The Land Institute

THE LAND REPORT

Number 14
Fall 1981

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PHOTOGRAPSH:
Pages 3, 4, 10, 16, 22, 31.....,Dana Jackson
Pages 14, 15, 33.....Terry Evans
Page 24.....Fred Vogler

On the Cover

This cover photograph by Terry Evans was taken on the afternoon of October 18, 1981, during the Visitors' Day Program. It reminds us of how much has been accomplished in the last five years. On October 17, 1976, the original classroom/shop burned completely to the ground. With the help of friends, we started another building in less than a month after the fire. Its unique "design" has evolved according to the availability of money, time, labor and salvaged or inexpensive materials, as well as the needs of the student program and agricultural research projects.

At The Land

This fall The Land Institute began its sixth year of operation. We offer an alternative academic program for college-age students, serve as a source of information on environmental and energy issues, provide workshops, seminars, and speakers to the community, and are engaged in research on the potential for perennial, seed-producing polycultures to replace annual seed crops on sloping, erodable fields.

The staff at The Land this fall includes the co-directors, Wes and Dana Jackson; secretary, Linda Okeson; appropriate technologist, Paul Rasch; Marty Bender, research associate in agriculture; and Mari Peterson, research associate in community energy planning.

The students are Jean Stramel from Hays, Kansas; Hilary Henri from Winslow, Arizona; Jan Ryan from Grand Rapids, Michigan; Lynn Hirschberg from Miami, Florida; and Marie Rasch from Conklin, Michigan.

Regular classroom sessions on assigned readings occur from ten until twelve each morning. The routine was happily interrupted on September 21 when John Quinney of New Alchemy visited The Land and gave a slide presentation on tree crops. The cultural historian, William Irwin Thompson, accompanied by Beatrice and Andrew Thompson, was a guest at The Land October 11-13. Bill spent a morning in the classroom answering questions about his new book, The Time Falling Bodies Take to Light.

The Land Report

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THE LAND INSTITUTE IS A NON-PROFIT EDUCATIONAL-RESEARCH ORGANIZATION DEVOTED TO A SEARCH FOR SUSTAINABLE ALTERNATIVES: AGRICULTURE, ENERGY, SHELTER, WASTE MANAGEMENT.

In the afternoons, students are outside or in the shop working on individual and group projects. Jan and Lynn are installing a new 500 watt Windcharger to provide electric lights for the Indian House. Jean and Hilary are remodeling to improve the passive solar heating potential in the shed north of the building. Marie Rasch is redesigning the solar hot water heater. The winter LAND REPORT will contain accounts of their projects.

These students will be able to say that they certainly had a "concrete experience" this semester. The adobe walls of an experimental shelter were weathering badly, so for their first group project, students plastered the outside with concrete. An inscription on the wall now reads: "Six brave people gave their skin here." On another afternoon, they and Paul Rasch poured a concrete floor in the saw shed. (See photos.)

The students do not live at The Land, but they car pool out each morning and work a full day, nine to five. On Thursday noon they share a potluck lunch in the Jackson house.

The Land has special cooperative programs with Kansas Wesleyan in Salina and Doane College in Crete, Nebraska, for undergraduates. Students can also often earn credit from their home universities by special arrangement. Graduate students can enroll for credit at Emporia State University in Emporia, Kansas.

Spring Term

The Spring, 1982, semester will begin on February 8 and end May 31. The Land admits students of any race, color, and national or ethnic origin. We recommend that applicants have completed at least one year of college. To apply, write a letter describing past academic work, job experience, interests and goals to Wes Jackson, The Land Institute, Rt. 3, Salina, Kansas 67401. Call (913) 823-8967 for appointments to visit.

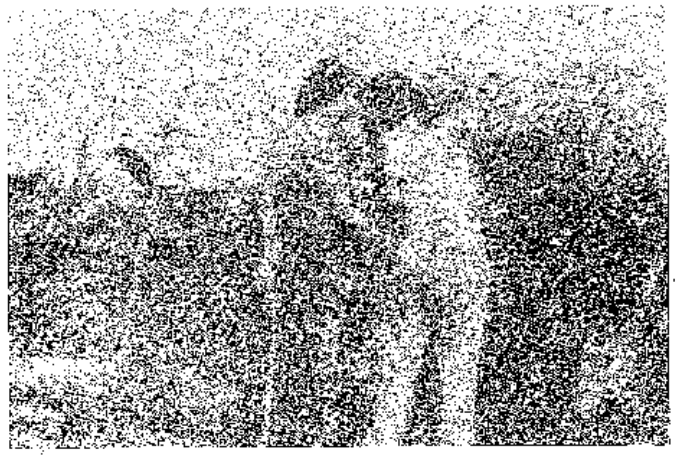
Visitors' Day Program

Each fall The Land Institute hosts a special Visitors' Day Program. Persons who have been curious about activities and projects have a chance to tour the grounds and talk to students and staff. Discussion groups or lectures are also scheduled so that visitors can become engaged in some of the ideas which are the substance of our program.

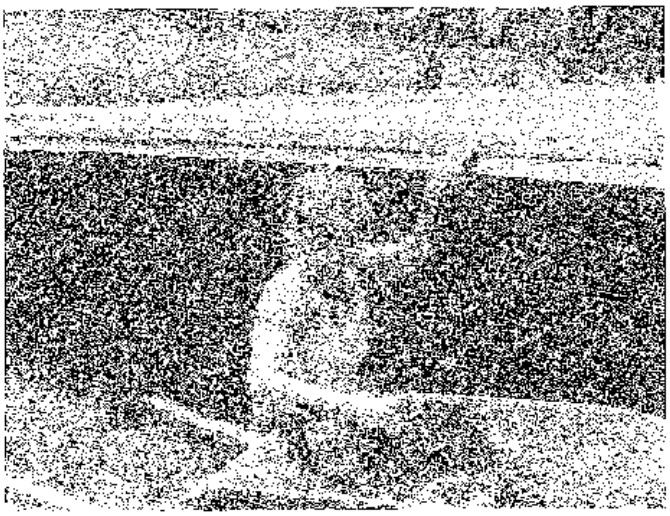
Over 100 persons attended the Visitors' Day Program on October 18. This included a class which hiked out from Kansas Wesleyan in Salina.

As people arrived, they were divided into groups and guided to various spots. They learned about the agricultural research underway from Marty Bender in the Herbary and Wes Jackson in the experimental plots. Paul Rasch explained the wind energy systems and battery storage of electricity. Students showed current projects

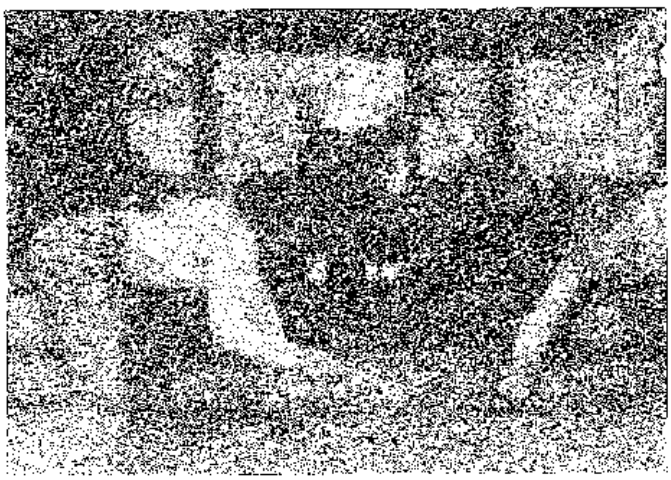
A "Concrete" Experience



Jan, Jean and Lynn



Marie Rasch



Jean, Paul, Hilary and Marie

and certain former projects, such as the greenhouse with insulating shutters and the solar growing frame.

After the tours, refreshments were served in the classroom. Then Wes Jackson presented a lecture on the topic, "A Call for a Revolution in Agriculture," followed by a question and answer period. Part of the lecture appears as an article in this issue of THE LAND REPORT, beginning on page 8.

Discussion Evenings

Energy policy and our obligations to future generations was the general subject of a set of special discussion evenings offered at The Land this fall. The discussions focused on working papers prepared for the Center for Philosophy and Public Policy of the University of Maryland under grants from the National Science Foundation and the National Endowment for the Humanities.

On September 29, participants discussed "Energy Policy and the Further Future" by Derek Parfit; on October 27, "Intergenerational Justice in Energy Policy" by Brian Barry; and on November 23, "Conflicting Views on a Neutrality Criterion for Radioactive Waste Management" by David L. Bodde and Thomas B. Cochran.

Papers in this series analyze the claims of rights and justice on behalf of the unborn, and in this context, the moral implications of our policies involving long lasting toxic wastes, the depletion of nonrenewable resources, and environmental damage arising from energy production.

The serious nature of the papers did not allow participants much gaiety or laughter during the discussions. They were more characterized by brow-furrowing, concentration, and intellectual challenge. Yet the participants interacted by relating personal experiences, individual interpretations of the authors' points, and varying opinions and conclusions.

A series of discussion evenings may be offered on another topic in the spring. Details will be announced in the winter Land Report.

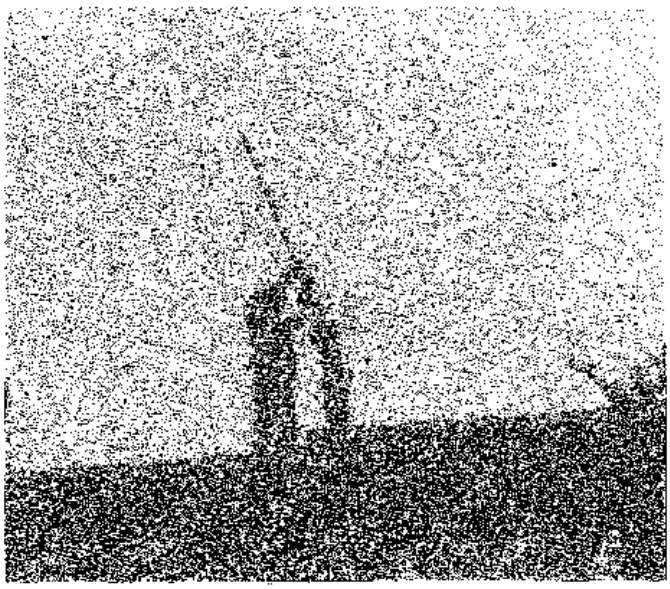
Mark your calendar now to attend the 4th annual Prairie Festival at The Land Institute on May 29-30.

"Resettling America" will be the theme, and our special guests will be Wendell and Tanya Berry. Wendell, a poet, novelist and essayist, is the author of the now classic book, The Unsettling of America.

The two day event will be further enriched by the participation of David and Joan Ehrenfeld and Donald Worster. David Ehrenfeld, Professor of Biology at Rutgers University, is the author of The Arrogance of Humanism. Joan Ehrenfeld is a plant ecologist at Rutgers' Center for Coastal and Environmental Studies. Donald Worster, Professor of American Studies at the University of Hawaii, is the author of Nature's Economy and Dust Bowl: the Southern Plains in the 1930's.

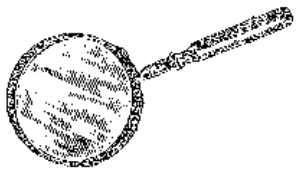
The Unsettling of America, Nature's Economy, and The Arrogance of Humanism are used as textbooks at The Land Institute.

The winter Land Report will contain more details about the festival. Invitations will be mailed in April.



PREPARING FOR COLD WEATHER in the Fall means sorting the woodpile to fill the woodboxes, cleaning the chimneys and blacking the stoves.

On Consumption: Food, Pesticides and a Plastic Lifestyle



September 4, 1981

Dana and Wes Jackson
The Land Institute
Route 3
Salina, Kansas 67401

Dear Dana and Wes,

I received my Land Report today and found it a delight, as usual...

Dwight Platt's essay interested me very much, especially his attempt to clarify the current controversy in the ecological literature over diversity and stability... I would agree with Platt that the argument has more to do with lack of clarity and definition of the words and concepts than with the real matters of substance. I wasn't entirely satisfied with the way Platt dealt with the confusion, however. I decided that the literature is confusing because the main quarrel with the diversity-stability connection is based on the fact that natural, evolved systems with low species diversity may be just as stable, or more so, as disturbed or natural systems of high diversity. But that misses the point that the earlier ecologists were trying to make, I think. They were trying to say primarily that the diversity of highly evolved systems was an important element in their stability. The complementarity of evolved systems with relatively few species may grant as much stability to the system as the complementarities in evolved systems with more species. But both systems are more likely to falter if their evolved diversity is reduced. If a desert has lower diversity than a tall grass prairie, and yet may be demonstrated to have similar stability as measured by particular yardsticks, it does not follow that reducing the diversity of the prairie to something like that of a desert will improve upon the stability of the prairie eco-system. The young Turks in ecology who are attacking the diversity-stability connection seem to understand this clearly enough, but one hears biologists, who should know better but don't care, distorting the argument to a fine agnosticism about such fairly clear issues as whether strip-mining will disturb its surroundings. Of course, I know very little about ecology, but I think this whole question has more to do with the use of language. Does that make sense to you? ...

...on the things that bothered me a bit in the Report let me mention that it seems very dangerous and almost certainly incorrect to talk about the Mideast bidding our food away from us. The fact is and will almost certainly remain that the vast majority of people in the Mideast remain desperately poor. The only exceptions are in very small countries like Kuwait whose inhabitants would have to develop enormous stomachs to be a serious draw on the world food system. Monocultures--whether of coffee, bananas, or petroleum--seldom feed the majority in the regions or the nations that produce the raw commodity. Usually they feed a small, local, highly predatory class and a similar small class in the metropolitan centers like New York, L.A., or Sacramento. Sacramento, or a small piece of it, is getting very fat off armaments contracts and engineering and construction projects in Saudi Arabia. The process robs the bellies of the poor in Sacramento and Arabia with fine equanimity. If investors here invested in local, sustainable agriculture and industry rather than in armaments production and Arabian Potemkin villages, and if the Saudi royal family invested in sustainable agriculture and industry in their own country rather than in AWACs, F-16s and plastic plants, then the poor would be better off at both ends of the line. As it is, the strawberries will pile up in the kitchens of people according to their role in the international system, not according to their nationality. This is important to remember in order to avoid feeling a vicious self-protective jingoism that will protect all the wrong people here and abroad, and certainly will not protect American farmland.

Actually, reading between the lines, it seemed that Gussow might have been saying just this, but the way it was reported could be quite misleading, it seems to me.

On this general topic, I've been paying a lot more attention to Mexico recently, and the tragedy of petroleum seems so far to be repeating the story of Iran and Venezuela. (Remember how oil-rich Iran had a $30 billion debt when the Shah fell? Mostly to the U.S.) (And a bitterly impoverished population, uprooted from traditional culture and offered nothing but Coca Cola culture in return.) The Mexicans have been somewhat more responsive and sophisticated, but at the moment, the momentum seems to be on the wrong side. Their agricultural program, like the Shah's, is nominally in support of the small producer, but in fact is a very clear attempt to go hell bent for leather with petroleum based agribiz on a very grand scale. The policy, except for its rhetorical passages, could have been

written in Ralston-Purina headquarters and very possibly was. I visited a migrant camp for workers who harvest tomatoes in Sinaloa for export to the U.S. The living conditions were beyond appalling, with almost everyone in the camps sick, being sprayed from the air continually with pesticides, drinking out of irrigation and drainage ditches that reeked of pesticides, and using pesticide containers for cooking utensils. Fifteen dead cattle lying in a dry swill--the workers knew not to eat them but they did butcher some and took the meat to market for cash. And so on. I'll tell you the whole story sometime. Had an article published in the Sinaloa State University Journal on the "ecological connections between California and Sinaloa." Also managed to get a little information to university people and labor organizers on pesticide hazards, in Spanish.

One more thing about the Land Report. I really like the graphics, art and poetry. They give a beautiful sense of unity and completeness to what you are doing...

Angus Wright
Environmental Studies Department
CSU, Sacramento
Sacramento, California

Dear Angus,

Thank you for your interesting letter.

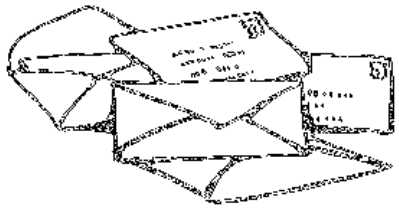
Joan Gussow does, of course, understand that those of whatever nationality who have the money will get the food. A broad understanding of food issues is obvious in her book, The Feeding Web: Issues in Nutritional Ecology. If readers were misled, it was my fault.

