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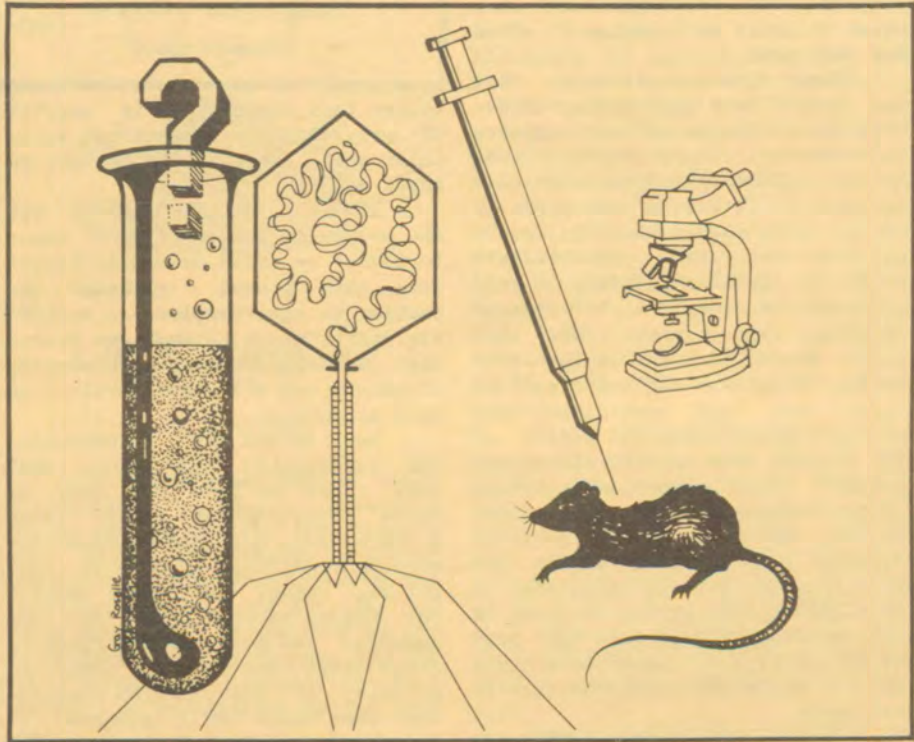
Monthly



Planet Earth

APRIL VOLUME 2 NUMBER 3

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Recombinant DNA: Redesign of Nature

by Valerie Smith

Genetic research is an exciting and rapidly advancing field. In such research, man has gone beyond attempting to merely understand nature, and has delved into the unpredictable realm of tampering with the fundamental codes of life. Recombinant DNA research has overcome obstacles at a tremendous rate, and there are no signs of slowing. We have been assured the potential benefits will be significant, an undeniable statement considering the capacity of the research. Yet, will the positive aspects tip the scales when measured

against the risks? It is vital the public and the scientific community do not underestimate the stakes at hand.

The potential benefits to society from recombinant DNA research are indeed promising. We can attain a greater understanding of important biological phenomena, such as mechanisms which control gene activity and cell metabolism. Besides this significant scientific gain, we have been offered large and practical benefits as well. There is hope scientists may one day be able to transfer specific nitrogen fixing genes to important plants, such as cereals, which are

unable to fix nitrogen into a usable form. This will reduce the need for artificial fertilizers manufactured from petroleum. With the recently developed molecular cloning technique, human biological substances such as insulin and other hormones, as well as the promising substance interferon, could be produced on a large scale rather inexpensively. The mysteries of genetic diseases like diabetes, sickle-cell anemia, and cystic fibrosis could be unlocked. Some have claimed this research holds promises for a greater understanding, and perhaps cure, of cancer. The ambition to make these potentials reality has led many scientists into this rewarding research.

Yet, along with exciting rewards and benefits of recombinant DNA, frightening and unpredictable hazards may also result. The capacity has now been placed in human hands to reshape and reconstruct the products of three billion years of evolution. Genes cannot only be transferred from one species to another, an exchange found only in some species of bacteria, but shifted from one genus, phylum, or perhaps kingdom, to another. The invention and introduction of new self-reproducing living forms may well be irreversible. Can we, in truth, foresee the consequences, short and long-term, of our interventions?

