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## Monthly Planet, 1982, February

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# Monthly



# Planet 2

February VOLUME 3 NUMBER 3

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## Geothermal energy: Mt. Baker targeted

by Jim Lafley

The mention of geothermal energy conjures up visions of volcanoes, geysers, and hot springs. In fact, these are all indicators of the presence of the earth's heat reaching the surface, which is necessary for feasible geothermal development.

The heat source is currently believed to be radioactive action and friction deep below the earth's crust. This results in a natural nuclear reactor in the mantle. Where the crust is thin or where fractures allow the hot material to come to the surface, geothermal energy can be harnessed.

The best potential for geothermal energy is direct utilization of the heat. As in the case of solar energy, the conversion of geothermal heat to electrical energy is inefficient. A conversion efficiency of 70 to 90 percent is possible for direct use in comparison to a conversion efficiency of from 5 to 25 percent for electricity production.

That geothermal energy can be effective is evidenced in Reykjavik, Iceland where over 90 percent of the homes are heated by this source. Closer to home, in Klamath Falls, Oregon, geothermal space heating has been used since 1930. The city is located in what the federal government calls a "Known Geothermal Resource Area (KGRA)". Most of the homes using geothermal have individual wells and pumps located on their property. In deciding on a new location for its campus, Oregon Institute of Technology chose to locate near a geothermal resource. As a result is

has saved a significant amount of money on energy while developing an excellent program in geothermal energy research.

Commercial uses are fairly diverse and range from dehydrating vegetables in Nevada to heating greenhouses in Hungary. An industry in Iceland uses the heat to dry diatomaceous earth and the Japanese use it to breed eel and carp. Agricultural uses include growing mushrooms, tomatoes, peas, and processing potatoes from germination to cooking for sale as a prepared food.

A serious concern in geothermal development in an area is the extent of the construction required in the site area. Roads, drilling sites, wells, waste disposal facilities, steam conveyance systems, power plants, cooling towers, and electrical transmission lines are necessary. A geothermal facility would displace wildlife habitat and diminish the wilderness value of the land.

Noise created by the expanding gases is also a serious problem. The Geothermal Steam Act requires operators on federal land to minimize noise that may be harmful to personnel or the public, but it does not address the effect on wildlife.

The open circulating systems, which do not allow for complete reinjection of the geothermal fluid, have the potential to emit gases other than steam into the environment. Some gases are noxious and pose serious health hazards. The gases involved are a function of the geochemistry of the area and they can include nitrogen, methane, ammonia, and hydrogen sulfide.



Generally the impact is greatest during the development phase. Federal regulations require that operations must comply with federal and state standards for the control of pollution. In addition, while developing their waste disposal plan, facilities leasing federal land must "take into account" the effects of wildlife and their habitats.

This accounting for effects includes not only gases, but also waste water and solids. Both the temperature and chemical content of the wastes must be examined before development. In some instances, geothermal plants can generate more waste heat than either fossil-fueled or nuclear plants. The geothermal fluid may contain undesirable chemicals which could be detrimental to the surrounding environment. The aquatic plants and animals would feel the brunt of the heat and chemical damage.

Weather modification may occur with systems that emit substantial amounts of water vapor. Although it may not be a serious problem in the Cascades, it is a consideration.

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GEOHERMAL cont'd.

The least understood problems with geothermal development are subsidence and seismicity. Subsidence, the vertical sinking of the earth's crust, occurs when the support is extracted or compacted. Because some systems have been in operation a short time, little is known about the impact of subsidence. Apparently, it is a function of the system and reinjection of fluids seems to limit the effect.

Seismic activity is prevalent in fault zones and volcanic areas. These areas also have good potential for geothermal development. It is important to have a good geologic profile of a site for predicting the likelihood of these events.