The pesticide problem in developing countries has come to our attention through the book, Circles of Poison: Pesticides and People in a Hungry World, written by David Weir and Mark Shapiro for the Institute for Food and Development Policy. Your personal observations are also much like those described in an article in the Sept.-Oct. issue of the Sierra Club Bulletin called, "The Poisoning of Central America." Tens of thousands of pounds of pesticides considered too dangerous for U.S. use, such as heptachlor, chlordane, lindane and DDT, are exported to Central America each year to be used on coffee, sugar cane, bananas and cotton. In 1975, 20% of the world's production of parathion was applied to crops in El Salvador, an average of 2940 pounds of parathion per square mile. Much of the chemicals return to the United States as residues on coffee beans, bananas, beef, etc.

Five days before he left office, President Carter signed the Executive Order on Federal Policy Regarding the Export of Banned or Significantly Restricted Substances. This might have been an important step in controlling the export of hazardous substances, including dangerous pesticides. But on February 17, President Reagan rescinded the order. Many like those you saw in Sinaloa will remain victims of the BLACK "magic of the market."

Please write to us again about your work.

Dana Jackson



September 16, 1981

Dear Wes and Dana,

...Dana, I have an observation to make about your most recent "Action" column which mentioned the highly desirable land ethic of the Amish. You open with the sentence, "Except for having too many children, the lifestyle of the Amish in Pennsylvania impacts the earth very little." Perhaps we should celebrate the birth of each Amish child. As an adult he or she will probably demand far less of the earth than counterparts from the typical American farm. Maybe we need more Amish to serve as models for the rest of us...

Dave Kromm
Department of Geography
Kansas State University
Manhattan, Kansas 66506

Dear Dave:

You brought out an important point in your letter. In the early 1970's we used to hear about the Indian/American ratio. It takes 25 (or is it 50?) people in India to impact the earth as greatly as one American because of our affluence and consumption patterns. Our demands on the earth's resources to feed, clothe, shelter, transport and entertain us are enormous. In this sense, the U.S. is the most over-populated country in the world.

Guilt about our high consumption is out of style these days. People who religiously saved plastic bags, re-used aluminum foil, and rode their bikes in the early seventies have mostly abandoned these practices. This minority eventually felt foolish when they saw how affluence and advertising kept consumption rising, and their small, personal sacrifices made little difference, except to raise their own consciousness. Some became self-righteous, critical of everyone else's lifestyles; some ruined friendships and even marriages.

Frugality is not really a part of our national consciousness. The unprecedented growth in consumer goods has led to the assumption that we can just continue improving our material standard of living, that we "deserve" to do so.

"Maybe we need more Amish to serve as models for the rest of us," you said.

Several years ago the Amish community in Lancaster County, Pennsylvania, was one of the most popular tourist attractions in the U.S. Visitors loved to observe the horse-drawn buggies with the quaintly dressed people in them, see the tidy, lovely farms managing without electricity or large machinery. But how many tourists leaving Lancaster County lessened their impact upon the earth as a result of observing the Amish?

Perhaps if the Amish lifestyle were promoted by Madison Avenue, Americans might adopt it.

Of course, few people would opt for a life of material "sacrifice." Giving up one's electric mixer to be like the Amish is not really the point. People who have something else to live for besides material things are the only ones who easily have low-consumptive lifestyles. Those whom I have noticed feeling free of the burden of proving themselves by acquiring "nice things" are certain religious persons: Roman Catholic sisters and priests, Zen Buddhists, Mennonites, Quakers. Another group is the college-age living in cheap houses, buying clothes at the Salvation Army, "trashing" for household goods and some groceries, growing gardens, making sprouts and buying at food co-ops. They are not burdened with the responsibilities of property owners. Then there are the older citizens who have never lived any other way except frugally. They know how to fix things, to mend clothes, to preserve foods.

Our major religious groups in the United States do not honor low consumption. It doesn't make any difference whether you sit in a pew or one of the Jerry Falwell Fundamental type churches, or in one of the "first" Protestant churches or a cathedral or a temple, or the YMCA or the Masonic Lodge. We show our achievements, our very worth, by the objects we accumulate around us.

What, do you suppose, would be the Amish/average American ratio? How many Amish children would it take to equal the consumption of one average American child?

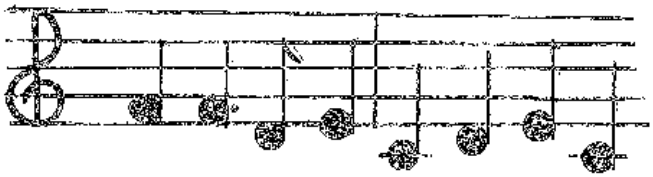
Dana Jackson

A Prairie Home Companion

Land Institute people have become fans of Garrison Keillor, the host of a two hour national public radio program called "A Prairie Home Companion. Each week Keillor reports the news from Lake Wobegon, a ficticious Minnesota town peopled by such characters as Father Emil of Our Lady of Perpetual Responsibility Church, and Harold Star, publisher of the Lake Wobegon Harold Star. Keillor advertises non-existent products, especially Powder Milk Biscuits, which "give shy people the courage to get up and do what needs to be done," and businesses such as Ralph's Real Good Store, whose motto is, "If we don't have it, you don't need it."

The delightful low-key humor is mixed in with bluegrass and folk music. Kansans in our area can hear it on KHCC, 90.1 FM on Saturday evenings at 8:00 P.M.

During a recent broadcast, Keillor sang a song he had written about the rejection of modern plastic living. A letter from a couple saying that you don't need a lifestyle to live in Wichita, Kansas, inspired the composition. It expresses another perspective of consumption.

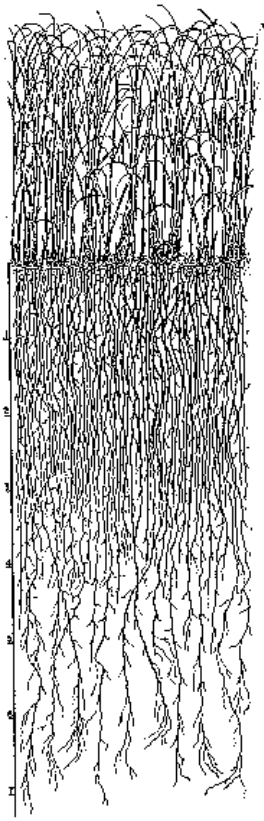


Darling, We Don't Need a Lifestyle

Darling, let's turn off the tape deck:
let's dump our decor in the lake.
These imported chairs never fit me;
the Beta Max was a mistake.
I don't feel good about jogging
in these $95 shoes.
I'm tired of this mustache, this blow comb.
I feel like I'm in TV news.
I don't care if the guys down at the factory
wear Calvin Klein work shirts and pants;
my rear end's too big for these fashions,
and the house is too small for these plants.
Let's drain the water bed, darling;
and take back those butcher block boards.
Let's cancel our New York subscription,
and head down to Montgomery Wards.
Darling, we don't need a lifestyle.
The amenities simply won't do.
I'm not a quality person--
I'm just an old guy who loves you.

We don't have to try all the options,
or buy everything that we're sold.
We can try to be 18 forever,
but we don't learn to live 'til we're old.
I'm going to be 40 next summer,
with who knows how many to go.
And if I'm going to spend them in costume,
I want it to be my own show.
(Repeat refrain.)

Well, we did our best to be modern.
We read all the books we could read.
We turned our home into a warehouse.
But, darling, that's not what we need.
I'll get the car fixed tomorrow
and you give away all the stuff.
Then we'll take our chances in
Wichita, Kansas,
where being in love is enough.



Laying the Groundwork for an Ecological Agriculture

Wes Jackson

At The Land we are working on the development of mixed perennial grain crops. We are interested in simulating the old prairie or in building domestic prairies for the future. Our current agricultural system, which features annuals in monoculture, is nearly opposite to the original prairie or forest which features mixtures of perennials. If we could build domestic prairies, we might be able to one day have high-yielding fields which are planted perhaps once every twenty years or so. This would be an agriculture in which soil erosion is so small that it is detectable only by the most sophisticated equipment, an agriculture that is chemical free or nearly so, and certainly an agriculture that is scarcely demanding of fossil fuel. It would be an ecological agriculture.

What We Have Learned

Since we began our research, we have been learning about perennials from the literature. We were pleasantly surprised to learn that perennial grasses grown anywhere, but particularly in semi-arid climates, are the most efficient producers of granular soil structure. When it comes to forming soil aggregates, the roots are the most active part of the plant. Also, a legume and a grass together do a better job in forming soil aggregates than either growing alone. Studies suggest that perennials also do a better job of keeping nitrogen available than annuals, because the rhizomes, or underground stems of perennials, release inhibitors which suppress nitrification. Nitrification ties up nitrogen in nitrates which can be leached from the soil. When denitrification occurs, nitrates become gaseous nitrogen which can be lost to the atmosphere. Researchers are now working to develop natural and synthetic nitrification inhibitors to be applied with urea or ammonia on the conventional annual crops. But the perennials produce the inhibitors by themselves.

Our research into perennial polyculture began when we became concerned about the enormous loss of soil through wind and water erosion.

The soil loss problem from water erosion ultimately boils down to how a living community is going to deal with the "bombs", miniature "bombs" are Professor Beasley at Iowa State calls them. These raindrop bombs measure 0.12 inch each on the average and fall at a velocity of 25 feet per second. On a bare field, they <u>can</u> legitimately be called bombs for they shatter soil granules and clods, compacting the area below, reducing infiltration, creating craters and eventually carrying the detached particles seaward.

We have learned from the literature that one acre of bluestem, above ground, can hold over 50 tons of water from such bombs. This is significant, for it is not unusual out our way to have a two-inch rainstorm in 30 minutes, yielding a weight of 226 tons of water. Between a fourth and fifth of that tonnage, in other words, can be absorbed by the first line of defense, the cover itself.

As we anticipate our breeding program involving perennials, we have learned from a survey of the literature that different species of perennials of the same genus, or even from closely related genera, are more likely than annuals to successfully cross, and in turn have fertile hybrids. In other words, the barriers to yield improvement through crossing of perennials are significantly fewer than the barriers which affect annuals.

We have also learned much from growing prairie plants at The Land. It is our goal to get 1,000 species from across the Great Plains and other places as well, growing in five meter long rows. Under the direction and care of Marty Bender, who is director of the herbary, we have over 150 species now established.

We are developing the herbary for the purpose of having the plants close at hand so that they might suggest to us how they might be used, as for example within a domestic tall grass prairie mix, or in a domestic mid- or mixed-grass prairie or the short grass prairie west of us. We are ideally located because we live in the middle in mixed grass prairie country. To the east, 75 miles or so, is tall grass country and to the west, less than 100 miles, is short grass prairie. We are also close enough to the middle of the prairie north-south that we can grow plants from Manitoba alongside plants from Texas.

We have learned that wild plants, with only a moderate degree of assistance by us, respond with an overall vigor which is much higher than that demonstrated by their relatives struggling in nature. We have nine foot

tall perennial sunflowers at The Land. Our Wild Senna is over five feet tall with a surprising abundance of seeds. Maximillian Sunflower is loaded with blossoms far beyond what I have observed in nature.

Perhaps our favorite star, so far, is a relative of corn, Eastern Gama Grass. It is a strong and highly nutritious perennial which has 27% protein in the seed, three times that of corn and twice that of wheat. It is also 1.8 times higher in the important amino acid, methionine, than corn. We are involving five characteristics in crosses to increase the yield in this strong perennial.

Other plants which interest us include Wild Senna, Illinois Bundle Flower, Maximillian Sunflower, Sand Dropseed and Sand Lovegrass. We are only interested in these plants as seed producers, for we think it is important to come up with compelling alternatives to the annual grain producers for sloping ground.

But we are careful not to get ahead of ourselves by looking at specific plants to become crops. Rather we plan most of our experiments with two important biological questions in mind. First of all, are perennialism and high yield mutually exclusive; and secondly, can a polyculture or mixture of perennials out-yield the same perennials in a monoculture? This has led us into numerous other questions. For example, there is the very important, yet so far as I can find, not asked question, "What is a perennial?" My bet at the moment is that the biochemical pathways which point toward perennialism in one group may be very different from the pathways which contribute in another. Tropical plants which are perennial simply don't winterkill. Temperate perennials have some mechanism that keeps them around over winter.

We have an experiment underway to determine if there is something inherent in perennialism that might keep a perennial from responding to selection pressures as quickly as an annual. For example, we have two species of Lespedeza, one an annual, the other a perennial; both are obligate outcrossers, that is they won't accept their own pollen. We intend to weigh the seed of each plant from each species, plant the seed out from the top three percent and then repeat this process in subsequent years and see how the perennial responds compared to the annual. We hope to do the same with some obligate selfers in which one is perennial and the other annual.

We have over 160 plots, each 4 feet wide and 24 feet long, devoted to two major categories of experiments. We grow two species together in a biculture and the same two in monoculture in order to determine if they get along better together or separately. There are some additional plots with two species growing together, involving fifteen different combinations, and here we hope to introduce a member of the sunflower, mint, or crowfoot family.

We have known that legumes enhance yield, but we didn't know until relatively recently that they fixed nitrogen which the entire plant community could utilize. We want to know if these plants of the prairie make a contribution that we can measure or are they "just there." In this respect, Wendell Berry has reminded us in a recent Sierra Club article that the creation is mysterious, precisely because it does not conform to human purposes. In other words, just because there is no measurable yield increase from incorporating members of various families in the mix, it does not mean they have no purpose. Over the longer pull, the role they play may be of profound importance for the kind of ecological agriculture we envision.

Another insight we have gained from this growing season came totally as a surprise from a certain set of experiments. We had a pasture consisting mostly of Indian grass at The Land which was there when we first saw the place a dozen years ago. It is adjacent to a brome grass pasture for our livestock. This spring we mowed the Indian grass pasture into blocks 20' by 4' each, separated only by aisles one lawnmower width wide. We then grouped them. One plot was mowed, one burned, a third was mowed and disced, one burned and disced. We also had a control in which we did nothing. We then hand sowed approximately 50 live seed of one species per square foot in all five of these conditions, in order to learn what conditions would accommodate that species best. We did this for a total of fifty different species. In other words, we have 250, four feet by twenty feet plots tied up for all fifty species. Then we had a decision to make. Do we allow

Maximilian's Sunflower

the livestock - a horse, a milk cow and two calves - to be part of this or not? We had it partially fenced off already and with three or four hours of work, we could have isolated it from the livestock with an electric fence. We decided to let the livestock graze the area as a matter of choice, for they had plenty of good brome this year. Now comes our surprise. Where we burned, the livestock systematically ate the growth. Where we did not burn, but only mowed early, the livestock mostly left it alone. Consequently, the burned area scarcely flowered, while the unburned area, regardless of whether it had been disced or not, bolted and flowered.

A possible explanation is that even though nitrogen is lost with burning, the rest of the nutrients are quickly released and taken up by the early growth. Maybe this early growth is more tasty. There are other interpretations, but what is important is that both cattle and buffalo selectively graze. This reality suggests a great possibility for a sustainable agriculture. Imagine livestock grazing in a field where burned strips alternate with unburned strips. The unburned area becomes the grain crop and is harvested. The burned area feeds and is fertilized by the livestock, all in the same field. In the next year, the burned strips would be mowed and the mowed strips burned, in a new kind of rotation system. Here is an agriculture which begins to utilize the natural integrities of nature.

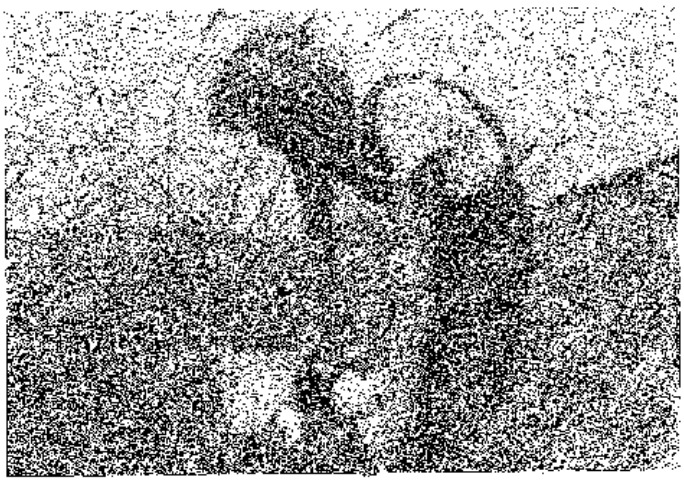
Succession in Agriculture

As we have studied the literature and developed our research plots, we have discovered more ideas for integrating ecological principles in a new agriculture. Probably our most radical idea is introducing succession to agriculture. Annual monoculture has been compelling in the short run because we have successfully denied our fields the opportunity to go beyond the first stage or two of succession. Agriculture has depended upon successfully fighting what nature wants to do. But an ecological agriculture would not totally suppress nature, or succession.