The significance of the potential hazard of recombinant DNA depends upon the perspective in which the issue is examined. Viewed narrowly, the potential dangers are slight. Most novel organisms would be innocuous, a few others through careful selection and design may be beneficial. Still others may inadvertently be perilous. The chance of release of these organisms is statistically small. A series of fairly unlikely events must be followed to produce infections, or worse, a plague, and such chances seem quite slim, in any one experiment.

CONTINUED ON BACK PAGE

Diet for the Future

by Sadao Miyamoto

Vegetarianism, a diet that has been practiced for centuries in various cultures of the world, is now an emerging trend in this country. Different people become vegetarians for different reasons -- health, political, emotional, -- to name a few. Whatever the reason, it is a significant part of the awareness that is evolving in society today.

People tend to regard vegetarianism as a sort of abstinence from the natural human diet of eating meat, but recent research has revealed that our early ancestors were vegetarians who ate no meat except during periods of extreme crisis. It was only during the last Ice Age when their normal diet was not available that humans started eating meat for survival. This custom continued thenceforth either by necessity (e.g. Eskimos), through habit, or through lack of proper knowledge. However, there have been many individuals and groups of people who have realized the importance of a pure diet for health, mental clarity, or spiritual reasons, and have therefore remained vegetarians.

Contrary to the common belief that it is natural for humans to eat meat, human physiology, bodily functions, and digestive system are completely different from those of carnivorous animals. Carnivorous animals have many unique characteristics which set them apart from all other members of the animal kingdom. They all possess a very simple and short digestive system--three times the length of their bodies--for rapid expulsion of putrefactive bacteria from decomposing flesh. They perspire through their tongue as they hunt in the cool of the night and sleep during the day. They also possess powerful jaws and pointed, elongated "canine" teeth to pierce tough hide and to spear and tear flesh.

Human beings, on the other hand, have characteristics that are very different from the carnivores. The human digestive system is twelve times the length of the body; our skin has millions of tiny pores to cool the body by sweating; and unlike carnivores, we have the well developed salivary glands needed to pre-digest grains and

fruits. These characteristics are in every way like the fruit eating animals, and very similar to the grass eaters. Furthermore, it is obvious that our natural instincts are non-carnivorous. Most people would be sickened if they had to do the killing themselves. People usually cook and spice meat when eaten in order to disguise it from its raw state.

There are many diseases that are linked to a meat eating diet. Statistics have shown that vegetarians have a significantly lower cancer rate compared to non-vegetarians. One reason non-vegetarians get more cancer might be due to nitrate and other preservatives added by the meat industry to mask the discoloration of meat. Another possible reason is the fact that since meat is on top of the food chain, poisonous chemicals such as fertilizers and pesticides are highly concentrated in bodies of the animals that eat the plants and grass. Meat contains thirteen times as much DDT as vegetables, fruits, and grass. This meat is further poisoned when animals are treated with various chemicals to stimulate their growth. There is also a striking fact that the meat of an animal with cancer or a tumor is sold after the cancerous part is cut away.

Perhaps the most convincing argument for a vegetarian diet is the correlation between meat eating and heart disease. The fats of animal flesh, as well as cholesterol, do not break down well in the human body and line the walls of blood vessels, placing a tremendous burden on the heart. In America, one person out of every two will die of a heart or blood vessel related disease; these diseases are practically unheard of in societies where meat consumption is low.

Notwithstanding all the hazard of a meat eating diet, people believe that a vegetarian diet cannot provide sufficient protein and nutrition. There have been many studies that have proven a vegetarian diet is capable of providing more nutritional energy than a meat diet. Soybeans, for example, have 40% protein, twice the amount found in meat. A certain combination of non-meat foods, such as rice and legumes, has a synergetic effect that enhances the protein value of



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either food alone, and is capable of providing the 8 essential amino acids which comprise the protein we need.

It is often said that if all the people in the world were vegetarians, we could eliminate hunger from this planet. Although the problem is more complex--an equitable distribution network is essential in order to eliminate hunger, it points out the waste involved in meat production.