The Proposal for Northwest Geothermal Development optimistically states that, "One of the most abundant and proven (renewable) resources is geothermal energy." The proposal continues, "using mainly off-the-shelf technology, geothermal energy can be utilized to generate electricity, and provide process heat...in many parts of the Pacific Northwest at a rate equal to or less than conventional fuel costs. Based upon the promise that geothermal energy holds for contributing to the energy future of the BPA (Bonneville Power Administration) service area, the states of Montana, Idaho, Washington, and Oregon recommend that BPA fund a comprehensive regional geothermal energy program..."

The proposal was submitted to BPA in October, 1981. This was one of the first steps to serious development of geothermal energy in Washington as public financing often precedes private corporate involvement.

R. Gordon Bloomquist, a geothermal expert with the Washington State Energy Office, explained that Washington has some of the most promising geothermal resources in the country. The Cascades offer the greatest potential source due to the number of hot springs and volcanoes. He feels that the source

can be tapped for both electricity generation and direct application.

More complete information of the Cascades is needed. The Washington State Energy Office and the United States Geological Survey are presently coordinating an effort with the assistance of Dr. Bloomquist. As more accurate assessments are available developers will be more interested in exploration.

The Mt. Baker area has recently become a target of geothermal exploration. Two private developers have leased National Forest land for exploration purposes. Two of the leased areas are within the proposed Mt. Baker Wilderness Area.

The Mt. Baker Wilderness Association has appealed the Forest Service decision to lease the land. "Our main objection at this point is their (Forest Service) neglect to include the public," MBWA member Susan Scanga explained. "We appealed to discover the content of the leases and the extent of activity that is allowed." The appeal is being reviewed by the Chief of the Forest Service. Apparently, the developers are limited to some minor exploratory activities until they have a site specific proposal. At that time they may be required to complete a detailed environmental assessment or an environmental impact statement.

Seattle City Light is also interested in leasing around Mt. Baker. Their Proposed Geothermal Resource Development Program recommends that the agency conduct its own exploration and development program in the Mt. Baker area. They have designed a flow chart and they estimate between 7 to 10 years before electrical generation can be achieved. The staff also stresses that now is the time to begin as private developers will try to acquire the most promising sites.

If the pace of geothermal research and development in this area increases, as it is likely to do, the people of Whatcom County will witness a first-hand account. We will experience the benefits as well as the costs.

For further information you can contact the Washington State Energy Office, 400 E. Union, Olympia, WA. 98504.

# Avalanche hazards

by John Cook

The mountains are full of snow again and many skiers are headed out to enjoy Washingtons reknowned alpine terrain. But some skiers are not sufficiently familiar with the hazard of snow avalanching which is present all winter long. When skiers venture out into the winter mountain environment several factors should be kept in mind concerning avalanche danger.

An important element to consider is how recently, and how much, new snow has fallen. The most hazardous period in avalanche terrain is during or soon after storm. When new snow has enough time, the force of gravity, temperature changes, and wind effects, will cause it to consolidate or bond with the old snowpack. During, or soon after a snow storm, the snow has not adhered to the older snow surface and could slide off. As little as six inches of snowfall could create a hazard, and a foot or more dictates the use of much caution.

Dangerous accumulations of snow will generally slide on slope gradients of between thirty and forty-five degrees. Above forty-five degrees, gravity's force is great enough to cause snow to slide off before a large deposition can occur. Below thirty degrees, gravity does not have enough pull to trigger a release. Skiing on a slope of greater than thirty degrees requires the consideration of whether the person's weight will add enough force to trigger a slide.

North facing slopes, during early and mid-winter, may be unstable due to a weak layer in the snowpack. This is called a temperature gradient metamorphism. South facing slopes in the spring can become unconsolidated by the sun's radiance. Snow that is transported and deposited by wind is often unstable. Deposits underneath large cornices should be watched for and avoided.

