colorado, preserves the most extensive cultural remains of the Anasazi people who inhabited the area between 600 and 1300 A.D. Because pottery styles changed so little in 700 years,

Oppelt surmises that the

Anasazi came in contact with few outsiders.

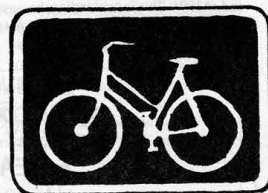
Johnson Books, 1880 S. 57th Court, Boulder, CO 80301. Paperback: \$12.95. 92 pages. Illustrated with black-and-white and color photographs, sketches, maps, and tables.

—Ann Vileisis

STONE CORPORATION WANTS TO LOG IN HONDURAS

Stone Container Corp., the multinational paper company that is logging some of the last old-growth forests in southwestern Colorado, plans to cut 900,000 acres of the largest pine savannah in Central America. According to the *Colorado Daily*, the Chicago-based corporation intends to sign an agreement with Honduran officials in February despite strong local opposition. Jose "Pepe" Herrara, director of a Honduran environmental group, says, "We've been used and abused by everyone. When the Contras were here, we were very passive. Before that, it was the Sandinistas. This time everyone has gotten together and said: 'Enough! We don't want this.'" Stone Corporation refuses to make public its contract with the Honduran government, according to Pam Wellner, a coordinator with the Rainforest Action Network in California. The Stone Corporation generated controversy last summer when it began cutting 777 acres of old-growth near Pagosa Springs, Colo. Groups such as Ancient Forest Rescue and Save Our San Juans joined forces in acts of civil disobedience to block logging activity (*HCN*, 8/26/91). Trials are still pending for nine of the 23 protesters who entered the old-growth sale after the San Juan Forest supervisor had closed the area.

—Heather Woodcock



TWO COUNTIES AND TRANSPORTATION

Boulder and Jefferson counties, located on the western edge of the Denver metropolitan area, up against the Rocky Mountains, have lots of scenery and open space. The two counties are therefore ripe for development and the resulting traffic, congestion and dirty air. In an attempt to stay ahead of the problem, the two counties will hold a conference titled "Transportation management" all day Friday, Feb. 21, at Clarion Harvest House in Boulder. The focus will be on Travel Demand Management: ways to help people get where they are going without driving there alone in their cars. To register, send \$25 to Boulder County Public Works Department, Transportation Management, P.O.B. 471, Boulder, CO 80306; Fax 303/441-4594, or call conference coordinator Charlotte Brownlee (303/642-0109).

HOT ISSUES AT CLUB 20

Endangered species, public land grazing, conservation water rights and the sometimes tense relationship between Denver and Colorado's Western Slope will all be topics of discussion at the 39th annual meeting of Club 20 in Grand Junction Feb. 15. The club is a coalition of counties, communities and businesses concerned about issues facing Colorado's Western Slope of the Rockies. This year's keynote speaker is Frank Dunkle, who headed the U.S. Fish and Wildlife Service during the Reagan administration. He will focus on how the upcoming congressional debate on reauthorizing the Endangered Species Act affects the West. Other highlights include talks by Denver's Mayor Wellington Webb, the Denver Post's historian Bill Hornby, and *HCN* publisher Ed Marston. The meeting place is the Grand Junction Holiday Inn; for more information, contact Club 20 president Greg Walcher at 303/242-3264.

OTHER VOICES

Nevada speaks with fissioned tongue

by Jon Christensen

It is time for a nuclear truce in Nevada.

The state's political leaders are talking in ever more militant tones in their battle to keep the nation's high-level nuclear waste out of Yucca Mountain, the proposed dump site 100 miles north of Las Vegas. Yet these same politicians are the first to cry foul when anyone suggests even a temporary halt to testing nuclear weapons in the same southern Nevada desert.

"This amounts to a declaration of war against the people of Nevada," bristled Sen. Richard Bryan upon learning of nuclear industry plans for a \$9 million public relations campaign to overcome Nevada's resistance to radioactive waste. Bryan's outrage was duly echoed by all four members of the state's congressional delegation.

The very same chorus, however, has roundly criticized a bill in Congress that would have matched a Russian offer of a one-year moratorium on nuclear weapons testing, which has pockmarked the Nevada desert with radioactive craters and caverns for 40 years. "We have to test," said Rep. James Bilbray, whose district is home to most of the workers at the Nevada Test Site.

Nevada's leaders don't seem to recognize that the Cold War is over, but the United States still needs to deal with the lingering legacy of radioactive contamination. With their fingers to the winds of local public opinion and their hands in the pockets of the federal government, Nevada's politicians want it both ways: They want nuclear weapons testing. But they don't want nuclear waste. It doesn't make any sense, except, of course, politically.