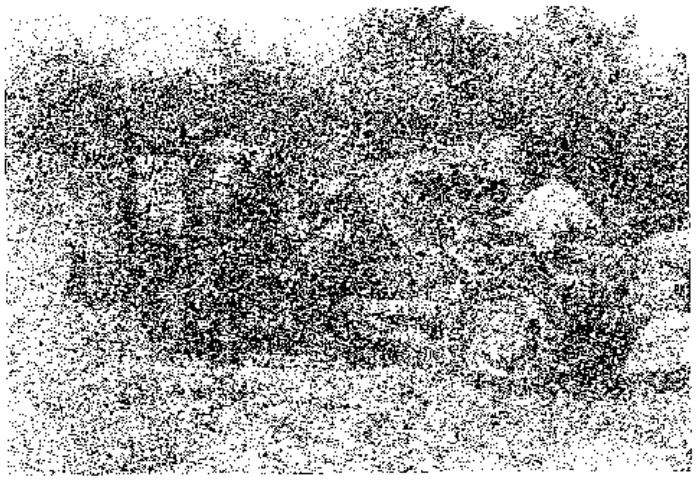
Succession is an ecosystem's way of obeying a fundamental of biology. We know that for all levels of biological organization that there is a juvenile stage, eventually a mature stage, and the inevitable senescence and death. It happens to cells. It happens to tissues, organs, organ systems, to the individual. It also happens to species which evolve, often with a flourish, settle down and then become extinct before changing into something else or dying out.

When it happens to plant and animal communities, we call it succession. Weaver and Clements of Nebraska studied this phenomenon thoroughly early in this century, and Henry David Thoreau was preoccupied with the idea in the last century. I think that revolutionary agriculturists must keep it central in all considerations.

I began to think seriously about ecological succession in agriculture as we considered putting together mixtures of species which would simulate the tall, mid, and short grass prairies. We had thought that perhaps there would be two harvests, one to collect the seeds of the cool season plants in early summer, and one in the fall. We would need to breed these plants to set seed in synchrony for one harvest or another. Maybe there would be cool season prairies and warm season prairies. All plants in the mix need not be seed producers, but may be there for other purposes, such as nitrogen-fixation or to serve as hosts for a critical mass of certain insects which stand ready to nip a potential epidemic of other insects. Somewhere in all this I was forced to think about ecological succession for agriculture. We looked over our inventory of plants in the herbary and picked some to be sown in four feet by twenty feet plots for another experiment. We noted, however, that the aggressive types, such early-stage invaders as



Marty Bender uses gas-powered hedge trimmer to harvest seed in experimental plots.



Leland Lorenzon helps Wes Jackson make small combine operational as a stationary thresher.

Unfortunately, ecology has had little or no influence on economics; rather, economics has tainted ecology.

Illinois Bundle Flower or Maximillian's Sunflower, had few weeds in the plot material. On the other hand, the plots of the climax species, Purple Prairie Clover, which were not weeded, were mostly taken over by cheat and other weeds. The unweeded plots weren't worth harvesting.

These two conditions represent extreme ends of succession on the prairie, but what about the intermediate species which represent other stages between the invaders and the climax? The question now became: can we be participants in succession? Thinking ahead a century, perhaps some of our descendants will plant their bare fields with high-yielding luxuriant perennial mixes--aggressive species. They would then closely follow with other species, plants with less total potential energy, but with more elaborate information systems and perhaps a more efficient use of energy overall. After twenty years, perhaps they would have accelerated their domestic prairie to the climax stage with a relatively high yield along the way. The presumption here is that the information system of the prairie has evolved to accept succession as a reality as much as gravity.

There are many possibilities for an ecological agriculture, and we may feel that we are on the verge of a new tomorrow if only agriculture embraces ecology. But we should proceed with caution.

A Problem with Ecological Agriculture

Toward the end of Nature's Economy, a fine book about the roots of ecology, the author, Donald Worster, builds a strong case for mistrusting ecology as an operating paradigm for future human action. He shows that the science of ecology is studied and understood in the language of economics and industry by people who, whether they know it or not, not only betray their belief in the economic system in which we operate, but betray their belief in the industrial society. As early as 1910 one of the pioneers of modern ecology said, "bio-economically speaking, it is the duty of the plant world to manufacture the food-stuffs for its complement, the animal world...Every day, from sunrise until sunset, myriads of (plant) laboratories, factories, workshops and industries all the world over, on land and in the sea, in the earth and on the surface soils are incessantly occupied, adding each its little contribution to the general fund of organic wealth." We may think, that was a long time ago when such language was used in describing nature, but less than fifteen years ago, a noted ecologist at the University of California, Berkeley, said, "Like any factory the river's productivity is limited by its supply of raw materials and its efficiency in converting these materials into finished products."

The metaphors used in understanding ecology, Worster says, are more than casual or incidental, for they express the dominant tendency in the scientific ecology of our time. Nature has been transformed into a reflection of the modern corporate industrial system. Unfortunately, ecology has had little or no influence on economics; rather, economics has tainted ecology. It's been a one-way street.

What do we do now that ecology is saddled with such terms as "food chain," "producers," "consumers" and "eco-system," now that the whole is broken down, now that energy is the medium of exchange, now that efficiency is such a virtue it is seen as the key to biological order? That working ecologists see little wrong with the use of such language is a sign that the completely economic world view is coming closer. It is tempting to conclude that science is such an inherently alienating force that we have to begin anew. But Worster's intention is not to "debunk science or to reject its insights as worthless," but rather to suggest that "our age may be overly reverential toward the ecologist." He is not suggesting at all that scientific methodology is undependable or wrong-headed, but that we need a "more carefully hedged, skeptical and humble notion of truth."

New Concepts for Ecological Agriculture

The problem is, where do we begin? What do we build on? I think that a long time ago nature gave us two important ecological concepts which became religious philosophy, and both need to be emphasized in a new ecology. Both are central to the Judaeo-Christian tradition, though in recent times they have been understood in rather shallow ways. These concepts center around the idea of redemption and the idea of transcendence.

Nature has shown us that we can damage an area and it will eventually redeem itself, perhaps not completely, perhaps not for a long time, but eventually and to some degree. Out of nature comes the idea of redemption and as such, a source of hope. There is so much that falls into place from this idea. Abuse a hillside and the sins of the fathers will visit the sons even unto the third and fourth generations, but not necessarily forever, for redemption of the wasted hillside is possible if loving care is given it.

The idea of transcendence is one that even the most ardent zealot of reductionistic science can't ignore. For example, there is nothing about the properties of hydrogen and oxygen which gives a clue about the properties of water. The properties of both are completely transcended by what water can do and how it figures in our lives. We can move up the hierarchy of the sciences and see that at every step of the way, more is different. As

we approach the cultural level, more specifically the agricultural level, we have a clear example in the power of transcendence in the Amish compared to the conventional farmer of today. Wendell Berry has written about a 56 acre Amish farm in Indiana which grossed $43,000 and netted $22,000 in one year. A conventional farmer linked to the industrial world could not do that. The conventional farmer may have a degree in agronomy or agricultural economics, but turns out to be a terribly unsophisticated farmer in the sense that his way is not sustainable. The Amish farmer probably never had a single vocational agriculture course in high school; but his way, though not completely sustainable, is more ecologically correct than the conventional farmer. The Amish simply believe that the highest calling of God is to be a steward of the land, and this is tightly tied to an aesthetic ideal. Because economics is not foremost in their thinking, they are able to make sound economic decisions. By being obedient to a higher calling, "all these other things are added unto them." This is a practical kind of transcendence.

The fact that consistently sound economic decisions are made by people who do not make economics primary should be no more surprising than the fact that water is more than the combined properties of hydrogen and oxygen. The idea of transcendence cuts through all and is essential to an ecological agriculture. It can go a long way toward helping us temper the unfortunate language we are saddled with, the reductionistic language of economics and industry, which has been applied to ecology. It should help us soften the utilitarian point of view.

If we do one thing that is ecologically right, we have reason to expect more than a multiplicative effect, indeed a transcending effect; just as when we do something that is ecologically wrong, we can expect more than a multiplicative effect in the negative sense. If the rigorous reductionists insist that what we are talking about is not real, then neither is water.

The implications of an ecological agriculture, in which some of nature's information is allowed to operate, are unforeseeable at the moment, but they are nevertheless something we can trust. This approach to agriculture is clearly in the spirit and teachings of E. F. Schumacher who was an economist very much interested in ecology. He was president of the Soil Society of England and a gardener. He was a strong advocate of planting and caring for trees which he saw as more than bearers of fruit, but also as redeemers of the landscape. In his description of mega-economics, he was talking about transcendence. In addition to the concepts of redemption and transcendence, Schumacher spoke about permanence, a synonym for a concept in ecological agriculture that we label "sustainability."

Perhaps as we lay the groundwork for an ecological agriculture, we will discover more ways to rescue both agriculture and ecology from the industrial world.

People, Land and Community

"In the simple question of how we treat the land, next to people our most precious resource, our entire way of life is involved, and before our policies with regard to the land will really be changed, there will have to be a great deal of philosophical, not to say religious change."

E. F. Schumacher in Small is Beautiful

The first in an American series of lectures sponsored by the E. F. Schumacher Society featured Wendell Berry and Wes Jackson speaking on "People,Land and Community" at Mt. Holyoke College in South Hadley, Massachusetts, on October 24. The speakers and panel of respondents were asked to address the question of how new farming practices and community efforts can bring about long term institutional changes that could lead to sustainable food and land systems.

The day's program was started with an introduction about E. F. Schumacher by Hazel Henderson, author of Creating Alternative Futures and Politics of the Solar Age. David Ehrenfeld, author of The Arrogance of Humanism, introduced the lecturers and acted as moderator for the day.

Following the lectures, a panel responded to issues raised by Wendell Berry and Wes Jackson. The panel included Hazel Henderson; Robert Rodale, president of Rodale Press (Organic Gardening); Pat Sackrey, consultant on rural and small farm development in New England; John McClaughry, Senior Policy Advisor to President Reagan and Executive Secretary of the Cabinet Council on Food and Agriculture; and Robert Swann, President of the E. F. Schumacher Society and author of Community Land Trusts: A Guide to a New System of Land Tenure in America.

Wendell and Wes made summary remarks to conclude the program.

The auditorium was filled to overflowing, even though tickets were $15 per person, and, in fact, many people wanting to attend had to be turned away. "People, Land and Community" was an auspicious beginning for the E. F. Schumacher lecture series in the United States.

The E. F. Schumacher Society is planning a spring conference on World Forests. For information, write the Society at Box 76A, Great Barrington, Massachusetts 01230.

The Great Plains in Transition

The Great Plains: Perspectives and Prospects

Edited by Merlin P. Lawson and Maurice E. Baker
University of Nebraska Press, 1981
284 pages, 21 tables, 44 figures, index and annotated list of authors.

REVIEWED BY *Marty Bender*

Most policies and institutions that seem to be successful in the humid eastern U.S. have been and often still are inadequate for the Great Plains in dealing with the unpredictable changes in the rigorous environment and the external demands from outside the regions. To analyze these inadequacies, the Center for Great Plains Studies held its third annual symposium on March 2 and 3, 1979, from which 16 papers of 23 authors make up this book. Available resources in the Great Plains were identified and information was presented to assist policy makers in anticipating future conditions. The scope of the papers covers the impacts of drought, urban and industrial influences, agricultural practices, land ownership, and changing population size on the people and communities of the Great Plains.

A major weakness of this book is that it tends to focus on resources that have been highly visible to the Great Plains people, so that there is no focus on renewable energy resources such as wind and solar energy, which are just as available as coal, uranium, and oil shale. Thus this presents a rather limited and conventional vision for policy makers who use this book. The omission of renewable energy resources is just as serious as the omission of coal deposits would be in the consideration of the future of the Great Plains.

One would expect that the subject of soil would receive much attention since topsoil is, in the long run, the most important resource in the Great Plains. Yet, an examination of the pages listed for "soil erosion" in the index reveals that the historical aspect of the Dust Bowl is covered by Lockeretz, but the present seriousness of soil erosion in the Great Plains receives little mention. The reader should refer to a 1981 publication from the Council on Environmental Quality with the title of Desertification of the United States by David Sheridan. The author shows how federal policies are promoting much severe desertification.

One of the goals of the symposium was to encourage multidisciplinary analyses of life on the Great Plains. The annotated list of authors in the book shows that they represented at least ten disciplines, but there was not as much interaction as I expected. Eleven of the sixteen papers were done by single authors, and there was no mention of questions and responses to the papers during the symposium. The lack of communication among disciplines in the universities makes it difficult to assess the overall situation in the Great Plains.

In spite of the shortcomings of the book, many salient points were brought up. Warrick and Bowden proposed two hypotheses which are a result of the unpredictable climate of the Great Plains. The "lessening" hypothesis states that adaptive societies, through technology and social organization, lessen the impact of drought upon the resident population. The "catastrophe" hypothesis states that success in insulating a livelihood system from drought increases the vulnerability to catastrophe from both natural and social perturbations of rare frequency. Schmedemann points out that widely fluctuating product prices and unpredictable climatic and biologic conditions require quick management response, which is the single most unique factor of the U. S. agricultural system in comparison to other agricultural systems of the world.

Rugg and Rundquist note that a major weakness of urban fields (cities and their urban peripheries in the rural areas) is political fragmentation. Furthermore, the people of the Great Plains don't perceive regional planning as being necessary.

Grassman ends the book by pointing out that the image of people in the Great Plains being independent is in reality a myth because of the continued desire for government intervention to alleviate problems. When Great Plains citizens become aware of the limits of fossil energy, land, and water resources, then they can begin to control what happens in the Great Plains.

Water Resources

There is a growing consciousness of the common and inter-related water resource problems on the Great Plains. Water demands for energy development and industry are in competition with water requirements of agriculture in South Dakota and Wyoming. People in water-poor areas of Texas and Oklahoma, where the Ogallala Aquifer is already markedly depleted, are eyeing rivers in the Missouri River Basin and many other areas and making plans (with the help of the Army Corps of Engineers) fot "inter-basin transfers." The availability of fossil groundwater in Nebraska has made it possible for large, out-of-state corporations to invest in farming the sand hills, which traditionally have been grasslands. The politics of who controls and uses water in the Great Plains could eventually rival those of California and the Southwest.

Two separate meetings dealing with water development issues on the Great Plains were held recently. On October 31- November 1, represen-

(CONTINUED ON PAGE 35)

Alternatives in Energy

The Salina Energy Fair

The Land Institute joined with Salinans for Alternatives to Nuclear Energy (SANE) and the League of Women Voters in sponsoring the first Salina Energy Fair in Oakdale Park's Agricultural Hall, October 18, 1981. The purpose of the fair was to privide information about low-cost conservation and solar options, and to demonstrate specific technologies which are available commercially.

Paul Rasch, appropriate technologist at The Land and a member of SANE, was the chairman of the organizing committee. Mari Peterson, research associate at The Land, was in charge of publicity. The League of Women Voters representative on the planning committee was Mary Anne Powell.

Twelve businesses set up information tables and displayed their products: woodburning stoves, solar collectors for space and hot water heating, wind electric machines and insulation materials. Salespersons were present to answer questions. Each business paid a small registration fee to be represented at the fair. Several Salina businesses gave discount coupons for purchasing caulk and insulation to all people who attended the fair.

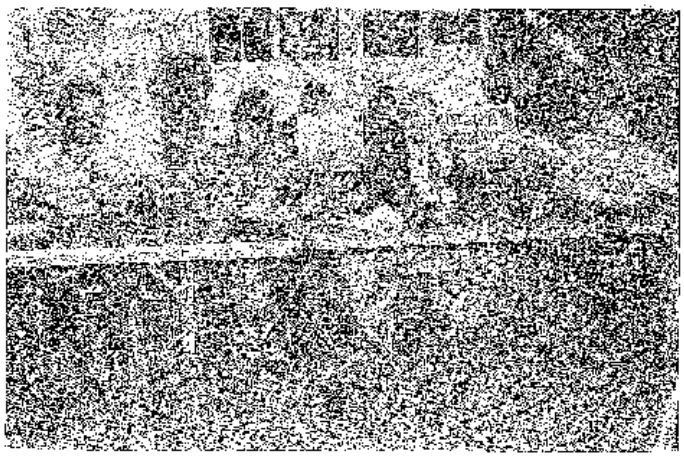
General information about conservation techniques was available at the Kansas Power and Light Company table, and the Kansas State Extension Service displayed a model of an energy efficient house.