Meat is the most uneconomical and inefficient food we can eat. Vast acres of land are used to raise livestock for food. These acres of land could be utilized far more productively if planted with grains, beans, and other legumes for humans to eat directly. For example, one acre used to raise a steer will provide one pound of protein; if planted with soybeans the same land will produce 17 pounds of protein. This means that it takes 17 times as much land to produce a certain amount of protein in the form of meat as compared to soybeans. In addition, it is estimated that raising food for a meat diet uses eight times as much water as growing vegetables and grains.

The magnitude of this inefficiency is formidable in this country where the policy to reduce agricultural surplus has allowed nearly 90% of our corn, oats, barley, and unexported soybean crop to be fed to livestock. It is also true that this superfluous agricultural production is made possible at the expense of our soil, degrading the land with excessive fertilizers and lack of sound conservation techniques.

One might wonder if he or she could contribute in changing this wasteful system by becoming a vege-

tarian. It is this aggregation of individual awareness that becomes the agent of change, and it is from here that the action for our better future begins, and nowhere else. The vegetarian diet is the diet of the future--the diet which we must adopt once again if we are to save our natural resources and precious lives of human beings all over the world.

To quote Mahatma Gandhi--"The earth has enough for everyone's need, but not enough for everyone's greed."



MX Update

By Mark Gardner

The recently released MX Draft Environmental Impact Statement spells trouble for the Air Force's plan to place the system in any of the sparsely populated areas of the American West. In the EIS, the Air Force presented its estimate of the environmental consequences of the main operations base and the 4600 shelters to be required by the system.

Two high priority areas for the main operations base were studied, one at Coyote Springs, Nevada, and the other at Milford, Utah. The EIS also looks at alternatives to these sites, six in Nevada and Utah, one in Clovis, New Mexico, and another in Dalhart, Texas. Another alternative looks at split basing, using Coyote Springs and Clovis.

The report notes that the Coyote Springs base would use more water than the recharge rate of the aquifer; this would result in draw-down of the groundwater used for watering crops in the area. According to the report, all of the other proposed sites would encounter the same problems with water in these moisture scarce areas.

According to the EIS, the construction and operation of the system could cause violations of the Prevention of Significant Deterioration Amendment to the Clean Air Act. The report notes that visibility in the area could be impac-

ted due to construction dust, sulfur oxide, nitrogen oxide, and other pollutants resulting from the project.

This effect would be worsened at the Coyote Springs site, which is in close proximity to an operating coal plant and near a site proposed for another coal burner. Should it be determined that air pollution levels would violate the legal standards, legal battles would be sure to ensue.

According to the EIS, the system's construction would bring thousands of workers into the region, straining health services, schools, housing, sanitation, and government. The report stated that "the smaller, static, and more homogenous communities are likely to be impacted the most." Such large scale development would also irreversibly alter the holy lands of the Shoshone and Paiute peoples. It is also predicted that the mining industry of the area would be adversely affected by the MX, which would draw workers away from such enterprises.

Many have criticized the report, including James Santini of Nevada, who was convinced that the EIS greatly underestimated the project's effect on the mining industry. Governor Matheson of Utah attacked the statement as containing a "grossly inadequate estimate of the required construction force." Governor List also expressed skepticism over the adequacy of the report.

The EIS added fuel to the fire for the growing group of critics of the Missile X. During his campaign, Ronald Reagan expressed concern over the Air Force's MX deployment scheme. He called the plan "fantastic," adding that, "We need the missile, I think...but I am not in favor of a plan that is so costly." Estimates of the project's cost have ranged from the Air Force's figure of 34 billion, to 108 billion, a figure calculated by SANE, an arms control group. An anti-MX coalition has been formed, consisting of environmental groups such as the National Audubon Society and Friends of the Earth; organizations concerned over defense policy such as SANE and the Center for Defense Information; and the Taxpayer's Union, which feels the missile carries too high a price tag.

This is a crucial period for the MX project. The administration stance on MX is not yet decided; this is an important time for concerned citizens to express their views on this gargantuan scheme.