Just 65 miles north of Las Vegas, the Nevada Test Site is a sacred cash-cow employing the well-paid, technocratic elite of southern Nevada. The facility provides nearly 14,000 jobs, making it one of the largest employers in the area. Some 24,000 southern Nevadans are said to be dependent on the facility. With the

majority of Nevada's population living in the south, Las Vegas has become the electing ground of state leaders. Politicians in southern Nevada just don't talk about shutting down the test site. Instead, they are busy courting the new and potentially even more dangerous nuclear-fueled rocket project to keep jobs and federal funds at the test site.

On the other hand, Yucca Mountain does not have a powerful local constituency yet. Only 1,400 scientists and support staff are involved in current studies of the barren ridge on the western border of the nuclear weapons proving ground.

But that doesn't keep Nevada's elected and appointed leaders from also milking the nuclear waste project, for political and financial gain. While they accept money from the Energy Department to pay for various state overseers and public information offices on nuclear waste, state officials stall the progress of Yucca Mountain studies at every available opportunity.

In this war of political one-upmanship, relations between Nevada and the Department of Energy — which runs both the weapons testing and waste facilities — have turned so sour that a recent meeting of the agency's public confidence task force was moved from Las Vegas to Oakland, Calif.

Now, a lot of Americans probably believe that Nevada is a wasteland that has been nuked already, making it a perfect place to store nuclear waste too. Nevadans know they are wrong. We know the beauty of the state's vast valleys, alpine summits, and verdant canyons.

But we also know they are right. We read about the periodic nuclear blasts over our morning coffee. Each nuclear test is reported with a nonchalance that belies the underground contamination that is created and will stay behind forever. So our refusal to even consider dealing with nuclear waste seems a little disingenuous, at best.

Nevada's leaders should get off their high horses and admit that the Nevada Test Site is already a vast

repository for the radioactive debris that is formed every time a nuclear device is exploded. Why should another place on earth suffer the risk of such contamination?

Let's make a deal. Let's get on with testing Yucca Mountain and stop testing atomic bombs.

The United States should declare a one-year moratorium at the Nevada Test Site, with an automatic renewal unless Congress votes to resume testing. In return, Nevada should stop standing in the way of studies to determine if Yucca Mountain might be as safe a place as we are likely to find to store nuclear waste.

There are some signs that the current stalemate may be breaking up. An Energy Department spokesman recently conceded that the agency should be studying other possible locations for the nuclear dump. And Nevada's senior Sen. Harry Reid has announced that he will sponsor a panel of contractors, state officials and environmentalists to explore alternative uses for the Nevada Test Site. Last year, a poll showed that 58 percent of southern Nevadans — their ranks nearly doubled by newcomers in the 1980s — now favor simply shutting down the test site.

A test site spokeswoman recently said that a one-year testing moratorium would not cost many jobs. And even if a test ban were made permanent the weapons proving ground would not close down. The Energy Department is just beginning an environmental containment and restoration program that will cost at least \$578 million and keep workers busy for many years to come.

If a nuclear test ban holds, and sooner or later it is likely, the Nevada Test Site could become a permanent monument to the Cold War and a great laboratory for learning how to clean up after the deadly nuclear pursuits that have taken us all to the brink. If the Cold War resumes, we can all go back to our bunkers. ■

Jon Christensen writes frequently for *High Country News* from Carson City, Nevada.

Spring bear hunt raises hackles high

by Michael L. Smith

A year ago, the Colorado Wildlife Commission unanimously approved regulations designed to protect female black bears and their nursing cubs from hunters.

Yet in November, the Wildlife Commission, meeting in Denver, voted to lengthen the spring black bear season by two weeks for the next three years.

The vote came despite the state Division of Wildlife's recommendation to eliminate the spring bear season. Editorials in the *Rocky Mountain News*, *The Denver Post*, the *Boulder Daily Camera* and the *Grand Junction Sentinel* urged the commission to end spring bear hunting. Public comments to the department also ran 16 to 1 against spring bear hunting, and at least two attorneys testified that failure to end the spring season was illegal. Division biologists had even told the commission that lengthening the spring season by two weeks would more than triple the number of nursing females killed this coming year.

Outrageous? Of course! But read on.