Steep areas lacking prominent vegetation have a high probability of experiencing snow slides and should be analyzed carefully. Large rocks, trees, and heavy brush help anchor

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the snow to prevent an accumulative release. Slopes above tree elevation, when void of substantial vegetation, thus have a high sliding probability. The safest routes are on ridgetops, but the skier must always be cognizant of cornices. If travelling along a ridge is not feasible, the safest route is in the valley below, away from the slope.

There are numerous factors relating to snow stability evaluation, and the preceding examples are only an introduction. There are many variables in the dynamics of snow structure, and the structure changes continually. The most important precaution is to be mentally alert and aware of the overall surroundings. Information gathered from books can be very helpful, but the best way to learn is to go out into the backcountry with someone who has experience and can point out where threats exist.

If you happen onto a virgin powder run that strongly beckons, and you can't tell if it is stable, keep your eyes open and let your buddy go first! Happy trails.

For further information, Ed LaChapelle's ABCs of Avalanche Safety is available in most skitouring and mountaineering stores. A Forest Service number, 285-WASH, will provide daily recorded avalanche predictions.



PLEASE RECYCLE

# Awareness begins: a fantasy

by Michael Willis

At first, all things in the cosmos were silent and void. There is no way to describe how it was because there was no awareness. If objects and forms did exist they held no meaning, for consciousness was not part of the cosmos. It was chaos for infinities upon infinities until a beautiful thing occurred. A golden feather became visible against the background of the cosmic void.

The feather floated ever so gently until it landed upon an arched plane. When the feather touched the arch, a transition began to occur within the cosmic realm.

The surface upon which the brilliant quill landed took on meaning as the earth. A flowing river came into existence at the same moment. The flowing of the river was music and the music flowed through the golden feather and gave it life. This life was human consciousness. The mind of man was beginning to flower into the beauty of creative thought. This consciousness was unencumbered by any shell or flesh. The mind of man was free to sing the songs of nature. Creative intelligence, power and beauty were the virtues of this mind, and it was Shakti.

After a time, Shakti became a bubble in the singing river. The bubble danced along and something exquisitely beautiful began to take place. The bubbles, which trumpeted the melody of the river, began to voice a different song. Shakti had become one of them and all of them at the same time and he conducted the bubbly notes to the song of creativeness. It was a song like no other had been or will ever be. It was the first song of man.

Suddenly, a bubble, a beautiful note, exploded and took the shape of a cloud. This cloud was Shakti, the flower of creativeness, and it floated to the center of the cosmos. Each tuft of the billowy cloud was a dream of a different color and one-by-one these colors began to flow to form a rainbow.

The omnipotent rainbow pulsed with color and musical sounds. From this vibrance of color and sound emerged a dancer. The dancer, who was Shakti, had no physical form, but was the essence of movement and melody combined. All human love and understanding energized the dancer, and the movements of the dancer were facets of all these emotions and more. The beauty of the floating dancer caused the music to soar higher. Music was color and energy and every movement of Shakti created a different note and a different color. This was man's first dance.

It was the movement of the dance that carried the music along. No motion occurred without creating a song and no song stood still. If a note was created it held no meaning unless connected to another. Every molecule of energy that touched another transmitted its energy to another and still another into infinity.

And so the song of creation of consciousness rang out and all that had been and all that was yet to be joined the dancer. The awakening of Shakti gave awareness, form, color, and sound to all that was void before.

The spirit of human existence danced throughout the cosmos. Bright colors of indescribable hue poured in from the far corners of the celestial sphere. Acoustical majesty sang within and around every physical and spiritual form. It was the manifestation of consciousness and the beginning of being.





# Alternative actions

by Valerie Smith

In all social movements, factions will develop and wings emerge. The environmental movement is not exempt as people become involved in a wide variety of strategies aimed at the same ultimate goal. A spectrum of choices exist for the environmental activist, ranging from those at a personal level to involvement in a group, and from peaceful to violent action.

A French ecological group has claimed responsibility for the five rockets shot into the construction site of a fast-breeder reactor on Jan. 18 of this year. Obviously, this group was opposed to nuclear power and saw no other effective means of bringing the plant construction to a halt.