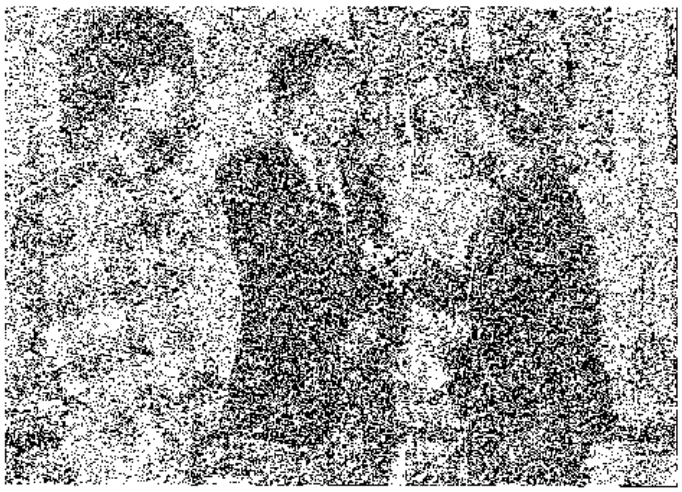
The League of Women Voters organized a large information table, with free information, books and magazines for browsing, and some books for sale from Salina's Downtown News and Books. Many people at the fair were surprised that so many books and magazines about house design, greenhouses, wind machines and other solar technologies were published.

The League of Women Voters also carried on a recycling drive in the parking lot, where people attending the fair could leave newspapers, cardboard and aluminum.

Special activities for children during the day included movies, a puppet show, and the making of solar prints with the help of the Central High School Biology Club. In the game shown in the photograph, children could win prizes if they could answer questions keyed by numbers on the roulette wheel. Sara Goering, a member of SANE, organized all the children's activities.

One very popular display was about food drying. Carol Craft of Hillsboro, Kansas, demonstrated how her dryer worked, displayed dryed



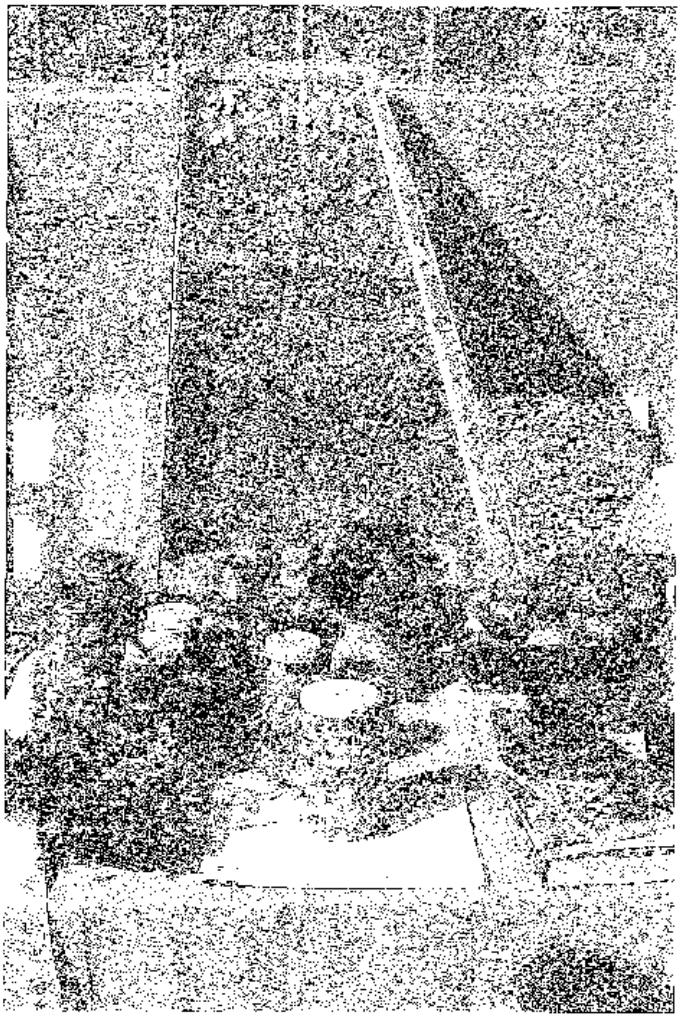


produce, and provided copies of the plan for her simple, inexpensive food dryer.

At 4:30 in the afternoon, three members of a panel, introduced by Dana Jackson, discussed the future of commercialization of solar technology. Travis Taylor of the Kansas Energy Office explained the importance of making it clear to people that practical, workable solar equipment is now on the market. Bill Dorsett, an independent contractor building solar greenhouses in Manhattan, Kansas, and John Craft of Windcraft Energy Systems stressed the importance of federal and state tax credits as incentives for people to make the initial capital investment in solar energy.

The Salina Energy Fair was organized on a very small budget. Excellent cooperation from local radio stations in airing public service announcements and the businesses that allowed posters in their windows helped keep the advertising costs low. Community friends were generous in loaning materials and equipment. Many people volunteered their time and labor. In addition to the work of all the students from The Land and assistance from the League of Women Voters, members of the Prairieland Food Co-op prepared food for the refreshment stand, and the president of the Smoky Hills Audubon Society helped on Saturday at clean-up time.

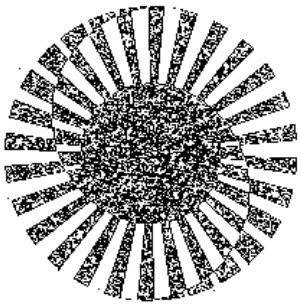
Several weeks before the fair, the sponsors advertised a contest for the best, low cost ideas for saving energy or capturing solar energy. The number of entries was lower than the sponsors had hoped. Sharrie Zarr of Salina, the winner, was awarded $100 for her entry: an insulated, portable window shutter. Governor John Carlin made the presentation.



THE PRIZEWINNING
Hand-built Movable Insulating Window Shutter.
Approximate cost: $50
The layers are (1) (facing inside) a piece of fabric and polyester batting wrapped over a ¼ inch plywood piece and stapled to back; (2) a piece of one inch celotex (compressed insulating foam covered with foil on both sides); and (3) (facing outside) another layer of ¼ inch plywood, wrapped with reflective mylar fabric. All layers are nailed inside a wooden frame which fits tightly inside window. The shutter has an R-value of approximately 5, compared to R-1 for a double glazed window.

The Renewable Challenge:

The Reagan Administration



vs. Solar Energy

Dana Jackson

The American Section of the International Solar Energy Society will be holding its annual meeting, the largest solar event in the nation each year, in Houston, Texas, June 1-5. It is expected to attract over 2,500 registrants and several thousand more to tour the exhibits. An added first for this Houston conference is the designation of the exposition as an International Trade Fair by the United States Department of Commerce. Through worldwide promotion by the Department of Commerce, hundreds of foreign buyers are likely to be in attendance, and the U.S. potential as an exporter of solar technologies and services will be spotlighted. The title for the 1982 solar technology conference in Houston is "The Renewable Challenge."

The future of solar energy technology is certainly being challenged these days, particularly by the Reagan administration. The attack began when the Department of Energy (DOE) slashed the Solar Energy Research Institute's budget, reduced its staff by 370 employees, and announced that SERI would no longer be doing work to assist commercialization of solar technology. Denis Hayes, one of the originators of SUN DAY, headed the Solar Energy Research Institute for two years, where he directed an ambitious research program in near and long term solar technologies. When he was forced to resign on June 22, Hayes minced no words about the Department of Energy in his parting remarks to the staff.

"Secretary of Energy James Edwards has embarked upon a careful, methodical campaign to destroy America's best energy hope. The shifts in the energy budget have been described by administration spokesmen as pure exercises to trim the federal budget. This is a manifest lie. If the budget were being trimmed for purely macroeconomic reasons, the nuclear budget would not be increased by 36% while the solar budget was slashed by 67%, and the conservation budget was cut by more than three-fourths."

"Secretary Edwards has said, repeatedly, that he is acting on behalf of a mandate received in the last election. He claims that a vote for President Reagan was a vote for nuclear power. Yet, at exactly the time of the election, a national Gallup poll found that, of seven possible energy sources, solar was by far the most popular with adult Americans, and nuclear had the least support." [1]

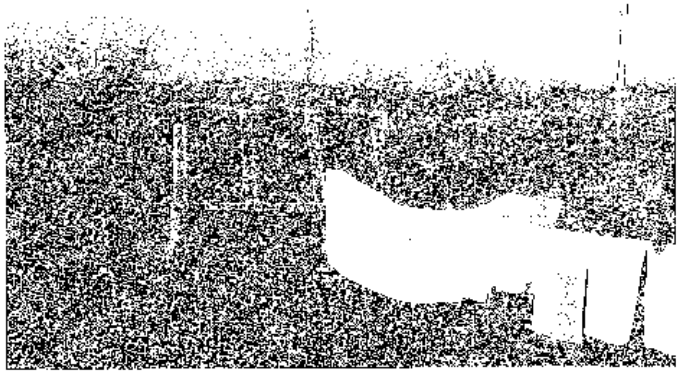
Though popular with Americans, the initial price of solar technology does discourage many from installing it. A commercial solar hot water heating system usually costs more than an electric or gas hot water heater. High interest rates and the inflated price of new homes often cause buyers to choose standard electric or gas hot water heaters, even though a larger initial investment in solar might save them money in the long run. Active solar space heating systems and wind electric systems require an even larger initial investment, and they are not produced in large enough numbers to bring down the cost. Mass production because of mass demand would change the prices significantly.

The commercialization of solar technology is a necessary component in a soft energy path. Although many clever do-it-yourselfers have built passive solar greenhouses, bread-box hot water heaters, vertical wall collectors, etc., the widescale use of renewable energy sources will not be possible unless "off the shelf" solar products are available at reasonable prices to the general public.

By and large the biggest help to commercialization of solar technology has been tax credits. The 40% federal tax credit for purchase of active solar space or water heating systems or wind generators, plus tax credits of 30-50% which some states provide, have put solar technology within the means of ordinary people.

Tax credits have made possible the 40 percent annual growth rate in the industry. An increase of the solar tax credit to 40% in 1979 (from the original 30% for amounts up to $2,000, and 20% for additional amounts up to $10,000) as part of the Windfall Profits Tax Act, resulted in an immediate 29% growth in the industry. [2]

In his nationally televised speech on September 24, President Reagan called for "elimination of certain energy tax credits for businesses and individuals." All indications are that the administration is considering a formal legislative repeal of both the residential and business/industrial conservation and renewable energy credits. Earlier Reagan pointed to the importance and effectiveness of the tax credits to



A solar laundry.

justify his drastic cuts in the Department of Energy solar budget. But now that reports indicate the federal budget deficit will be much higher than predicted, the President has come up with plans to raise revenue by, among other things, eliminating the tax credits for solar and conservation.

The revenue losses which would be recovered by repealing the solar and conservation tax credits are not large, particularly when compared to other energy tax incentives. According to Treasury Department figures, only 17½% of the total energy tax expenditures was for solar and conservation in 1980. Tax expenditures for solar were $897 million compared to $4,240 million for fossil fuels.[3]

When speaking about solar and conservation, the Reagan administration always uses rhetoric about the market and free enterprise being enough to nurture the renewables industry. They pretend that the free market is to be the arbiter of our energy policy, but the billions of federal dollars in oil depletion allowances, synfuels loans, and nuclear subsidies distort the marketplace against solar and conservation measures.

Before Denis Hayes was forced to resign, the Solar Energy Research Institute released a significant study on the potential for energy savings through conservation and the use of renewable sources of energy. The report concluded that energy conservation and renewable resources could play a crucial role in America's energy future, a viewpoint that found little favor with the Reagan administration. DOE, under Edwards, refused to release the study to the public until it had been reviewed by DOE staff. Representative Richard Otinger arranged for its printing by the House Energy and Commerce Committee because he was afraid DOE was going to suppress the report. Brick House Publishing then produced the full text in paperback for the general public. A New Prosperity: Building a Sustainable Energy Future (453 pages) is available from Brick House Publishing Co., Inc., 34 Essex Street, Andover, MA 01810, for $19.95.

Joe Tribble, the new assistant secretary for conservation and renewable energy, said that he has not read the SERI solar and conservation report (according to the Sept./Oct issue of Sun Times), the most thorough, up-to-date research on solar available. Mr. Tribble is openly opposed to the Residential Conservation Service, which would require utilities to do home energy audits, and building performance standards which set minimum energy efficiency requirements for building. And he's not sure he approves of the Public Utilities Regulatory Policy Act that requires utilities to purchase electricity from small producers, such as individuals with wind generators or photovoltaic cells. So the office in DOE designed to assist solar and conservation is run by a man uninterested in solar and conservation. Americans should not be surprised at this lack of interest. A clue to the direction of energy policy under the current administration was given when the obviously uninformed Presidential candidate Ronald Reagan said, "Conservation is being too hot in the summer and too cold in the winter."

> Israel now has 400,000 homes with solar hot water heaters, more than a quarter of all the country's housing units. (Sun Times, Sept./Oct., pg. 18.)

The Commerce Department is sponsoring the 1982 conference of solar energy technologies as an international trade fair. Perhaps foreign purchases can fill the slack left if U.S. tax credits are removed and domestic sales drop. But then solar technology would become just a toy for the affluent, not an opportunity for all people to be more self-sustaining while impacting the earth less. Will solar technologies be put in the category of "novelties" to be sold to foreign tourists? Of course, here again the solar industry will be competing with the nuclear industry, as the Reagan administration has departed from policies of former administrations in cautious sales of nuclear technology to other nations and is promoting the peddling of nuclear hardware abroad.

At the conference on energy in Nairobi, Kenya, this summer, world leaders determined that developing countries need greatly accelerated reforestation programs and the use of simple, indigenous renewable energy technologies. But the U.S. under the Reagan administration persuaded the World Bank to shelve plans to increase lending for small scale technology and reforestation by $30 billion and offered free market, free enterprise philosophy instead. A coalition of more than 100 private organizations concluded: "The Reagan administration is fast becoming one of the major obstacles to the worldwide use of renewable energy."[4]

If the U.S. government were cooperative, or better yet, if it were dedicated to a soft energy path and a durable peace, the renewable challenge would be a great, joyful adventure. The SERI study shows that increasing the energy efficiencies of our buildings, factories and transportation system would increase productivity while decreasing energy demand by 25% in the year 2000. Of this reduced need, the SERI researchers found, renewable resources could provide 20 to 30%. Instead of working to meet this challenge, the renewable industry must combat the federal government's challenge to their very existence. In his resignation speech, Denis Hayes concluded:

"I think it is not an overdramatization to say that this administration--and in particular, Secretary Edwards--has declared open war on solar energy. I am confident that, unless they change direction, the American public can be counted upon to fight back."[5]

To arms!

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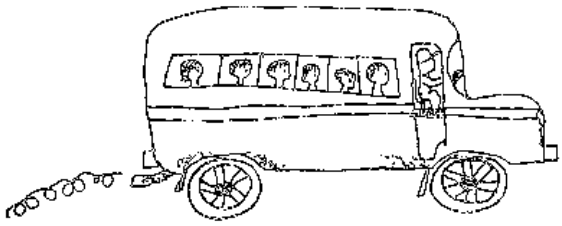
1. & 5. Sun Times, July/August, 1981, pg. 10
2. & 3. Solar Lobby Fact Sheet on Solar and Conservation Tax Credits, October, 1981.
4. Steve Ferrey and Mary-Claire Baker, "meeting at Cancun," The Wichita Eagle-Beacon, Oct. 22,1981.



A Tour of the Wolf Creek Nuclear Power Plant

Ivy Marsh

The Kansas Corporation Commission arranged for members of its Consumer Information Board to take a tour of the Wolf Creek Nuclear Generating Power Plant on July 17, 1981. Our bus left from the east door of the State Office Building in Topeka promptly at 8:30 a.m. The KCC had spared no expense--it was an old yellow school bus which tended to be bone jarring at times--but it was fun and put us in a "kids-going-to-camp" mood during the hour and a half trip to the plant.