In Colorado, sport hunters kill black bears using both bait and dogs, techniques that have been banned in most other states and have come under increasing fire in Colorado. Even more controversial has been Colorado's spring bear hunt. The spring hunt gives Colorado's black bears the dubious distinction of being the only big game animal hunted in Colorado during the season it rears its young. Each year, females with dependent cubs are killed, leading to the subsequent death of those cubs by starvation, accident or predation.

In September, the Colorado Division of Wildlife recommended an immediate end to the spring bear season, citing as "indefensible" the loss of nursing females and their cubs to sport hunters. Under heavy pressure from outfitters and sportsmen's groups, however, the commissioners told the division to return in November with alternatives. At that time the division refused to endorse any alternative short of eliminating the spring hunt.

Prior to the November commission meeting, the division conducted a poll showing a large majority of Coloradans opposed to spring hunting, as well as to the use of bait and dogs. The polls also revealed an even



Margaret Pettis

split within the bear-hunting community on these issues. Comment from citizens poured into the division, with the final count on spring bear hunting running 75 letters in favor, 1,199 opposed.

Division biologists and administrators ignored pressure from the commission and threats to their jobs from sportsmen and outfitters, and stood by their recommendation to end the spring season immediately.

The Nov. 21 meeting was tense. In response to threats of violence, Adams County Sheriff's deputies stood outside the entrance to the state's Hunter Education Auditorium. Over 150 people packed the hearing room.

Testifying for an end to spring bear-hunting and the use of bait and dogs were representatives of several national organizations, including the Fund for Animals and the Humane Society of the United States, and representatives from local chapters of the Sierra Club, Audubon Societies and the Colorado Environmental Coalition. Also testifying were two lawyers who pointed out that the commission was obligated to end the spring season because of a clause in its management plan.

Although none of the groups testifying for reform had suggested in any way an outright elimination of bear hunting, the commission discussion centered on anti-hunting paranoia with an extended "anti-hunting" tirade by commission chairman Eldon Cooper. Immediately following, the commission voted 5-3 to extend the spring season by two weeks (it will now run April 1 - May 31

with both bait and dogs), to allow a fall season running through the month of September (with bait only), and to gradually phase down the number of limited licenses available for spring hunting. Under the plan, half of 1992 licenses will be allocated for spring, half for fall. In 1994, 10 percent will go for spring, 90 percent for fall.

The commission vote was a serious blow to the bears. Division biologists estimate that the new season structure will more than triple the number of lactating females killed during the 1992 spring season and double the number killed in spring 1993.

Not until 1994 will deaths drop below the current level. To add insult to injury, the commissioners made it clear by their comments that they have no intention whatever of ending the spring season after the three-year phase down, but rather will start again from scratch, likely resulting in the reinstatement of large-scale spring bear hunting.

Other issues under discussion, such as the use of bait, dogs, radio-collars and other electronic aids by hunters, were swept aside by the commission amid the anti-hunting rhetoric.

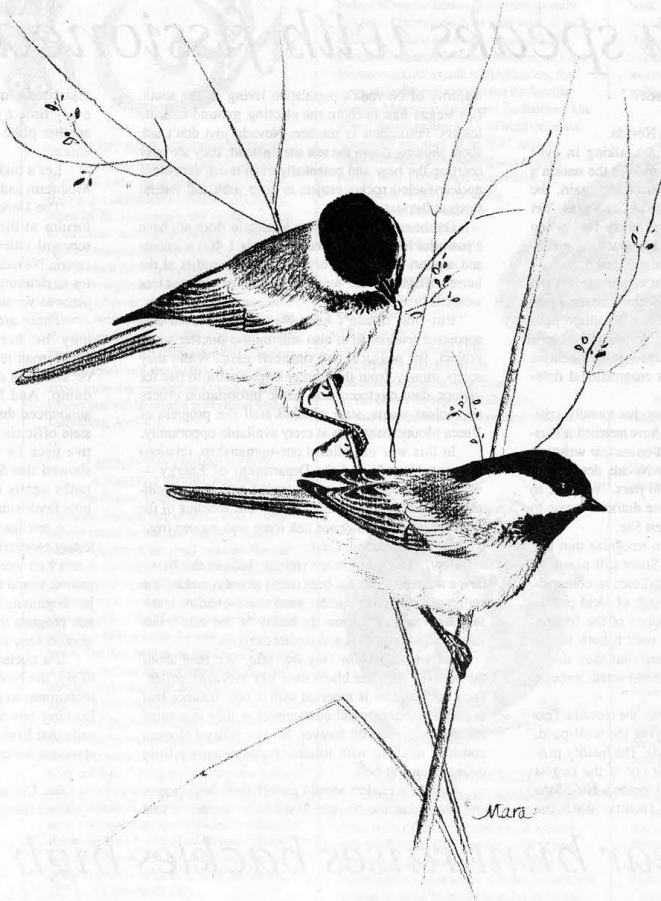
The Division of Wildlife, although initially slow to respond to the general public's regard for Colorado's wildlife, has begun managing bears for all the people of Colorado, not just that tiny minority who hunt bears in spring.