It has been called "environmental terrorism." That term sounds absurd. Environmentalism and terrorism are incompatible concepts. Violence is unwarranted and counter-productive to a movement whose fundamentals lie with a love for life of all forms and the desire for a healthy earth in which to live. Alternatives to violence do exist, and though we may not always be successful using them, at least we will have been true to our values.

James and Kay Bedell found an alternative way to express their opposition to nuclear power. Jim, 68, and Kay, 64, went on a fast that lasted nine days in New Brunswick, Canada. They called their fast "a penance for our generation," telling the press that "nuclear power is a terrible thing our generation has imposed upon future generations." Though the Bedell's fast in itself could not halt the construction of nuclear reactors in Canada, it served to draw attention to the subject. Their ages lent a bit of legitimacy to the cause, forcing recognition that opposition to nuclear power does not lie only with younger generations.

Environmentalists in West Virginia are taking action to preserve their state's water quality. A volunteer group is taking advantage of a provision in state coal mining regulations in which the state must provide training to any persons interested in

monitoring streams for acidity. With the many coal mines West Virginia, acidity in mountain streams has become a serious problem. The state hasn't enough money to monitor the streams regularly, so a group of citizens calling themselves "Mountain Stream Monitors" paddle out in canoes downstream from coal mines to test the water. One of the MSM members, Margo Davis, told an Environmental Action reporter, "I got involved so that if they mined they would do it right. Do you think anybody does it right if no one watches?"

The basically non-violent efforts of Greenpeace usually are well-publicized. Their action includes painting baby harp seals with organic dye in order to ruin the sale value of the pelt, sailing into nuclear testing areas, surrounding ships that are dumping barrels of nuclear waste overboard, freeing captive marine mammals, staging sit-ins atop tall smoke stacks, and harassing whaling ships.

Of course, there are the lobbying legislative measures important to the placement of protection and preservation laws on the books. Though working through the courts is slow, laborious, and expensive, it is probably the most effective means at our disposal, at least in the United States, to insure our efforts have lasting consequence. Initiatives and referendums are very difficult to get through but have been very useful in the past. Demonstrations, rallies, sit-ins, petitions signing and conferences serve to make information about environmental issues available, and draw attention to an issue through the media.

There are many methods by which the environmental activist can publicize an issue and further a cause, but violence and destruction should never be considered. Violence invariably leads to counter-violence. We should listen to the words of Mahatma Gandhi: "I have an implicit faith—a faith that today burns brighter than ever, after half a century's experience of unbroken practice of non-violence—that mankind can only be saved through non-violence." \*



*River Of Searching*

*Hand in hand  
With gravity  
The river sounds  
Off granite rocks  
Blending with  
The crescendo  
Of wind  
Through bowing cedar tops.*

*The music of life  
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Flowing fulfillment  
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- Catalyst
- CoEvolution Quarterly
- Critical Mass Energy Journal
- Environment
- Environmental Action
- East West Journal
- EPA Journal
- Greenpeace Examiner
- Groundswell
- High Country
- The Living Wilderness
- The Nature Conservancy News
- National Parks
- National Wildlife
- Not Man Apart
- Nutrition Action
- RAIN
- Resources
- Solar Washington

The library will accept suggestions for Hanes Fund acquisitions through the end of the quarter.

**THE PLANET STAFF**

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The Monthly Planet is a biquarterly publication that strives to inform, entertain, and stimulate planetary citizens of all persuasions. Reader participation is invited in all aspects of its publication. Submit any contributions to Jim Springer, c/o the Huxley office, ES 539. The views expressed herein are not necessarily those of the Associated Students or of any advertisers.