In addition, the Air Force, in an effort to maintain a low profile, is planning to hold only six hearings on the MX in the affected areas. This contrasts with the fourteen hearings held during the scoping process for the EIS. The state of Utah and local citizen's organizations are pressing demands for fourteen public hearings in Nevada and Utah and one hearing per affected county in Texas and New Mexico. There is a need for a letter writing campaign in an effort to extend the hearing process. Send letters to:

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House Appropriations Committee
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Hon. Henry Jackson or
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Department of the Interior
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Reaganomics and the Environment

by John Miles

It is far too early to push the panic button or even make judgements about the outcome of the Reagan administration's policies and plans, but it is not too early to examine actions and indicators of significance to those who have concerns about the environment. Everyone knew from the start of the presidential campaign that Reagan was no friend of the environmental movement and its causes. Now that he is in office, how do things look?

Item: Reagan named James Watt as Secretary of the Interior. Watt's much-publicized involvement in the Sagebrush Rebellion and other efforts to reduce federal control of federal land and resources, as well as his skeptical disavowal of environmental causes, makes his appointment seem like a ludicrous mockery to those concerned with preserving the earth's natural systems.

Item: Leading contender for the post of Assistant Secretary for Natural Resources and Environment in the Agriculture Department is John B. Crowell, general counsel for Louisiana-Pacific. This company is the largest producer of timber from public lands, cutting 85% of its timber from land managed by the Forest Service. In a recent speech, Crowell called the Forest Service policy of even-flow management "absurd" and described RARE II as "particularly ill-conceived" because the review was undertaken outside the planning process established by the National Forest Management Act. Whether the new administration will repudiate RARE II and change the current even-flow policy will be two of the most important questions facing the new Assistant Secretary.

Item: The field of candidates for Director of the Bureau of Land Management has narrowed, with the front-runner being Robert Burford, a Colorado rancher who co-sponsored the state's Sagebrush Rebellion bill in the 1979 legisla-

ture. Across the board, the administration is placing people in control who either have actively fought against conservation, preservation and environmental regulation in the recent past, or who have simply not been involved in environmental issues (as in the case of the new administrator of the EPA). The actions of all federal resource management agencies, under this new leadership, will demand close scrutiny.

The big news these days is "Reaganomics", the administration's grandiose plan to fight inflation, improve our defense posture, and to get the government "off the people's backs." The budget-cutting and the priorities it reveals are definitely a cause for concern.

Item: In his recent speech to a joint session of Congress, Reagan never mentioned the subject of energy. Yet, in that speech he proposed major cuts in federal subsidies to mass transit. Federal policy in the recent past has been to support mass transit systems in order to get people out of their private cars, thereby conserving petroleum. Reagan's speech seems to indicate that he does not regard the energy supply situation as a significant problem, and that policies aimed at reducing petroleum use will be abandoned. Indeed, on February 17, Reagan canceled Jimmy Carter's energy saving restrictions that held all public buildings to a maximum of 65 degrees in the winter and cooling to no lower than 78 in the summer. An Energy Department aide said that Carter's restrictions resulted in fuel savings of 300,000 to 400,000 barrels of oil each day. The Reagan administration's plan seems to be that the recently accomplished decontrol of gasoline and fuel oil prices will "prime the pump" and provide incentive for new petroleum exploration and development. The assumption seems to be that the energy crisis is nothing but a creation of government intervention; with industry unleashed, we will again be swimming in an oil glut reminiscent of the 50's. This remains to be seen.

Item: The new Secretary of Energy said last week that the United States must regain its position of leadership in the field of nuclear energy development. He argued that the rest of the world is going nuclear and that the U.S. must do so or be left in the dust. The federal government must get out of synfuel development (not a bad idea in the opinion of many environmentalists, but for different reasons than those motivating the administration), reduce its subsidies to solar energy development and other alternative energy technologies, and reduce the regulations that have crippled the nuclear energy industry. This done, federal money will be saved and the market will determine the best course for this country in the energy field. The Secretary obviously feels that this course lies in the direction of nuclear energy.

Item: In his revised fiscal year '82 budget President Reagan virtually eliminated funding for the Land and Water Conservation Fund, and drastically cut money for urban park grants and the historic preservation fund.. The Land and Water Conservation Fund, begun in 1965, is a trust fund whose money comes from oil and gas sales on federal lands and the Outer Continental Shelf. The money is used for land acquisition for parks, recreation areas and facilities--such as Redwood National Park, authorized additions to which still must be purchased.