Security at the plant was fairly tight. There were no signs on the road indicating the turnoff to Wolf Creek from Highway 75, so the bus missed the turn and took the next road. We hadn't proceeded far before a small white pickup truck with three men in the front seat pulled across the supposedly public road and asked our destination. They then directed us to the correct road. When we approached the gate, we were met by a guard with a hand-held stop sign. Our driver identified the group and we were told to follow a white pickup truck which led us to a second guard who was blocking the road. After another I.D. check, we were directed to turn into the parking lot. We went through a sign-in booth where we were issued our name tags, hard hats and safety glasses. (Names and addresses of those participating in the tour had to be submitted in advance.) A guard then escorted us, four at a time, to the first building and stayed with us until he could see the next "white hats" further down the corridor. He said goodbye courteously and returned to escort the next four. We were never left alone for a moment.

Robert Rives, KG&E's public relations manager, and other bigwigs from KG&E, KCP&L, and Daniels Construction Company arrived and greeted us cordially. They explained that we would divide into three groups to tour the plant, but first we would view a slide program giving background information about the plant. They also provided us with fact sheets and a manila folder full of information about nuclear power. (Reading these going back on the bus, we were surprised, amused, and skeptical to learn about the many beneficial aspects of nuclear power. One would think, reading a brochure entitled "Radiation," that it was so desirable we should be standing in line begging for a dose.)

The slide program was interesting. It explained that the principal reason utilities had gone over to a combination of coal and nuclear was because in 1970 Congress virtually banned the use of natural gas for power plants after 1990. A "How Your Electric $ Is Spent" slide showed that 42¢ of each dollar spent is for fuel and purchased power and is the dominant cost. Construction at Wolf Creek started in 1977, and a series of slides from 1978 to 1981 showed a pasture with snow and stakes, the first poured concrete, the containment building beginning to take shape, the turbine building enclosed, an overview of the lake and power baffle dike, and finally an artist's conception of the finished plant in operation.

Lots of general data was thrown at us.... We were told that the plant is scheduled to be operational in 1984 and construction is now about 75% complete. It will have an electrical capability of 1,150,000 kilowatts. This is a pressurized water reactor from Westinghouse Corporation. The turbine generator is General Electric. The cost is now about $1.7 billion. The land requirements are for 10,500 acres, which includes a 5,000 acre cooling reservoir. There are 3,000 people employed at the site during the construction period but only about 250 will comprise the permanent work force. Their "thermal safeguard" plan is to discharge warm water from the plant's condenser into a closed-cycle cooling impoundment, with none of it being returned to the John Redmond Reservoir. ("Some discharge into the Neosho River may be necessary to stabilize the natural mineral content of the water.") Bechtel Power Corporation is the architect-engineering firm, and Daniel Construction is doing the actual construction. Wolf Creek is one of three nuclear power plants being constructed under what is called the SNUPPS program, an acronym for Standardized Nuclear Unit Power Plant System. Supposedly this standardization will reduce the cost, shorten the time to become operational, and in general give better results than plants which are designed and built separately. It was implied that this system would reduce the chance of design errors and failures because identical components and systems would be used in all three plants. With this general background, we were ready to start the tour.

The day was cool and overcast. There had been a lot of rain during the week and the site was muddy, with pools of standing water. Our hosts offered us large boots to go over our hiking shoes. We were joined by several more CIB members who had driven over in their own cars because they lived in nearby communities

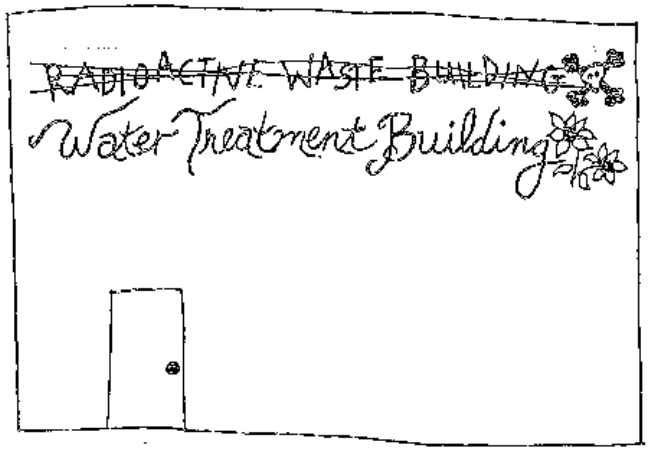
and hadn't wanted to drive to Topeka and then double back, but they had met with almost insurmountable problems with the guards and the gates.

On the bus, the utility and construction personnel almost outnumbered the CIB and KCC people. It was hard to hear over the motor roar, and the bus was bouncing too hard to write legibly, but I believe I heard that we drove first past the pond and baffle-dike area while they explained how essential a water supply is to a nuclear operation.

We heard constantly throughout the morning about the many safety aspects and redundant systems of the plant. For example, the dam holds enough water to shut down two plants this size; there are 2 sets of pumps, 2 sets of power supply, etc. The screen house holds a 4,000 horsepower pump which circulates water through an underground pipe large enough for our bus to drive through. Chlorine is added to the water to prevent algae and get a better heat transfer. The lake is filled to 58% of minimum capacity at the present time. We passed the Water Treatment Building (once called the Radiation Waste Building, but they don't like to use that name). Someone asked how hot the water discharged into the lake from the plant will be; the answer was that they don't know the exact temperature, but it will be only one or two degrees above the temperature at the John Redmond Reservoir.

Eventually we got off the bus and began our walking tour. After hearing all of the promotional talks about safety and redundant systems, we were told straight off that the ELEVATOR IN THE FIRST BUILDING WASN'T WORKING and we would have to climb four steep flights of stairs to get to the roof of the first building.

They were correct in earlier warnings about the potential dangers of a walking tour. There were no designated overlooks or paths to follow. Cables and boards were constantly crossing the "walkway" areas. We tried to keep track of where we were on the map, but with all of the interconnecting passages and trips up and down, it was tricky. At last we arrived at a building where the elevator, mercifully, was working and we could ride up and down the



remaining heights. It was impossible to take notes, because holding a pad and pencil and looking down to write distracted one's attention from watching her footing and that required concentration. I can appreciate why they discouraged the use of cameras for the same reason. We were shown where the fuel rods would be placed, and looked down from a great height to the bottom of the spent fuel pool where they would be stored.

But the reactor building was the most memorable for me even without notes to remind me. Looking down into the depths of the containment vessel which would house the reactor was an eerie experience. My stomach was in knots. It wasn't the heights which bothered me; it was the knowledge that this would have to be flawlessly constructed, for this is an unforgiving technology. Even if it works as designed and a TMI-type accident never takes place, we know that the maximum (optimistic) operational life estimate for a PWR-type nuclear plant is 40/years. After that, it will remain radioactive for thousands of years, with the remains needing to be closely guarded. For centuries to come it will stand on our prairie, silently leaking radiation into our spacious skies. When we approached Wolf Creek on the bus earlier on this gray, overcast morning, the cooling towers rose out of the mist like some great cathedral. Standing at the top of the containment vessel, the cathedral image, which had been my first impression, changed to one of a mausoleum. It was a sobering experience, and the "camp" mood disappeared entirely.

I don't doubt the integrity of the plant and utility personnel who conducted our tour--obviously they believe in this project. But I do question their infallibility. Fallible people conceived, designed, built, and operate these plants. Millions of components are needed to make them go, and there is little margin for error in a single one of them, redundant systems or not. Fortunately we moved right along and the noise of the working construction site was deafening, which left no time for tears or despair en route.

The only place we were not permitted to enter was the control room, and that was because sensitive panels were being installed which require a dust-free, closed environment. We were allowed to peek through the glass in the door and watch the workers, who were garbed in futuristic-looking space-type suits. We saw the fuel buildings, the turbine building (which is the largest one in the Wolf Creek complex), and Jack Stokes, our group leader, tried to field questions above the

roar. He seemed most proud of the outside of the containment vessel in the reactor building, pointing out the thickness of the walls and the abutments which assure that it will withstand all reasonable possible stress. He quoted facts and figures which we could barely hear and had no way to record, but his confidence in the system was apparent.

When we arrived back in the conference room, most of us felt drained. While waiting for the question and answer period to begin, I noticed the room's ceiling tile had a leak-stain which was still wet-looking from the early morning rain, and tiredly thought if such a simple problem as a leaky roof hadn't been solved by this group of hot-shots, we were probably in big trouble. Although our bus was waiting outside and it was time to leave, the group had lots of questions. It seemed to me that the answers were unnecessarily drawn-out, which prevented a lot more questions from being asked. They all began, "First let me give you a little background on that"...

-----The first question related to the fuel contract. Answer: There is a 7-year contract with Westinghouse which they once tried to repudiate, and a court settlement was necessary. The uranium is mined mostly in New Mexico, and processed at the Kerr-McGee plant in Oklahoma; then it goes to a federal enrichment plant.

-----There was a question about the Three Mile Island accident. Answer: Westinghouse did some design modifications after TMI. They now have the ability to measure pressure in the whole containment vessel, and there is a wide-range level instrument more sophisticated than TMI's. They were fortunate that construction had not proceeded to the point that they had to back-fit these changes, which would have added considerably to the cost. They were able to install the new systems now as part of the initial construction.

(I commented to the CIB members on the way back that I was amused that they spoke of the Three Mile Island "experience." In only a few short months it has gone from being an "accident" to an "incident" to an "experience," as though it is a great learning thing that happened and we should all be grateful. Later in reading the promotional material they provided, I read, regarding TMI, that it was an "occurrence." "There were valuable lessons and experiences gained from that occurrence, and the industry has responded openly, quickly, and enthusiastically to those challenges.")

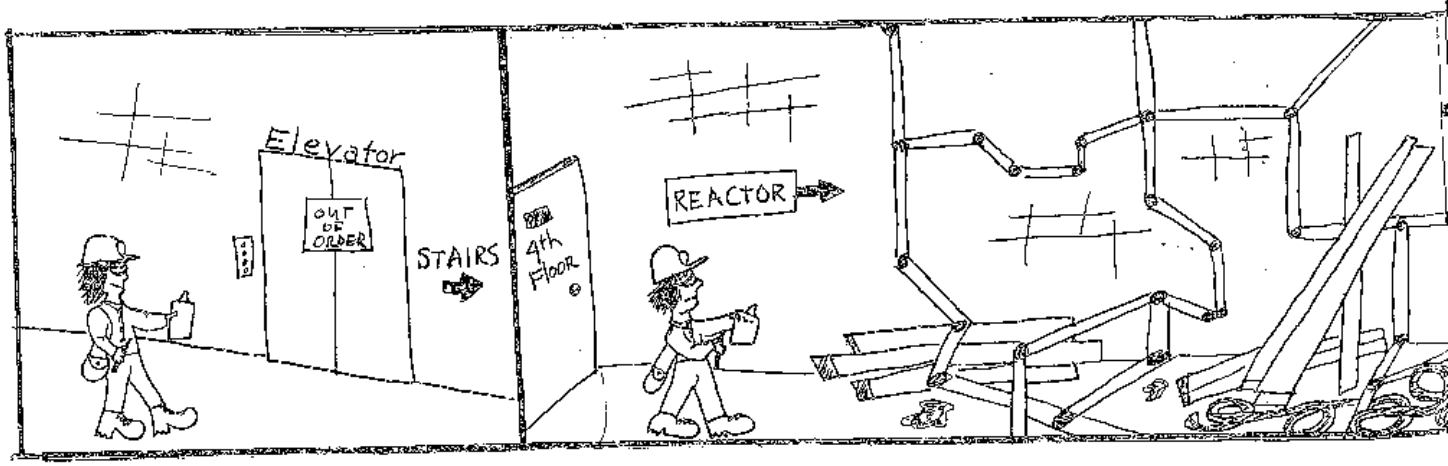
-----A question was asked about the necessity for new power plant construction since the use and growth projections for electricity are decreasing. The answer: Wolf Creek is not so much related to growth; it is considered more of a replacement than an addition to their power generating system, since plants wear out and must be replaced.

-----There were more questions about the Kresup report, and about the purchase of 17% of Wolf Creek's power by the Kansas Electric Producing Cooperatives (KEPCO).

Finally, I got to ask my question. (I'm glad I asked that question; let me give you some background first"...) Just prior to the scheduled tour, Channel 9 T.V.'s Pam Whiting did an investigative reporting series on problems at Wolf Creek. She stated that construction had been halted at various times because of problems in the concrete base mat, with cleanliness of the miles of pipe, with welding procedures; and that there had been a recent turnover of top management staff of the construction company building the plant. In addition, she had interviewed workers and former workers who alleged that quality control signatures in the plant's control room were forged, and other quality control documents handled improperly. Welders alleged they were told by their foremen how to "phony" their certification credentials required to weld on safety-related materials, and they also alleged that the spent fuel pool had been poorly designed and constructed and could be unsafe.

The NRC is investigating these allegations, and the F.B.I. has also become involved, for some of these are violations of federal law. The NRC also confirmed that the work involved in the allegations is safety related.

The spent fuel pool is a concrete and steel structure which will store the radioactive fuel



rods. The waste is "hot" both in temperature and in radiation. The radiation is contained through a series of barriers; first, the zirconium lining of the rods themselves; then through the stainless steel lining plate of the pool; through the leak-chase system; and finally through the concrete. A welder on the project alleged that there were deficiencies in the design and the construction of the liner plate. He said the gateways through which the spent fuel must pass were seriously out of alignment, and the gates designed to fit them would not close once they were installed. To correct that, cables, turnbuckles, and in one case a fifty-ton jack were used to try to push the gates in place. He believed the poor design caused the distortion of the liner plate. They then poured concrete around the gates while they were under this stress, and he feared the integrity of the concrete had been compromised, and also that the distortion of the walls and the stress of trying to pull them into line makes the welds susceptible to cracking.

There is also the question of cracking of the concrete in the reactor cavity caused by the force used on the liner plates. The spokesmen Whiting interviewed representing the plant stated that even if this were true and the welds did crack, the leaks would be handled through the leak-chase system. The NRC person interviewed also felt that there were enough checks and balances to handle any possible leaks because of the multiple barriers. Whiting was assured that the NRC was investigating these allegations, but the Union of Concerned Scientists called the NRC investigative process unreliable. With all of this in mind, I asked my question.

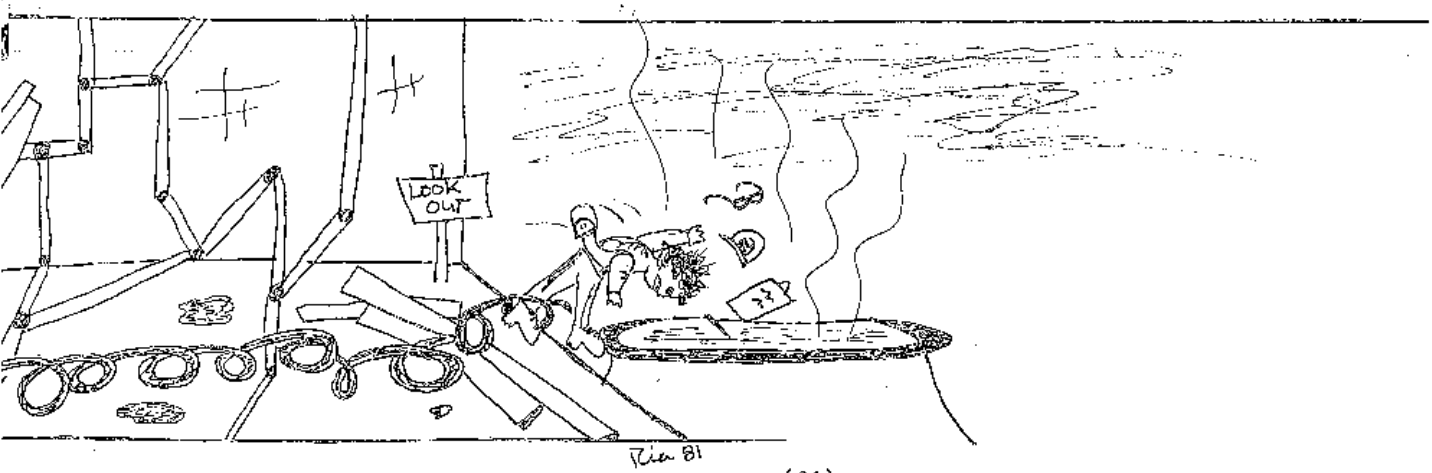
-----"I'm sure you're aware of the Channel 9 reports on Wolf Creek, and I was wondering about the status of the gates for the spent fuel pool. Are they installed yet?" Answer: (by Rives) "They are not installed yet"...Then he asked Jack Stokes to reply further. Stokes said that they were not yet installed, but they are "custom-made, anyway"--they are made to fit the slot into the fuel transfer canal and are custom made by design, per site. (He said at least four times in his reply that the gates were "custom made." I hadn't thought for a minute that they were pre-fabricated!)