*Wrinkled hands dexterously grasped  
the bamboo rod,  
bright sunlight danced  
off the spectacles of the timeworn man.  
Beside him sat his son  
who instructed his sons  
how to mend the lines  
and hold the poles.*

*The old man silently viewed  
this scene of generations renewed  
-It seems but a dream-*

*The boat gently rocking  
on the lily-pad lake,  
adding to the serenity  
of a special moment in time  
When these generations together  
passed but a moment  
in eternity's eyes.*

*-It seemed such a long time  
to one so young as I-  
I, who held in awe the man of old  
as some sort of demigod  
when he snatched off the lake  
a brightly colored dragonfly  
for us to examine with  
wonderfilled eyes  
this multi-colored beast  
that buzzed through the skys.*

*And a father watched on  
as his father did teach,  
with nary a word,  
the beauty of nature that abounds  
in the world.*

*As time presses on,  
I will never forget  
that magical day once spent.  
My brothers and I gained great respect  
for grandpa  
and dad.  
For they taught us to revere  
the miracle of life  
reflected in nature's workings  
through generations.*

by Mark C. Schultz



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...any social hope that is going to be any use against the darkness ahead will have to be based upon a knowledge of the worst; the worst of the practical facts, the worst in ourselves.

--C.P. Snow

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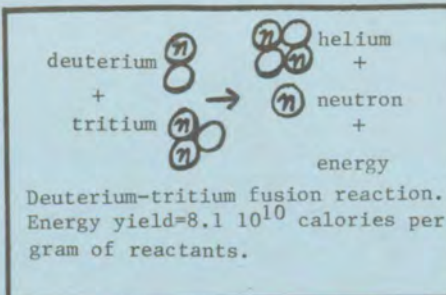
# Fusion power: a dubious boon

by Jim Springer

Recent advances in the development of controlled nuclear fusion give it promise as the energy source that will supply the world's energy needs in the next century. An article in the Jan. 3 issue of *New York Times Magazine* indicates that the extremely high temperature needed for deuterium/tritium fusion (70 million degrees) has been reached at the Princeton Plasma Physics Laboratory. For an energy yielding reaction to take place this temperature must be sustained longer and the fuel mixture must be compressed further. Nonetheless, a new tokamak reactor is being constructed and the physicists working on the project are optimistic they will be successful.

Nuclear fusion may be our energy salvation, but it may also aggravate the situation that has been brought about through our use of fossil fuels. The effects it has will depend on how we use it. If nuclear fusion fulfills all the hopes many hold for it and is a source of limitless energy, what would we do with it? Would we continue doing what we now do with limited energy sources, only more profligately? If so, we would continue distancing ourselves from the ecological realm out of which we arose, and further lose sight of the limits that we will someday be forced to reckon with.

What we have done with fossil fuels is power our technology, which we use, in large part, to dominate nature and divert biotic resources away from preexisting uses to our own use. In the 19th century, combustion of coal and later oil enabled man to do things on a scale never before possible. Eventually the tapping of this energy source allowed man to clear vast areas to devote to agriculture, and to increase the yield of each acre farmed. The abundance of agricultural products supported a quadrupling of world population in the seven generations since 1800. Phantom carrying capacity was greatly expanded. "Phantom carrying capacity" is a term used by author William Catton to mean an illusory capacity of an environment to support a life form or way of life. Carrying capacity that is increased temporarily through the



use of large inputs of energy results in an overextended population that will die off when either the energy input ceases, or when some other critical factor runs out, e.g., nutrient rich soil. In nature, when population overshoots carrying capacity, it plummets to levels below the level it could have sustained indefinitely at carrying capacity.

If we assume energy will be abundant with the ability to control nuclear fusion, soil could become a limiting factor. The Global 2000 Report has identified soil deterioration and loss of cropland as perhaps the most serious problem we will face in the coming years. "Present rates of soil loss in many industrialized nations cannot be sustained without serious implications for crop production," the report states.