Of this action, Ron Tipton of the Wilderness Society said "Reagan is legislating by appropriation, using the budget as a disguise for doing away with a program. This is a trust fund, not general revenues --he can't use the money he's saving for Food Stamps, defense spending, or anything else."

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The outgoing Carter administration proposed \$520 million for the fund in the fiscal year '82 budget, including \$230 million to be spent by the National Park Service. The Reagan budget slashes the National Park Service allocation to \$45 million. Land acquisition in parks that have been established will virtually come to a halt.

All of this indicates that the Reagan administration is taking a radically different stance in relation to "environmental" issues than previous administrations have. It seems that the President intends to virtually dismantle programs that have been years in the making. Only a few items have been mentioned, but through his appointments and his budgeting the President has aimed at the range of environmental programs, from energy conservation and development to parks and recreation. It seems also that he regards environmental problems as insignificant and soluble by market forces and technological innovation alone. Some of them may indeed be soluble in such ways, but many may not be, and the consequences of abandoning programs underway may be severe. All of which poses a great challenge to the environmentalist community. If it thought it was involved in hardball politics in the past, the new struggles may make those earlier efforts look like sandlot games.

Senator James McClure of Idaho and Chairman of the Senate Energy and Natural Resources Committee (formerly chaired by Henry Jackson), has described the situation. "There won't be any wholesale demolishing of laws that deal with the protection of the environment. It's a matter of changes in balance. Environmentalists have had their way pretty much in the last few years. They're not going

to have it as totally as they have had. The pendulum is swinging."

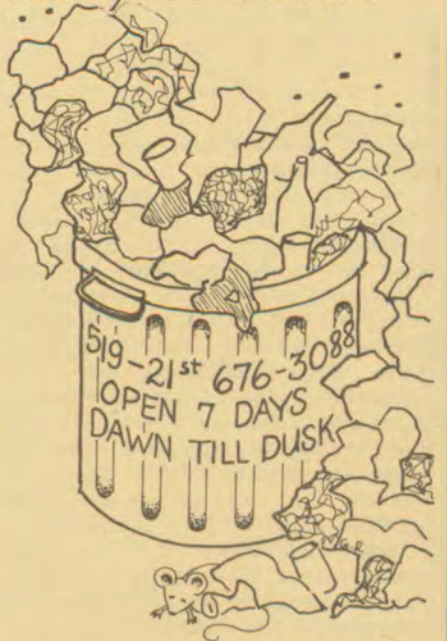
In a recent interview in *Pacific Northwest* magazine the distinguished American historian Henry Steele Commager placed the situation in another perspective. "There is not a single major problem that can be solved by one country. There is no way of saving the whales or porpoises or dolphins unless you have international cooperation. . . .The problem of starvation is not national. These problems can only be solved by scientists and scholars and men of wisdom getting together and looking at it the way scholars and scientists look at things. And they must not be presumed to serve national ends. They have their claims to humanity and to the future. Einstein had a marvelous little phrase. He said, "An election is for now. An equation is for eternity."

Commager's words come like a bugle call through the chatter about military superiority, containment of communism, neutron bombs, and exclusive pursuit of national interest in international affairs. The environmentalist community must rally to Commager's perspective and keep clear its vision of environmental quality and distributive justice. We must remain concerned about the health and welfare of all human beings and the Earth that nurtures them. It won't be easy to do so.

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-- Mark W. Vance --



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2050: Life on Barren Earth

by Stan Holmes

It is the year 2050 and life on bleak and barren earth is rapidly striving to reconstruct a once magnificent civilization. All of mankind is now housed in protective plazas, made necessary by the irradiation of the entire earth by the first--and last--all out nuclear conflagration. The air is not yet safe to breathe for fear of radiation poisoning. Scientists are working round the clock to devise a new chemical combination which will alter the irradiating molecules, eventually speeding up the detoxification process. In five years, the scientists predict man will once again walk freely on earth. But for now, the people are forced to live like rodents in underground plazas regulated by computers. These plazas are reminiscent of the covered shopping malls so common at the end of the twentieth century.