A gentleman in the back of the room (I believe it was Turner White of KCP&L) asked if he could ask me a question. "Did you come away from that report with the impression those gates should work today?" I answered that I had the impression that the situation was potentially dangerous--"that you were jimmying around to try to get the wall to fit the gates, like using cables and turnbuckles and a fifty-ton jack to pull it into alignment, and the stress on welds and so forth has called the safety of the pool into question as a result." The gentleman replied that the gates must close for the plant to be operational, and that the gates <u>will</u> close by the time they are supposed

"They don't have to close today...That's not to say there aren't difficulties that have to be corrected, but the gates will close on time. That's the point."

(Another interesting thing about the Pam Whiting report was that she was not allowed to talk to the principals involved in the construction of the plant; instead she was referred to the public relations manager. The official explanation was that the principals were too busy, and it was company policy to keep them working at the plant instead of talking to the media. "Their responsibilities at this stage of construction at the plant are so great they cannot take the time away from it." I couldn't help being amused that only days later, all of these blue-ribbon people from KG&E, KCP&L, and the top brass of the construction company could take a whole morning off to greet, personally escort, and take time for a question-and-answer period for a relatively small, insignificant group of CIB/KCC people. The power of the press isn't all it's cracked up to be!)

-----A final question dealt with the possibilities of reprocessing nuclear waste facilities in the U.S.A. One suggestion made by the Wolf Creek personnel was that reprocessing should be opened up to private enterprise, an idea that struck fear in my heart! Incidentally, one of their brochures



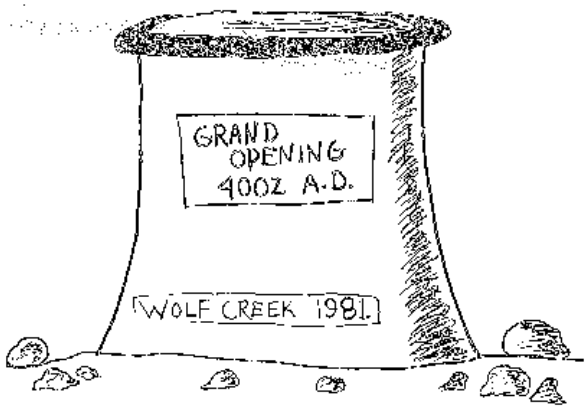
asserts that "the technology exists now for safe storage of nuclear waste," and goes on to explain that the best approach seems to be reducing it to a glass form and isolating it in stainless steel containers in stable formations underground. Another even more boldly announces that "there are safe methods for disposing of this waste...We know how to do it; we're only awaiting a decision by the government as to which of several potential solutions will be adopted."

After friendly goodbyes, and expressions of thanks were exchanged, we departed on the bus for Topeka and our belated lunch and the afternoon session dealing with other matters.

It took time to sort out our feelings and impressions. We were lucky to have had the opportunity to tour the facility. The personnel of the utilities and the plant couldn't have been more pleasant or hospitable, nor more open to questions of all kinds, and they did their best to answer them to our satisfaction. Seeing it first hand made it more real and, for me at least, more frightening. My eventual conclusion: if we're stuck with it, for obvious reasons, I hope it works as it is designed to do.

The electrical generating system has become an increasingly important component of our Kansas economy, and this fact did give me my one good laugh of the day. At an earlier CIB meeting, a pro-nuclear advocate had listened to my fears about the storage of nuclear wastes; even if a "safe" storage technique is found, these things will have to be guarded for up to half a million years, a period of time my mind can't comprehend. There is literally no way to ensure that these wastes are isolated for that length of time, and I raised the question about our responsibility to the human race hundreds of generations down the line. His response shocked me to the core. He sort of smiled, shrugged, and said, "That's <u>their</u> problem."

Visiting with him following the Wolf Creek tour, we discussed the financial impact on KG&E and KCP&L if the Kansas Electric Producing Cooperatives backed out of their deal to buy part of Wolf Creek. We mentioned the rising costs of nuclear power plants, and the marketplace chaos that will occur if utilities which have bought into nuclear facilities go bankrupt and fold. (A KCC staff member had said, "That plant was too damned expensive for those two utilities to build.") Now that spectre really touched him, and he said, "You can't be serious about hoping Wolf Creek won't be licensed...What would happen to those utilities if they had to absorb those costs?" I couldn't believe my luck. At last someone had asked me a question I could handle. I smiled, shrugged, and said, "That's <u>their</u> problem!" It made my day.



COMPARE

How much has the U.S. government subsidized the commercial nuclear industry? In the final days of the Carter administration, DOE reported that the federal government had invested more than $37 billion in subsidies for nuclear power development. The Reagan administration revised the report, virtually eliminating the word "subsidy" from the final draft, and set the total at $12.8 billion. Then the nuclear industry disputed that figure and gave their estimate at between $15 billion and $17 billion.

In the last ten years, what has been the total funding to all solar and renewable energy resources? <u>LESS</u> THAN $2 billion.

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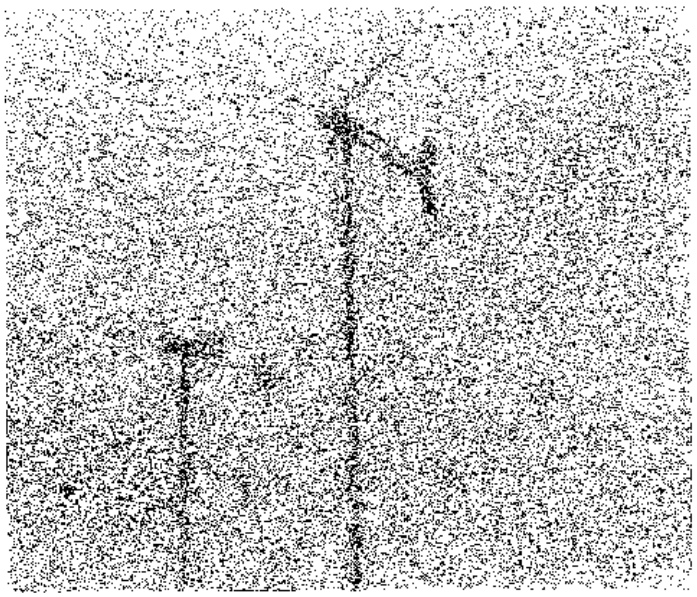
"The Administration is committed to reversing past Federal Government excesses and to providing a more favorable climate for efficient energy production, thus allowing nuclear power to compete fairly in the marketplace with other potential sources of energy supply." (From DOE's <u>Energy Insider</u>, Aug. 3, 1981)



PCBs in the Environment: Everyone's Problem

Fred Vogler and Jan Ryan

On August 26, 1981, a leak of natural gas forced some 40,000 people out of a financial district in San Francisco. According to news reports, many people were soaked with the oily mist, which was later found to contain polychlorinated biphenyls (PCBs). The amounts found were significant: 24 ppm in oil samples taken from various structures and vegetation around the area. This incident was a reminder of the pervasive presence in the environment of toxic substances called PCBs, in spite of the fact that their manufacture, processing, and sale were banned in 1979.

Polychlorinated biphenyls were first produced in 1929 as a result of research done by Theodore Swann, a member of the Federal Phosphorus Company. The new substance contained between 21 and 68% chlorine by weight and was extremely useful in many industrial situations because of its low flammability, high heat capacity and low electrical conductivity. By 1930, Monsanto Industrial Chemicals Company had taken over the manufacture and marketing of this substance under the trade name of Aroclor, and since that time they have produced an estimated 1.4 billion pounds of PCBs. Of this total, 150 million pounds were exported, 758 million pounds are currently in service, 55 million pounds are presumed to have been destroyed, 290 million pounds are in dumps and landfills, and 150 million pounds are in soil, water and air. In addition, the Environmental Protection Agency (EPA) calculates that 10 million pounds of PCBs contaminate the environment through vaporization, leaks and spoils yearly.

Through the years, PCBs have had many wide and varied uses, ranging from adhesives for envelopes and tapes and coatings for ironing board covers, to flameproofing for synthetic yarns. Primarily, however, PCBs were used as a dielectric liquid in the manufacture of electrical transformers, motors, electromagnets and capacitors. Though these uses were banned in 1979, much equipment containing PCBs is still in service and will remain so for many years to come, despite the suspected dangers to human health.

Besides these deliberate uses, PCBs also turn up accidently as a biproduct of paper recycling, in toilet soaps, water-treatment chemicals and primer paints, to name a few. In several cases, PCB's have been mixed with crankcase oil and sold to municipalities as a dust suppressor on roads. It is because of this widespread use that PCBs pose such a threat, since virtually everyone in the United States has, at one time or another, come into contact with the substance, usually without knowing it.

Just where do the dangers of PCB exposure lie? PCBs are among the most stable organic compounds known to science, and although they are insoluble in both ethyl alcohol and water and are resistant to acids, alkalies and corrosive chemicals, they are soluble in fat. They become stored in the fatty tissue of organisms. They are absorbed through the lungs, the gastrointestinal tract, and the skin; and they accumulate in the liver, kidneys, lungs, adrenal glands, brain, heart and skin.

In test animals, the results from PCB exposure have been as numerous and varied as they are frightening. Rats and mice developed malignant and benign tumors, as well as a high incidence of carcinomas and neoplastic nodules in the liver. Sows experienced a statistically significant rate of fetal resorption, as well as reduced fertility, and a variety of defects in their offspring. Female rhesus monkeys mated with untreated males demonstrated severe reproductive dysfunctions. Only one of the eight monkeys fed 5 ppm over a period of six months before conception gave birth, with five experiencing abortions and two not conceiving at all.

In humans, the data also points to health damage from PCBs. The first reported case of a PCB-related illness occurred in 1933. A worker, occupationally exposed to PCBs when he began working on the distillation of chlorinated biphenyls in 1930, developed a severe skin disease, chloracne, and his body was covered with pustules. By October of 1933, 23 of the 24 men working in the manufacturing plant had acne-form eruptions on the face and body.

In 1968, the worst case of PCB contamination to date occurred on the island of Kyusu in Japan. The disease was called Yusho (rice oil), and it affected an estimated 15,000 people. These people became ill when they ingested cooking oil that had been contaminated with PCBs during manufacture. Some symptoms of the disease included chloracne, loss of hair, numbness of the extremities, deformities of joints and bones, and poor development of teeth in children. There were also a higher number of stillbirths, and children were born smaller than normal. Several of them suffered from a dark pigmentation of the skin, and they were named "Cola babies." Infants with seemingly no symptoms at birth displayed pathological symptoms in six months or more from consuming contaminated mothers' milk. However, because Yusho victims were also exposed to high concentrations of chlorinated dibenzofurans and other chemicals, it was difficult to develop precise conclusions.

Because scientific investigation among humans has been limited to several extreme cases of exposure, it is not really known what can be expected

from a gradual day-to-day exposure to small amount of PCBs. Scientists have found that prolonged exposure brings about an elevated level of an enzyme, gamma glutamyl transpeptidase, in the blood, which is an indicator of liver dysfunction. PCBs have also been linked to alterations in the incidence of human cancers. Workers exposed daily to PCBs demonstrate heightened levels of blood fat which are directly linked to heart disease and stroke. In addition, there may be a lessening of the natural immunological properties present in human bodies. Little can be definitely proven, and that partially explains why so little has been done.

What action has been taken to protect the general public from PCB exposure? Very little. Although PCBs were first detected in the environment in 1966 by a Swedish scientist, they received little public attention until 1974. A General Electric spokesman disclosed that two plants on the Hudson River were discharging an average of 25-30 pounds to the river a day. It was a new record for industrial contamination, but still no action was forthcoming.

Then in August of 1975, the New York Times carried a story about the contamination level of the Hudson River. It warned people against eating striped bass from the river and from Lake Ontario because they contained more than 5 ppm of PCBs, which was the Federal Drug Administration's temporary tolerance for fish. At last, PCBs were a national issue.

General Electric was brought to trial in the fall of 1975. During testimony, the company admitted that 65 employees in the two plants had become ill over a fifteen year period under conditions that "may have been caused or aggravated by exposure to PCBs." Following purposely erroneous testimony by a G.E. spekesman, an independent laboratory was commissioned to run a complete analysis of Hudson River samples. The findings were shocking: several fish had more than 100 ppm in their edible flesh, while concentrations in what G. E. called "non-edible" tissue reached as high as 1,178 ppm. G. E. was found guilty of violating state water quality standards and agreed to pay a total of four million dollars to help in the cleanup project.

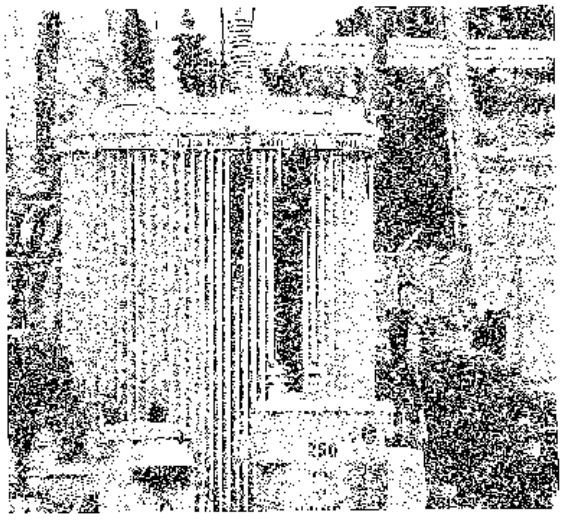
How could they clean up an estimated 500,000 pounds of PCBs in riverbed silt? As if things weren't bad enough, complications over responsibility for the cleanup arose because it was discovered during the investigation that as late as 1973, the New York Department of Health had given both plants a water quality certification. Whether the oversight was accidental or deliberate is not known, but the fact is that the problem will remain for decades in the river.

Finally, in the fall of 1976, the sale, manufacture and use of PCBs in anything but closed systems in the United States was prohibited under Toxic Substances Control Act. This became effective in 1978, with a total ban of new PCB use by 1979. But even these measures were short of needed legislation, since there were no provisions for the millions of pounds in landfills and dumps and in the soil, water and air.

Usually it is easy after reading articles of this sort to mentally comfort oneself by deciding that although there is a PCB problem, it is somewhere else. In this instance, that is not the case. The U. S. Fish and Wildlife Service, which maintains monitoring stations across the United States, has found "trouble spots" from the Merrimack River in Massachusetts to the St. Johns River in Florida on the Atlantic Coast, from the Apalachicola in the Florida panhandle to the Rio Grande on the Gulf Coase, and from the Sacramento to the Columbia and the Snake on the Pacific Coast. Inland drainage systems, such as the Mississippi, Missouri and Ohio, and much of the Great Lakes, are also contaminated. PCBs have been identified in Antarctic ice samples from depths as great as 5.5-6 meters, and polar bears, sampled as indicators of the top trophic level in arctic and subarctic food chains, have been shown to have PCB levels of up to 8 ppm.

Possibly the most eye-opening statistic comes from humankind itself. The EPA began testing the milk of human mothers in 1976 and found that essentially all samples had detectable levels of PCBs. The average, 1.8 ppm, gives an infant seven times the amount permitted in cow's milk by the Food and Drug Administration.

PCBs are not a problem "somewhere else" because they can be found wherever there are electrical transformers more than a few years old. In Solomon, Kansas, just a short drive from Salina, there is an outdoor storage facility for used transformers and capacitors belonging to a company in the business of repairing and selling distribution transformers and capacitors and salvaging non-repairable transformers. On May 19, 1981, the EPA, Region VII, filed a formal complaint against this business. They were cited for failure to properly mark PCB items and storage ageas, for storing PCB items in an area which did not have an adequate roof and wall to prevent rainwater from leaching of PCB items, and for



A transformer on a Salina street.

failure to maintain complete records on the disposition of PCBs and PCB items, among other things. On June 9, the company answered the complaint and requested a hearing. Although a tentative hearing date has been set for December 10, 1981, negotiations are taking place which might make the hearing unnecessary. In the meantime, no information is available as to whether they are cleaning up the contamination alleged in the complaint or not. Count four of the complaint alleged that test samples of soil taken at the eastern end of the open storage area indicated PCB contamination in concentrations of over 100,000 ppm; and at the western end of the open storage area, 3000 ppm.