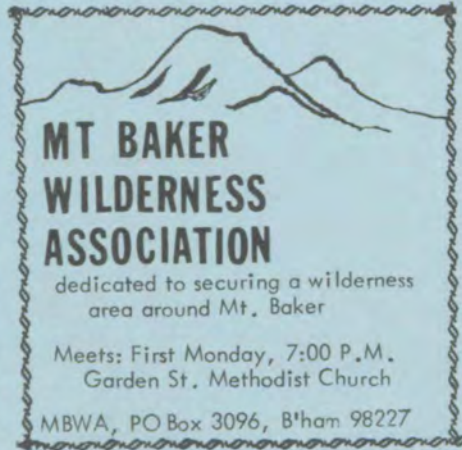
The U.S. Soil Conservation Service has concluded that to sustain crop production at present levels, soil losses must be cut in half. In the U.S., some 2 billion tons of topsoil are removed due to water erosion each year. Increasing energy inputs to increase crop production would accelerate this loss. With an abundant energy source we could use more chemical fertilizer, more pesticide, more irrigation, and more machinery to support a growing population. But this population would be precariously dependent on factors difficult to control with technology, such as erosion, soil salinization, climate, and aquifer drawdown.

As we expand the area needed to support our population, less and less is left to support natural communities. We use our concentrated energy stocks to give us the power to elbow out more room for ourselves. After we transform the last habitat of a species, it dies off and the world has one less life form.

George M. Woodwell, director of the Ecosystems Center at the Marine Biology Laboratory, Woods Hole, Massachusetts, says, "a conservative estimate suggests that as much as 30 to 50 percent of the net primary productivity of the earth is being diverted to direct use by man for support of the current population." There has been an unprecedented loss of species, coincident with a systematic reduction in the structure of natural ecosystems around the world, especially in forests, Woodwell writes. His statement is reinforced by the Global 2000 Study. "Between 1/2 a million and 2 million species—15 to 20 percent of all species on earth—could be extinguished by 2000, mainly because of loss of wild habitat, but also because of pollution," it states. The loss of any species is tragic both from an ethical and a utilitarian viewpoint.

Use of fossil fuels, and other energy sources, has translated fairly directly into strain on biotic resources. This strain will have repercussions on our food producing ability, and on our quality of life. Our impact on the environment as a result of energy use has been constrained somewhat by the cost of fuels. But if nuclear fusion turns out to be an abundant source of cheap, clean, energy, the only limit on its use would be our own self-restraint. History does not display a pattern of human self-restraint with regard to energy use. In the past, "more" was assumed to be "better." If it was ever true, it is not true now.

*continued next page*



## MT BAKER WILDERNESS ASSOCIATION

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*Ecotopia Emerging*, by Ernest Callenbach

by Janet S. Senior

The world cannot handle the release of large amounts of energy without reacting in a way that we will undoubtedly find detrimental. It has functioned beautifully for billions of years with a constant allocation of energy from the sun and there is no doubt it would continue to do so if not disturbed to violently. While it may be unreasonable to ask that we revert back to an energy budget based purely on the solar allocation, it seems only sensible that we do what we can to approach such an ideal.

The development of nuclear fusion is not good or bad in itself. It may have the potential to benefit mankind without seriously disturbing the planet. But if it is to be used for our long-term benefit, the powers that control it must have a keen awareness of its potential to disrupt the planet. If it, or any other energy source, serves only to support the expansion of phantom carrying capacity, we can expect a large die-off in the human population when the limits of permanent carrying capacity again become the limits within which we must live. \*

\*\*\*\*\*

### The Obvious Answer

An energy need was deemed.  
A solution was found it seemed,  
The atom was broken,  
An era was opened,  
The barons of industry beamed.

The wattage flowed out from  
from nuclear plants,  
A navy was powered and Rickover danced.  
The submarines dove,  
The strategists crowded,  
Waste questions got only a glance.

Some guessed what the answer would be  
To the Navy's small difficulty.  
But they still shook their heads  
At the headline they read:  
"N-subs may be scuttled at sea."