Glass domes have been constructed on the surface for dwellers to see and absorb the horrid atrocities created by runaway nuclear technology and greed. In many areas the environment is nothing but scorched wasteland with strong winds blowing wild and undeterred. Once great and proud cities, which stood as symbols of trade and goodwill, now rot in the aftermath of man's ignorance and hatred. Singed trees and shifting sand dunes are ghostly reflections of days when lush colors filtered to the earth, describing the changing seasons.

What little is left of humanity has finally managed to bring about the unification of existing cultures and nationalities. The people have consolidated and rejected all forms of hatred, racism, ignorance, jealousies and repressive governments. The surviving people have decided education must play an important role in rebuilding society, an education integrating the humanities along with the sciences. Professors have already decided on philosophy, literature and history as required courses that will begin at an early age and be emphasized throughout the students' academic years. It is clear, the scholars feel, that

if an emphasis is given to understanding the mistakes of the preceding society, people might finally learn something from it. Thinking and oral debate will also be stressed in every academic field with the question always asked, "how can this idea improve our existing society?" It is felt by many, that previous generations did not care about problems then afflicting the twentieth century, and that society at that time was very hedonistic and eventually nihilistic to the extent of almost destroying the entire world. It is the purpose of this new educational system to develop the students' mind so the individual can absorb future change and also be able to reflect back on history and understand the gross mistakes the twentieth century made.

The government, decided upon by all members of the community, is to govern on a democratic-socialist basis. It was learned from the years of political chaos in the 1980's that the only coherent and practical government would be one that incorporates something from each of the three main political theories: capitalism, socialism, and communism. The plaza's population is less than 250,000 people. Undoubtedly, this will make it easier to implement a logical and workable system of government. Everyone living in the plaza has been urged to take an active role in the political process. Gone are the days when the majority didn't care, and politics is now relied upon to bring positive change and to illuminate perplexing issues. This replaces a time when politics benefitted only an elite minority who cared nothing about humanity except for personal gains that could be reaped.

The causes resulting in almost total world devastation have been traced back to the 1980's. It is believed by many scholars that the election of Ronald Reagan as U.S. President was the impetus behind the final collision between the Soviet Union and the United States. The cold war mentality pervading the Reagan administration had accelerated an arms race, and soon the collision course was set.



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Historians reason that the immense power of the Reagan administration, supported strongly by big business, gave it the flexibility to antagonize the Soviet Union and control Third World countries, even though the majority of American citizens opposed such actions. The same was true for the Soviets, who controlled their citizens by force and subjected the majority of people to any scheme the contingent of dictators thought feasible.

Many scholars contend that if only the two superpowers could have sat down and concertedly tried to negotiate and understand each others positions, and had planned global strategy for all the world to benefit, maybe a nuclear holocaust might have been averted. A lot of professors then argue that too many religious, racial and monetary differences existed for humanity to jell into a cohesive unit; some think the nuclear holocaust was the only way for man to realize his stupidity.

Now, it is still five years before any man living in the plaza can walk outside on the surface. It will take many more years for the color and beauty to return to the once beautiful earth. But the people living in the plaza have realized the dangers of ignorance, limited education, and power. It is the people's goal to build a society on the basis of peace, understanding and respect for all. It is something that humanity has taken 3000 years to understand.

The Monthly Planet welcomes responses to the views expressed herein. Letters to the editor should be sent to the Associated Students Environmental Center, Western Washington University, 98225. Letters can also be dropped off at ES 535.

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Sehome Hill: Its Past and Future

by Brenda Horn

While housing developments, shopping malls, theater complexes and parking lots are eating up large tracts of land in the city of Bellingham, there remains one large hill that seems isolated and unconcerned with the local developers' growing lust for 'virgin' lands. We are all familiar with this place as Sehome Hill.

It is a bit of an understatement to say that the Hill has been around longer than the Lummi Indian subchief whom the hill was named after. Sehome Hill is a part of the Chuckanut sandstone formation from the Eocene epoch, making it more than 45 million years old.