In response, the company describes its poor financial condition due to the recession and the large amount of money it has already spent in complying with the EPA regulations.

This response falls on friendly ears since the Reagan administration took over the EPA. The investigation was undertaken and the complaint filed against the Solomon company before the full impact of the Reagan environmental policies were beginning to be realized. Indications are that the Toxic Substances Control Act will not be enforced to a significant degree.

Ann Gorsuch, the new administrator of the EPA, is one of several Reagan appointees seemingly out to sabatoge the very laws her office is sworn to administer. With absolutely no qualifications for the job, Ann Gorsuch was appointed in February, and she immediately reorganized the office of enforcement and began to slash the budget. Only ten cases have been referred since Gorsuch took command, a major decline in the rate referred prior to her taking office. Aids claim her policy of "negotiating" effectively replaces enforcement action.

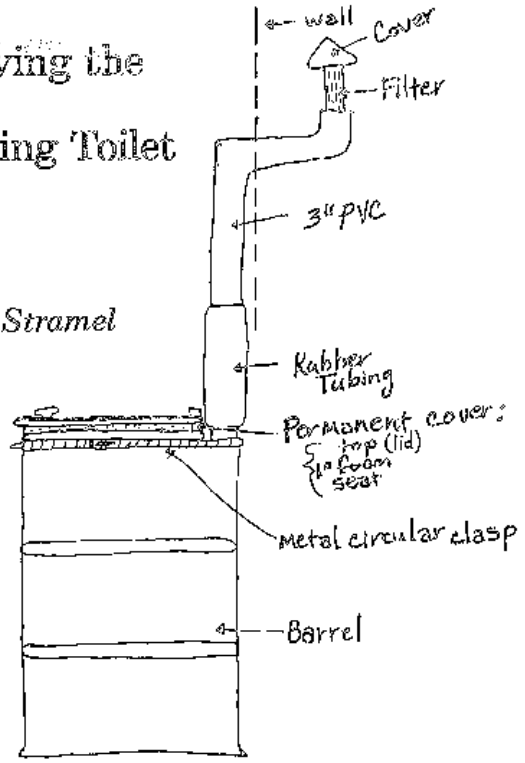
Permanent control strategies for PCBs were supposed to be established by 1982, but recent EPA decisions in regard to another suspected carcinogen, formaldehyde, leave cause for doubt that control strategies will be formulated. Newsweek magazine of October 19, 1981, states that EPA staffers at odds with Gorsuch leaked a draft of her letter to an industry group saying that "we just don't know" if formaldehyde causes cancer in humans and promising that EPA won't act until more positive direct evidence is obtained. This is the "human guinea pig" approach to testing a suspected carcinogen.

PCBs and many other chemicals suspected of being carcinogenic are likely to be of increasing danger to the American public if the EPA is allowed to proceed on its present course.

Almost all of the information on PCBs in this article was taken from Chapter 3, "PCBs: A Case in Point," in Malignant Neglect by the Environmental Defense Fund (Alfred A. Knopf, New York, 1979). Information on animal testing and effects on human health also came from a Support Document/ Voluntary Environmental Impact Statement compiled by the EPA, April, 1979. The EPA complaint and Answer and Request for Hearing is identified as TSCA Docket No. VII-80-T-85.

Improving the Composting Toilet

Jean Stramel



Several problems were encountered with the original design of the composting toilet at The Land. First, gases weren't being removed, evident from the lingering odor and poor digestion of the composting material. Second, the weather stripping under the lid was not keeping insects out; and third, changing barrels was clumsy and difficult.

One of our first group projects was to correct these problems by making several changes in the toilet design. We obtained a different fifty-five gallon vegetable oil barrel, with a pour hole in the top, from Tony's Pizza. The top can be taken off by loosening the metal circular clamp around the perimeter which allows for easy dumping when the barrel is full. After cutting a hole out of the barrel top, a piece of plywood was sawed to fit; then the seat and lid were attached in an attractive manner. We also glued one inch foam around the underside of the lid to keep out insects.

Originally, there was a piece of perforated three-inch PVC extended up into the inside of the barrel and vented out through the side near the bottom. This was for incoming air. There was no vent for gas to escape out of the barrel. The new toilet is vented with rubber tubing and three-inch PVC fitted together and attached to the barrel at the "pour hole." This vent pipe goes out through the wall near the ceiling, with a filter and screen to keep insects out and let air in. This system allows the rising gases to escape, and keeps the odor level low. The rubber tubing detaches from the barrel by sliding up over the PVC, so the barrel can be moved.

The new composting toilet design is easier to handle when changing barrels, digestion of the compost is occurring normally and the different vent system is allowing for more efficient gas removal.

The Limits of Cost-Benefit Analysis

Mark Sagoff

On June 17, 1981, the Supreme Court, in a 5-3 decision, held that the health of workers should outweigh "all other considerations" in regulations implementing the Occupational Health and Safety Act of 1970. "Any standard based on a balancing of costs and benefits...would be inconsistent with the law," the majority opinion said. This decision insists that market outcomes and economic analyses should not determine the goals and values regulatory agencies seek to achieve. This runs counter to efforts of the Reagan administration to base regulatory policy on economic techniques of cost-benefit analysis.

In what follows, Mark Sagoff, Research Associate at the Center for Philosophy and Public Policy, explores the limits of cost-benefit analysis in implementing laws that have political and moral, rather than economic, objectives.

President Reagan has ordered all federal agencies to refrain from major regulatory action "unless the potential benefits to society from the regulation outweigh the costs." Executive Order 12291, published in the Federal Register on February 10, may help to reform the nation's cumbersome regulatory process. Its critics contend, however, that it will add only another layer to mounting bureaucratic paperwork.

Who is right? Does cost-benefit analysis offer a neutral and rational approach to sound regulatory policy? Will it bias or delay hard choices instead?

Economists in the 1940s and 50s, who developed cost-benefit analysis, did so to apply the theory of the firm to the government. They thought that public investments should return a profit to society as a whole. These economists compared the market value of irrigation and hydroelectric power, for example, with the capital costs of building dams. The Flood Control Act of 1939 insisted upon this weighing of economic pluses and minuses. It permitted the government to finance water projects only when "the benefits to whomsoever they accrue (are) in excess of the costs."

The environmental and civil rights legislation of the 1960s and 70s dramatically changed this situation. Congress passed these laws--as it had earlier approved child labor legislation--for political or ethical rather than for primarily economic reasons. Even if child labor were profitable for society as a whole we may still want to outlaw it. Similarly, the Clean Air and Clean Water Acts were passed to improve air and water quality and not necessarily to achieve economically "optimal" levels of pollution. We may insist upon a cleaner environment as a matter of pride even if the resulting economic benefits would not balance the costs.

The Occupational Health and Safety Act of 1970 requires that the exposure of workers to toxic substances be set at standards as low as are "feasible." In two recent cases--one involving benzene and the other cotton dust--the Supreme Court has heard industry argue that exposure standards are "feasible" or "reasonable" only if they are cost-beneficial. Critics of this view say that if it were adopted workers would be maintained as machines are--to the extent that is profitable. Workers would then not be treated as ends-in-themselves, but as mere means for the production of overall social profit or utility.

Economists of the second kind believe that cost-benefit analysis can take the values, arguments, and convictions of citizens into account. These economists sometimes try to estimate moral and ethical values on the basis of market data, for example, by looking at prices paid for property in the range of a protected species. The primary technique, however, is to ask citizens how much they are willing to pay for the satisfaction of knowing that the government has acted consistently with some principle, for example, to preserve wilderness. Even if citizens would pay only a few dollars each for these moral "satisfactions," the aggregate sum might be very substantial.

This approach to cost-benefit analysis--which regards the ideals and aspirations of citizens as "externalities" consumer markets have failed to "price"--rests on three mistakes. First, it allows economists to justify virtually any policy at all or its opposite, for it is easy to find "fragile" values, "intangibles," and "moralisms," to support almost any position.

This ambitious approach to cost-benefit analysis rests also on what philosophers call a category-mistake. This is a mistake one makes in describing an object in terms that do not appropriately apply to it, as when one says that the square root of two is blue. It is nonsense to test the worth of an ideal or a principle by asking what people are willing to pay for it. As well try to establish the truth of a theorem by asking what it is worth, in economic terms, to mathematicians. Nobody asks economists how much they are willing to pay for their view that cost-benefit analysis should form the basis of regulatory policy. No, the views of economists are supposed to be judged on the merits not priced at the margin. Why shouldn't this courtesy extend to contrary opinions as well?

Third, cost-benefit analysis, insofar as it "prices" our convictions as citizens along with our interests as consumers, confuses the economic with the political process. Political decisions have to be cost-conscious; they need to take economic factors into account. But this does not reduce them to economic decisions. To think otherwise would be to suggest that economic "experts" should take the place of elected representatives as interpreters of the public interest. This would replace democracy with a kind of technocracy. It would deprive us of our most cherished political rights.

The same debate arises with respect to the protection of wildlife and the preservation of wilderness environments. In 1969, for example, the Forest Service approved a plan by Walt Disney Enterprises to develop a vast resort complex in the middle of Sequoia National Park. This would have attracted 14,000 paying visitors a day--far more than go there now. What could be more cost-beneficial? Yet Congress, in response to ethical and political arguments, outlawed this profitable scheme.

Interior Secretary Watts has now promised to give concessionaries a greater role in managing our national parks. These entrepreneurs know how to market a park--to turn unprofitable wilderness areas into money-making golf courses, motels, bars, discos, swimming pools, restaurants, gift shops, and condominiums. These are things that we want and are willing to pay for as consumers--no matter what we may think of them as citizens. A free market calls for these things; they sell; consumer benefits outweigh consumer costs.

The problem, as many people point out, is that although markets reveal our consumer interests, they may fail to measure our countervailing ethical or aesthetic principles and our convictions and concerns as citizens. Markets exist for bowls of porridge but not for birthrights. Must we, then, act only as consumers, to turn every arcadia into an arcade and all our free natural beauty into money-making commercial blight?

Economists respond to this question in two ways. Some recognize that cost-benefit analysis simply cannot be used to settle ethical or political controversies. Others are developing a "new" economics to create surrogate or imaginary markets to "price" ethical values and political convictions.

Economists of the first sort allow that Americans are not just consumers with interests they want satisfied in markets; these economists recognize that we are also citizens who have opinions legislatures are supposed to represent. These economists concede, therefore, that pollution, health, and safety standards should be determined through political argument and compromise. Economic factors are important, of course; they may not be decisive but they should be taken into account. These economists contend moreover, that the regulatory agencies should do the will of the legislature at the least social cost.

Conflict in our society involves ideological contradiction as well as economic competition. The one cannot be understood in terms of or reduced to the other. Cost-benefit analysis may be used to give us information about values for which markets exist and are appropriate. But this use is limited. We must otherwise rely on political argument and compromise in Congress ending in a vote and not resort to cost-benefit analysis terminating in a bottom line.

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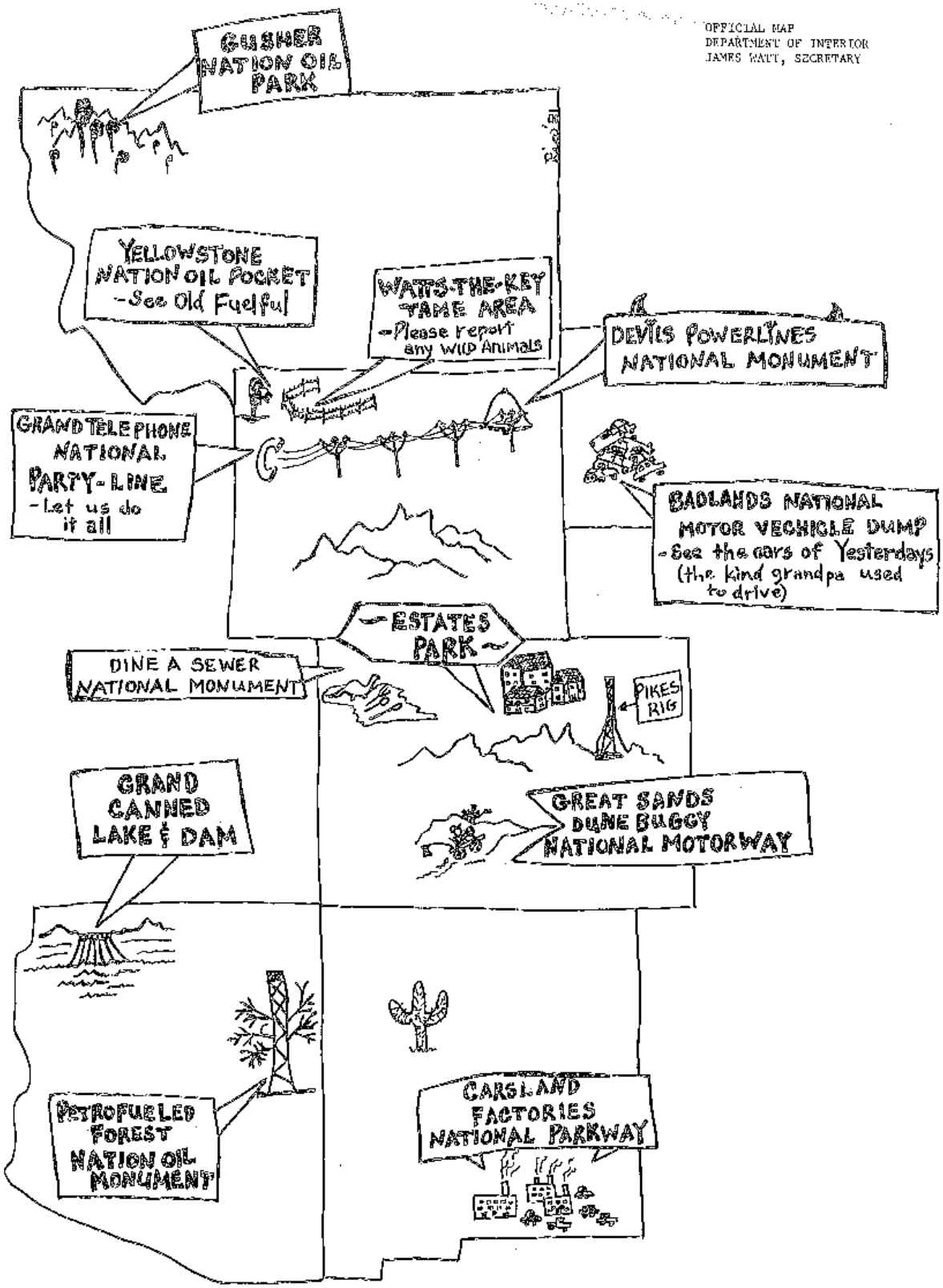
Schumacher Revisited

"...economics deals with goods and services from the point of view of the market, where willing buyer meets willing seller. The buyer is essentially a bargain hunter; he is not concerned with the origin of the goods or the conditions under which they have been produced. His sole concern is to obtain the best value for his money.

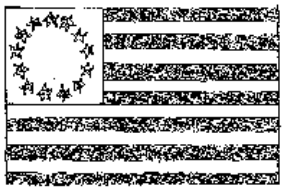
The market therefore represents only the surface of society and its significance relates to the momentary situation as it exists there and then. There is no probing into the depths of things, into the natural or social facts that lie behind them. In a sense, the market is the institutionalization of individualism and non-responsibility. Neither buyer nor seller is responsible for anything but himself.

In the marketplace, for practical reasons, innumerable qualitative distinctions which are of vital importance for man and society are suppressed; they are not allowed to surface. Thus the reign of quantity celebrates its greatest triumphs in "The Market."... To the extent that economic thinking is based on the market, it takes the sacredness out of life, because there can be nothing sacred in something that has a price."

(From Chapter 3, "The Role of Economics," in Small is Beautiful.



Vacation Spots in the Rocky Mountains



Democracy at Work

Paul Rasch

The people whose ideals molded this country held great aspirations for the role of democracy in our newly-formed nation. They believed that placing the decision-making power in the hands of the people was an essential ingredient for a great America. Thus, a constitution was formulated which gave each citizen the opportunity to influence the country for the good of its people. While the U.S. Constitution is an important statement of support for democracy, the vital support necessary for this democracy to be effective must come from the people whom it is intended to serve, through their participation in the country's policy making. The lack of citizen involvement has created a schism which has alienated the "common" citizen from the decision-making power. This schism manifests itself in a feeling of powerlessness to change what is perceived to be wrong, a feeling that "they" make all the decisions which "we" abide by. Thus, the lack of citizen participation in the affairs of our country creates the proverbial "vicious circle." It leaves the decision-making responsibilities in the hands of fewer people, yielding a feeling of powerlessness among the general population which makes them less likely to participate. The victim of this vicious circle is democracy itself.