The survivalists of the 1970s predicted a holocaust. In fear, they built underground, bomb-proof houses in remote areas, hoarded food supplies and bought automatic weapons to protect themselves against those who had not heeded their warnings. Their response to resource scarcity and economic decline was a negative and counter-productive one

In Ernest Callenbach's new book, *Ecotopia Emerging*, he describes a new survivalist movement. These new survivalists will take a more positive view of society's potential for the future -- an ecotopian view of steady-state economics and cooperative progress to fulfill human needs. Callenbach's survivalists are the basis of a political movement dedicated to flexible, positive change. They will seek to replace the "huge, heavy wheel" of traditional American policy with a system better suited to the natural state of constant change. Rejecting the subsidy of an outdated petroleum addiction and otherwise stagnant bureaucratic thinking, the survivalists campaign platform will attempt to transform the frustration of a few brave pioneers into the creative energy of a new society -- a new country -- Ecotopia.

In contrast, Callenbach paints a dismal future for the rest of America. Use of nuclear energy and artificial chemicals will rage out of control. Political decisions will be made in a state of paranoia -- leaders fearful of the collapse of an already crumbling power structure. Drastically increased cancer rates will be openly attributed to chemical contamination, though rationalized as an acceptable consequence of economic growth.

In his first novel, *Ecotopia*, Callenbach sketched a new ecological society developed when, in desperation, the Pacific Northwest seceded from the rest of the United States. *Ecotopia Emerging* is a sort of backward sequel leading up to the secession, narrating the growth and maturation of the ecotopian/survivalist movement.

Callenbach corrects some of the faults criticized in *Ecotopia*, the ecotopians are more realistically motivated and not quite so perfectly well adjusted. His style is similar to the first novel, journalistic discussion interwoven with an engaging storyline. Again, he displays a gift for interlocking detail. His description of already existing ecotopian innovations makes his utopian vision seem even more vivid and possible.

Ernest Callenbach is indeed a utopian, an idealist and at times an escapist. He assumes that human nature, if there really is such a thing, can be changed for the better. Ronald Reagan can also be called an escapist -- a seeker of simplistic solutions to inherently complex problems. I propose that Callenbach's theory is merely a change in emphasis, allowing the positive, cooperative spirit of man and woman to emerge. What makes Ronald Reagan's vision for the future any more possible or viable than Callenbach's Ecotopia? \*



## In tune

I like to think that I am sufficiently in tune with the world around me that I hear every owl that calls within hearing distance of my house, day or night. Pissing outdoors is essential to this awareness; the invention of indoor plumbing was a monstrous step in the reduction of human awareness of natural phenomena, in the ability to recognize ourselves as earth animals.

Daniel G. Kozlovsky

Pass this on to a friend!





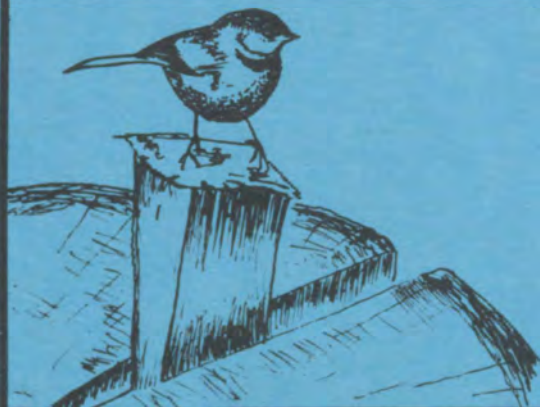
# Audubon Christmas bird count

The National Audubon Society conducts an annual Christmas bird count. The North Cascades Audubon Society counted birds in the western Whatcom County area on Dec. 27, and the results are printed below.