In the 1870's and 1880's the old growth forest covering the hill was logged; after logging was completed, the natural plant communities began to redevelop. For about 70 years the hill was left alone under the control of the city as a city park. As a city park, Sehome Hill was not actually protected from extensive recreational development, or from the expansion of Western Washington University.

In 1968 the head groundsman of the then Western Washington College went to the college president, Jerry Flora, to suggest that Sehome Hill be set aside and protected as an arboretum--a place to allow the natural vegetation of western Washington to grow and develop undisciplined by man, as an island of wilderness representative of what was once the Pacific Northwest. Jerry Flora pursued this idea and in 1969 the college trustees gave their approval to establish Sehome Hill as an arboretum. The Arboretum was ultimately composed of both college and city land, and the Arboretum Board of Governors was established in 1974, defining the dual city-college control of the hill. The Arboretum was "to be preserved in a natural state, to be devoted to educational, aesthetic, recreational and research purposes, and to be developed in a manner which is compatible with sound ecological concepts."


Sehome Hill Arboretum supports well over 160 different native vas-

cular plants including a few rare or endangered species. Spring and early summer are the best times of year to enjoy these plants. Late summer and fall is a prime season to see a great display of mushrooms and other fungi. During the winter, the greenness of the mosses stands out against the brown leaves and earth.

Over 100 different species of birds can be seen on Sehome Hill, including several different species of Owls, Hawks and Woodpeckers. Some of the more uncommon species that might be seen are the Goshawk, Merlin or Pileated Woodpecker. If you are lucky you might see one of those odd mammals that look like they jumped off the evolutionary train too early--the Mountain Beaver, or perhaps at the other extreme, a graceful flying squirrel.

It is important to remember that there is nothing that legally protects Sehome Hill and its inhabitants from alteration or development. Development in the past has been avoided at least in part because of the topography of the hill. Future development would be difficult because of the composition of the rock and soil. Most importantly though, the protection of the Arboretum lies in the hands of Bellingham residents and the W.W.U. students, faculty and staff. Public awareness and appreciation is the most crucial factor involved in the protection of the Arboretum. As the city of Bellingham continues to grow, the ecological and aesthetic value of the Arboretum will increase.

Except for declared wilderness, the acreage of forested land which is protected from logging is becoming more and more scarce, rapidly becoming restricted to land strips shouldering highways and areas that are highly inaccessible to the average person. Much of this forested and clearcut land is set for as little as 80 year logging rotations, which ultimately means that the true old growth forests (150 years and older) will become more and more scarce. Because of this unfortunate fact, the importance of Sehome Hill will strengthen in the future. The Douglas Fir



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forest of Sehome Hill is about an 80 year old stand, prime for cutting, but hopefully it won't be cut. If left untouched as planned, the Sehome Hill forest will become one of the few old growth forests in a suburban, lowland area. In the future it may be one of the few exposures that some city dwelling people will ever have to the true, great, old growth forests of the Northwest.

People interested in the management and future of Sehome Hill Arboretum are welcome to attend the public meetings that occur the second Tuesday of each month at 4 pm in the Environmental Studies Building, room #508.



Red Squirrel

The Special Collections department of the Wilson Library needs to obtain a tape recorded copy of one of the addresses given at the conference held at Huxley College, April 29-30, May 1, 1977, "An Environmental Question: Economic Growth and the Third World." The tape we need is from the Workshop Session II, Appropriate Technologies by Dave Mason. Please contact Dr. Richard Peterson or Christine Kienast in Special Collections if you have any information about obtaining this tape.

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CONTINUED FROM PAGE ONE

Viewed from a broader perspective, however--over many years of countless experiments, with multitudinous substances and recombinations, in numerous environs, a far greater chance of danger presents itself.

The scientists themselves recognized the potential hazards involved and called on the National Health Institute, which houses, sponsors, and promotes research, to form guidelines to minimize the risks. NHI Guidelines were thus formed, which included a ban on certain research, but consisted mainly of containment policies similar to those for highly infectious organisms. Yet, the question of laboratory containment has been set up as the pivotal problem, for which guidelines shall be the "solution". But what scientist can truly claim complete containment is possible and accidents due to human fallibility or technical failures will not inevitably occur? The guidelines are wholly voluntary, as well, and the only punishment for failure to comply is withdrawal of federal funding for the research. This then leaves out the rapidly growing industrial research complex, which may or may not feel so inclined to follow the guidelines. In the case of industrial research, profit is the motivator and more than once safety has been subjugated to monetary gain. There is often an apparent conflict of interests when a scientist working for a corporation is asked to assess the safety of recombinant DNA research in the corporate laboratory. Further debate is necessary to smooth out these snags and inconsistencies.