Sadly, an out-of-touch, reactionary Wildlife Commission remains openly hostile to this larger constituency, refusing to acknowledge the overwhelming public sentiment. Had the commission accepted its division's recommendation to end the spring bear season immediately, the bear management controversy would likely have been resolved.

The Fund for Animals is pursuing a ballot initiative to prohibit spring bear hunting and the use of bait and dogs. Its goal is to gather enough signatures to place this issue on the November 1992 general election ballot. In the meantime, an avenue that remains is a legal challenge to the commission's decision. ■

Michael Smith is president of the Boulder County Audubon Society in Colorado.

afield



by Michelle Mara

Surviving winter, chickadee style

When the habits of wild creatures are closely studied, some of the smallest are found to be the most amazing.

Winter survival in the mountains is a challenge to all, but for the little birds which remain year-round in high-altitude forests it almost seems miraculous.

Chickadees are an excellent example. Common and widespread, they are generally taken for granted. There's hardly a bird feeder any place where these small black-and-white bundles of energy can't be found. Yet they also manage to cope in wilderness areas during the months of white silence and numbing cold.

An adult chickadee, about five inches long, weighs between one-half and three-quarters of an ounce. Within this minuscule body, the tiny heart maintains a rate of 500 to 520 beats per minute. The normal, daytime body temperature ranges from 105 to 108 degrees.

To keep this dynamic system running smoothly, particularly in winter, a lot of food is required. But chickadees know where to find it: they search under tree bark, in rock crevices and the cracks of dead branches; they investigate weed stalks protruding from the snow and scour the limbs of shrubs and bushes. They find dormant insects, larvae, spider eggs, cocoons and seeds. During usual winter weather, they fare quite well for themselves.

With the onset of extremely severe cold, chickadees seek lower elevations and often flock with other small birds, such as nuthatches and hairy woodpeckers. Flocking serves a definite

purpose: The birds help each other to find food. When the temperature falls below zero degrees Fahrenheit, a chickadee must almost double its normal intake of food in order to sustain its body heat and energy. This amounts to eating between one-fourth and one-half ounce of food per day, or nearly as much as the bird itself weighs.

Research has shown that during lengthy spells of sub-zero weather, backyard bird feeders help the chickadee to survive. By being able to consume up to 300 sunflower seeds in a day, without having to expend energy to search for them, the bird can maintain its health and vigor much more easily. Chickadees also derive necessary nourishment from other feeder treats, such as cheese, mixed seeds, suet and peanut butter. These foods help build up reserves of fat, which increase the energy level. Even so, nature had equipped these robust little creatures for cold weather long before there were human hand-outs.

Chickadees grow extra feathers in winter, and in the bird's skin are muscles which enable the feathers to stand out from the body. When the bird "fluffs" its feathers this way, warm air is trapped next to the skin. This has the same effect as when a human being puts

on a down-filled parka.

When the thermometer reads 25 to 30 or more degrees below zero Fahrenheit, you may see chickadees sitting perfectly still with their feathers fluffed out and their tiny feet drawn up right against their bodies. At such times they may not feed at all, conserving their heat and energy by remaining completely motionless. This is especially true in the deep forest where the birds must search for all of their food. In such debilitating cold, more energy is expended in finding food than is gained from it. It is best then to avoid unnecessarily frightening the birds, for even flying to another tree can rob them of precious strength and heat.

Although they are well adapted to high-altitude winter, life is not easy for any of the year-round species of small birds, and their mortality is high. To compensate, the two species of chickadee native to the Western mountain states raise large families. The black-capped chickadee produces from five to eight eggs, and will often nest a second time during the summer. The mountain chickadee lays seven to 12 eggs. Less than half the resulting offspring survive their first winter, and only some 30 percent to 35 percent of them live to reproduce.

But the ones who enliven the forest with their soft "fee-bee" song in the gentle days of spring have successfully endured the rigors of the Rocky Mountain winter. Birds sing for many reasons and we don't yet know for sure what all those reasons are. But I suspect that in the chickadee's song there may well be something more than intended courtship and territorial proclamation. Who knows but that the chickadee, in its own way, is also singing, "I'm a survivor!" ■

Michelle Mara is a naturalist and artist in Lyons, Colorado.