Common Loon	34
Arctic Loon	23
Red-throated Loon	39
loon sp.	3
Red-necked Grebe	44
Horned Grebe	116
Western Grebe	2906
Pied-billed Grebe	20
Double-crested Cormorant	227
Brandt's Cormorant	12
Pelagic Cormorant	41
cormorant sp.	38
Great Blue Heron	94
Green Heron	1
Whistling Swan	125
Trumpeter Swan	11
swan sp.	100
Canada Goose	102
Brant	225
White-fronted Goose	2
Snow Goose	1
Mallard	14,636
Gadwall	20
Common Pintail	3130
Green-winged Teal	67
Blue-winged Teal	1
Eurasian Wigeon	5
American Wigeon	9748
Northern Shoveler	13
Redhead	10
Ring-necked Duck	79
Canvasback	33
Greater Scaup	365
Lesser Scaup	8
scaup sp.	1582
Common Goldeneye	310
Barrow's Goldeneye	114
Bufflehead	590
Oldsquaw	30
Harlequin Duck	20

White-winged Scoter	196
Surf Scoter	532
Black Scoter	32
scoter sp.	71
Ruddy Duck	66
Hooded Merganser	21
Common Merganser	290
Red-breasted Merganser	163
duck sp.	27,490
Cooper's Hawk	5
Red-tailed Hawk	80
Rough-legged Hawk	26
Bald Eagle	21
Marsh Hawk	60
Peregrine Falcon	1
Merlin	3
Kestrel	5
Ring-necked Pheasant	9
Virginia Rail	1
American Coot	1350
Killdeer	64
Black-bellied Plover	19
Black Turnstone	31
Common Snipe	1
Greater Yellowlegs	2
Rock Sandpiper	1
Dunlin	5370
dowitcher sp.	2
Sanderling	27
peep sp.	26
Glaucous-winged Gull	1631
Herring Gull	1
Thayer's Gull	18
California Gull	6
Ring-billed Gull	74
Mew Gull	370
Bonaparte's Gull	38
gull sp.	585
Common Murre	39
Marbled Murrelet	21
Rock Dove	630
Mourning Dove	1
Barn Owl	4
Screech Owl	1
Great Horned Owl	9
Short-eared Owl	9
owl sp.	1
Anna's Hummingbird	8
Belted Kingfisher	13
'Red-shafted'Flicker	118
'Yellow-shafted'Flicker	2
hybrid flicker	1
Pileated Woodpecker	1
Hairy Woodpecker	1
Downy Woodpecker	37
Steller's Jay	35
Common Raven	14
crow sp.	3021
Black-capped Chickadee	475
Mountain Chickadee	3
Chestnut-backed Chickadee	81
Bushtit	351

Red-breasted Nuthatch	6
Brown Creeper	11
Dipper	2
Winter Wren	56
Bewick's Wren	92
Long-billed Marsh Wren	30
Robin	1654
Varied Thrush	73
Hermit Thrush	3
Townsend's Solitaire	1
Golden-crowned Kinglet	955
Ruby-crowned Kinglet	150
kinglet sp.	39
Water Pipit	2
Bohemian Waxwing	6
Northern Shrike	7
Starling	26,116
Hutton's Vireo	4
Townsend's Warbler	5
House Sparrow	390
Western Meadowlark	75
Red-winged Blackbird	800
Brewer's Blackbird	836
blackbird sp.	1600
Evening Grosbeak	138
Purple Finch	40
House Finch	447
Pine Siskin	480
American Goldfinch	73
Rufous-sided Towhee	226
'Slate-colored' Junco	8
'Oregon' Junco	2272
White-crowned Sparrow	113
Golden-crowned Sparrow	40
White-throated Sparrow	1
Fox Sparrow	148
Lincoln's Sparrow	2
Song Sparrow	730



**A.S. RECYCLE CENTER**



- Paper (All Kinds)
- Cardboard
- Aluminum and Metal Cans
- Refillable Beer Bottles
- Glass
- 2 Liter Plastic Pop Bottles
- Used Motor Oil

• OPEN 7 DAYS A WEEK ; DAWN TILL DUSK

• 519 21ST ST (SOUTH EDGE UNIV. CAMPUS)