We must have open, unbiased discussions of risks and benefits; at the present there are too many unanswered questions. For example, we may know a good deal about the genetic characteristics of certain prokaryotic bacteria, yet we know precious little about higher eukaryotic organisms. To transfer genetic material from one to the other could prove to be a grave miscalculation. We need to know more about the higher organisms before we recombine and mix genetic material, considering the natural barriers which for epochs have prevented such transfer. Many scientists will answer that recombinant DNA is the key to a greater understanding of eukaryotic organisms, which may very well be the case. Nonetheless, we need limits and restraints within which we may delve

without fear; beyond which we must tread with utmost care.

Scientists of today, especially those involved in recombinant DNA have an unprecedented burden to carry. The ramifications of their research are far-reaching and too often unforeseeable. Unlike the focus of past research, these scientists search not only to understand nature, but to change and mold it. We are such short-term, short-sighted creatures; we do not know what the consequences will be when we meddle with the fundamental code of life which is DNA. Intricate inter-relationships may be disturbed, for nature is complex in her networks, and the subsequent repercussions could be dangerously pervasive. Too often we assume if it can scientifically be achieved, it naturally follows that it should be achieved; however, science does not necessarily promise betterment. Ambition and curiosity are questionable superiors to three billion years of evolutionary processes.



Review

The Columbia River Salmon and Steelhead Trout: Their Fight for Survival. By Anthony Netboy, Seattle: University of Washington Press, 1980.

by Bob Keller

Anthony Netboy, after half a lifetime studying the world-wide history and biology of salmon, has written a little book which will make you sick. Sick at heart, that is, if you love salmon--love to eat them, love to catch them, or just love to think about a remarkable creature. The salmon, he argues, is on the verge of becoming an endangered species in large areas of the Pacific Northwest. In other areas of the region, such as above Grand Coulee, it is gone forever.

Netboy begins with a description of the Columbia's magnificent salmon habitat before 1870. The magnitude of the runs staggers the mind. Next are accounts of aboriginal fisheries, the rise of commercial fishing and canning, devastating chinook salmon, the environmental changes caused by modern forestry, agriculture, mining and pulp industries. A chapter on "killer dams" argues that, beginning with Bonneville and Grand

Coulee, each successive dam on the Columbia-Snake system vastly multiplied the danger to the salmon's survival. One is especially impressed by the skill and persistence of the Army Corps of Engineers in pushing through hydro-electric projects rejected by Congress. The politics of Corps' promotion leaves the sense that the fish, and certainly Netboy, happily watched Slade Gorton replace Warren Magnuson in Congress.

Another section outlines the technological fix: compensation programs of fishladders and hatcheries, the operation cost alone of which means that each Columbia River salmon caught is now subsidized by taxpayers at about \$2.50 per fish. But even with these heroic measures salmon continue to disappear in the upper Columbia and its tributaries.

Since 1970 fish management has been further complicated by court decisions in favor of Indian treaty rights. Mr. Netboy has little time for Indians who went to court to break previous compensation agreements with the government. Modern Indians, he also observes, have lost the "innate" conservation and communal sense of their ancestors and are now no different from their white capitalist counterparts.

Although he does not pursue the issue, America's relation to the great Northwest salmon fishery is a paradigm of many other ways in which we have developed resources and used Nature. Netboy restricts himself to salmon and ends his book with an emotional appeal on their behalf. He condemns a society which has sacrificed massive and perpetual fish runs for irrigation to grow sugar beets and for cheap power enabling Alcoa and Kaiser to produce throwaway beer cans and foil-wrap. We can't eat aluminum or electricity, and shouldn't eat sugar. In the long run, these are fundamental errors which could cost us and our descendants dearly.

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