Workers/Citizens

The lack of citizen involvement in our nation's decision making has as a root cause the suppression of human spirit. Nowhere is this suppression more evident than in the monotony of most jobs, particularly those in industry. By denying its workers interesting and challenging work, industry prevents people from experiencing pride and self-fulfillment in their jobs. Industry destroys the spirit of those very people who make it possible for industry to survive.

Just as the schism between citizens and the country's decision-making power has reduced people's confidence in their ability to change matters, much of the same effect has occurred as a result of the alienation between workers and factory management. Rather than promote cooperation, the hierarchy of industry has produced enormous dissatisfaction among the workers, leading to high absenteeism and an extreme dislike of factory life.

In addition to the alienation between the average worker and management, the alienation between workers and their work is at least equally to blame for the lack of employee fulfillment. Karl Marx summed it up this way, "In his work, he does not affirm himself but denies himself, does not feel content but unhappy, does not feel content but unhappy, does not develop freely but mortifies his body and ruins his mind. The worker...is at home when he is not working, and when he is working he is not at home."[1]

The push for technological advances to enhance productivity has greatly increased the alienation of workers towards their work. An example was the General Motors assembly plant in Lordstown, Ohio. As GM steadily increased its production demands, the employees responded with soaring absentee rates, sabotage and finally a twenty-one day strike.[2] It is quite obvious that both the alienation between common workers and management and between workers and their work have produced tremendous dissatisfaction. This must be changed if industrialized societies are to survive.

The Desecration of Work

The inability of work to satisfy the need of humans for fulfillment brings to question the very necessity and value of work in our lives. Yet it must be remembered that in times past, work has been a fulfilling experience. Prior to ancient Greek and Roman civilizations, there appears to have been little distinction made between work and life. Historian Walter Neff notes, "If contemporary hunting and gathering societies provide any clue to man's distant past, it is that the earliest meaning attached to work is hardly a distinctive meaning at all. It also seems likely that no distinction existed between work and non-work, between labor and leisure..."[3] The ancient Greek and Romans formalized the distinction between "work" and "life" which has remained with us. Work has acquired the stigma of being unpleasant but necessary.

The industrial revolution played an enormous part in molding our attitude toward work by emphasizing specialization, which usually led to monotony and boredom. And, while the seeds of unfulfilling work had been carried by generations throughout history, it was the industrial revolution which institutionalized the adaptation of people to machines. Even Adam Smith, a founding father of capitalism and advocate of mass production, saw the drawbacks. "The man whose life is spent performing a few simple operations... generally becomes as stupid and ignorant as it is possible for a human creature to become." He added that when the monotonous work which accompanies a submission to machinery becomes extremely widespread, "all the nobler parts of the human character may be, in a great measure, obliterated and extinguished in the great body of the people."[4]

The perils of monotonous work were height-

ened even more with the advent of scientific management by Fredrick W. Taylor in the late nineteenth century. Taylor's system was designed to combat what he called "the natural laziness of men" by working them at their fastest possible pace. Central to scientific management was the idea that there was "one best way" to perform each job, and that this way could be determined by careful analysis of the worker at his job. Once this "one best way" was determined, workers were given pay increases to adopt "the way" into their routine. Without fail "the way" increased both productivity and worker alienation, and thus the system was applauded by management and deeply resented by workers subjected to it.[5]

In his book Job Power, David Jenkins explains that the major problems created by Taylorism were not in its details but in the distortion of attitudes toward work. Taylorism reinforced the notion that "employees need to be told precisely what to do and how to do it, that independent thinking is dangerous and impermissible, that the planning of the work needs to be separated from its actual execution, and that the only motivation is money."[6]

The Value of Work

Fortunately, not all people have accepted the industrial model. In the eighteenth century a number of utopian communities sprang up, devoted to more humane systems of economic survival. Among the most noted and successful were the Shakers, who combined disciplined religious beliefs with equality among its members. Although all of these experiments in utopianism eventually failed, the history of their efforts is inspiring. The Amish have retained some of the values held by these communities, in particular the strong devotion to work, which they hold as more of a religious need than an economic necessity.

E. F. Schumacher, in his book Good Work, states the three purposes of human work as: "First, to provide necessary and useful goods and services; second, to enable every one of us to use, and thereby perfect, our gifts like good stewards; third, to do so in service to, and in cooperation with, others, so as to liberate ourselves from our inborn ego centricity."[7] To fulfill these purposes will not require an increase in the quantity of work but rather in the quality of work and greater democracy in the workplace.

Industrial Democracy

The idea of promoting more worker participation is not a completely new one. Soon after World War II and into the 1950's, countries such as Norway, Sweden, France, Holland and West Germany established "worker councils," either in conjunction with, or in the absence of, the labor unions. These councils, which are created because of government legislation, differ in form from country to country, but are quite similar in their function, which is to provide more worker representation in the industrial sector. Basically, they are advisory boards made up of

"Work is... about violence to the spirit as well as to the body. It is about ulcers as well as accidents, about shouting matches as well as fistfights, about nervous breakdowns as well as kicking the dog around. It is... above all... about daily humiliations."

Studs Terkel in WORKING

both workers and management. They receive certain information from management and then act as consulting bodies based on this information. Their principal weakness is that they have no real decision-making power. Without the ability to effect changes, the councils have become nothing more than sounding boards benefitting management more than the workers. They relieve some of the friction of the workplace, but management does not relinquish any of its authority. Thus these worker councils have overall been quite ineffective in giving the workers a greater voice in what happens on the job. Most are now overwhelmingly rejected by the workers. While worker councils are a step in the right direction, the valuable lesson to be learned from their failure is that worker fulfillment will require much more than discussion clubs which are powerless to effect change.

Action to Change

One country which has gone beyond powerless worker councils is Yugoslavia. Following the country's split from the Communist International Association in 1948, a system of worker control was initiated by the President Josip Broz Tito. The amount of this control has varied through the years, but for the most part, has been steadily increasing, accompanied by a gradual decline in the power of the country's central governing body, the League of Communists.

In Yugoslav companies having fewer than thirty employees, all workers are on the council, while in larger companies the councils range from 15 to 120 members. Council members are elected directly by the employees for two-year terms at no extra pay. These councils now hold essentially all the formal power: they approve all important management decisions, set salary scales, decide on hiring and firing, carry out long-term planning and generally run the company.

Through its years of operation, the Yugoslavic system has encountered some serious problems. For instance, when workers were first given control over salary scales they were too generous to themselves. Thus, their power was curbed for some six years and, when reinstated, yielded more favorable results. The major obstacle facing the Yugoslavic system has been the tremendous number of ill-educated workers who have little concern for the operation of the company. This has led to a somewhat elite group of worker leaders who have been largely responsible for the decisions made by the councils.

However, as education and the general well-being of the country increases, this is becoming less and less a problem.

The benefits realized by Yugoslavia through its revolutionary system of worker participation are extremely hard to quantify. However, it may be safely said that the system has not had a detrimental effect on the economy and has enhanced the opportunity for fulfillment on the job.

A number of other countries have recently instigated worker democracy throughout their industries. The Tavistock Institute for Human Relations in London has advised the Scandinavian countries in the development of workplaces which are excellent examples of the potential of worker democracy. The Scandinavian countries have been especially willing to experiment with systems which make work a fulfilling experience.[10]

Other countries such as France and England have various examples of worker democracy within their borders, but do not actively pursue it as a matter of governmental policy. In Small Is Beautiful, E. F. Schumacher describes the English Scott Bader Company, which has utilized worker participation very successfully for nearly thirty years.

Democratizing the United States

Progress toward worker democracy in the United States has been very limited. As the industrial leader of the world, the U.S. has a great opportunity to promote increased worker participation, but thus far corporations have moved comparatively slowly in that direction. However, there are some fine examples of democracy in the workplace which have evolved during the last ten to twenty years and merit attention.[11]

One of the best known of these examples is the dry dog food division of General Foods located in Topeka, Kansas. The plant, which opened in February, 1971, after more than two years of planning and preparations, contained both modern equipment to facilitate more efficient packaging and processing of the product and some very different ideas about how people should go about their work. Probably the most pronounced change involved the formation of three worker teams: one for processing, one for packaging and shipping, and one for office duties. Rather than the traditional system where a person is assigned a particular task, workers within a team were free to rotate from job to job within their team. As they acquired the skills necessary to perform each new task, their pay was increased. For example, in the shipping and packaging team, a forklift driver would routinely swap jobs with the person loading pallets as well as everyone else within the team.

Paul Rasch & Mark Bigelow roofing the saw shed.

The most important result of the Topeka system was a drastic reduction in the alienation between workers and their work. By rotating jobs, workers were able to more fully understand and identify with the entire production process and thus be of more value to the plant as a whole. Another step in this direction was the abolition of specialized quality control inspectors. Each work team was responsible for its own quality control. Since workers rotated through each position in the team, everyone was acquainted first hand with the quality of the product. In addition, each worker acquired the technical skills necessary to test the product.

Another accomplishment of the Topeka system was decreased alienation between the workers and the management. Replacing traditional shop floor supervisors with team leaders was an important step in bridging the worker-management schism. Also, common facilities for both top level management and workers helped. Both parked in the same areas on a first-come, first-serve basis, entered the plant through the same door, and shared the same break and conference rooms. The trust which developed out of such practices was also reinforced by the removal of the time clock. This resulted in more of a tendency to work late without extra compensation than in increased tardiness, which might be expected.

The results of the Topeka worker participation system after the first year and a half proved its value.

--While quality of the product was uniformly high, productivity was ten to forty percent above similar, but "standard" plants.

--The absentee rate was one-half percent (ten percent is common in industry, with some heavy industries as high as twenty to thirty percent).

--Personnel turnover was negligible.

--There was little or no theft or misuse of property, despite the fact that there was minimal emphasis on inner-plant security.[12]

Despite the success of the Topeka system, the restrictions placed on it doom it to eventual failure. It was begun as an experiment to improve productivity by increasing the quality of workers' lives, and its success is slowly

becoming its downfall. From the beginning, General Foods Corporation has been more interested in maximizing profits than in humanizing work. Both executives and workers benefitted from the experiment, until eventually the desire for more worker control, which grew out of the initial dose granted by the main office, came into conflict with the short-sighted ideologies of the top executives of General Foods. The denial of further involvement in company policy-making has led workers to question the intentions of the company. The distrust thus spawned has resulted in the erosion of the very goals which the company envisioned for the system. Today the Topeka experiment is a reminder that workplace democracy requires a strong commitment by the company to the quality of workers' lives as an end in itself.[13]

I.G.P.

The International Group Plan Company (IGP) in Washington, D.C., shows just as clearly that commitment is required of rank and file workers as well as management. This insurance company is unique in its determination to give the workers ultimate control over the affairs of the company. The employees at IGP make decisions ranging from pay rates and benefits to types of insurance policies that will be sold. The result of self management at IGP has been very encouraging: a typical urban mix of middle and upper class blacks and whites (two-thirds are female and only one-third has college degrees) have consistently turned out a one million dollar annual profit. Most importantly, they do it by cooperating with each other, working out decisions in a democratic manner.

IGP has created a system in which all employees are given ample opportunity to have an impact on the decisions which affect them. Yet the same problem that plagues our political system is also evident there: not enough members take an active role in company affairs. Most workers lack experience in decision-making and thus show interest only in matters which affect them immediately.

Education in consensus decision-making, corporate finances, and other matters beyond the normal scope of the average worker is needed at IGP in order to encourage people to more fully utilize the opportunities afforded by the self-management system.

Making Helping it Work

The problems facing companies which promote worker participation are common to any major social change. Suspicion of corporate motives is well-founded in historical examples of worker exploitation. Thus it is not surprising that many labor unions see workplace democracy simply as a corporate ploy to reduce the power of the unions, while increasing profits at the expense of the workers. Neither is it surprising that many of the workers at these revolutionary companies are extremely suspicious of the new systems. While some of these fears are merited, examples of true workplace democracy are emerging, and the results of these examples worldwide are encouraging.

A 1975 National Science Foundation survey of fifty-seven field studies of U.S. worker participation experiences found that four out of five reported productivity increases.[15] The University of Michigan Social Research Institute's study of thirty employee-owned firms showed their having higher profits than conventionally-owned firms. Moreover, they found that, generally, the more equity owned by workers, the greater the profitability of the company.[16]

Probably the most encouraging result of worker-managed firms is the increase in community involvement outside the job by persons at worker-managed businesses. This has been documented by a UCLA psychologist, who noted that "open system workers" join more social clubs and organizations.[17]

The movement towards democracy at work will not come easily in the U.S. However, those who advocate reform of the workplace have the very goals of successful business as their allies: increased productivity and decreased absenteeism, tardiness and personnel turnover. They also have faith in the ability of people to help make decisions which best satisfy personal and community needs, a faith in democracy.

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The Plenty Project

Lynn Hirschberg

The Plenty Project is an outgrowth of "prosperity" on The Farm, an 1800 acre intentional community in Tennessee began in the early 70's. Prosperity is used in quotes because it doesn't mean having a two car garage, five bedroom house and a pool. It means having the bare essentials, living on approximately $1.50 per person per day, and feeling that they have enough. Enough, in fact, that they are commited to meet their meager needs and then give the rest of their produce, income and energies away. The Plenty Project is involved in the sharing of those things. Although only a fourth of the 1300 Farm residents are directly involved in Plenty, everyone works for the betterment of the community, and all surpluses are channeled into Plenty.

In 1974, when the people on The Farm felt they had enough for themselves, they began delivering food to hungry people in Tennessee and then expanded to helping feed hungry and homeless people after natural and man-made disasters. Plenty had crossed national boundaries in 1976 and became a non-profit international development corporation. Plenty workers have been involved in Bangladesh, Haiti, Lesotho, and Guatemala, developing appropriate housing, clean water supplies, soybean agriculture and soy dairies for the extremely poor. Their work has won them recognition from the United Nations, and they are becoming widely known as the "Hippie Peace Corps."

It is becoming increasingly obvious that the aid given by the U.S. government has often been reserved not for those most needy and hopeless, but for those with "strategic resources" which we want to secure. The Plenty Project, with no ties to government or private enterprise, shares resources freely with no economic strings attached, and with no hope or need for recompense. The low overhead (never over 57% of their budget), with no paid staff or administrators or fancy offices, allows Plenty's resources and energies to go straight to the people in need.

In answering the question, "What are you doing this for?", Steven Baskin of The Farm answers: "There's a lot of work to be done that nobody's doing...it has fallen to us because you guys with the neckties just aren't doing it... The mainstream culture is for wrong and has lost the essential human values, and we are trying to grow a little culture of the essential human values."

To read more about Plenty, see the July, 19 1981 issue of New Age. Subscriptions to Plenty News (156 Drake Lane, Summertown, Tennessee 38483) 38483), are free. Donations are tax deductible.

Resettling America: Energy, Ecology and Community

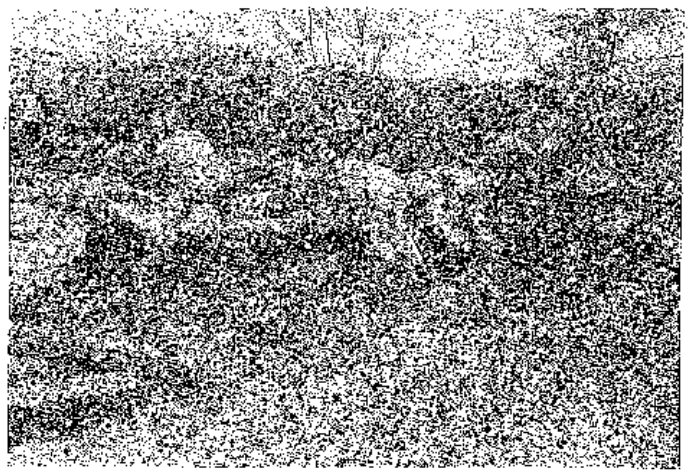
Edited by Gary Coates Forward by Amory Lovins
Brick House Publishing, 1981
560 pages, 142 illustrations, Paperback $14.95

REVIEWED BY *Dana Jackson*

This is a hefty collection of articles describing groups and organizations working for greater local self-reliance in the areas of energy, food, shelter and other basic necessities. The editor, a professor in the College of Architecture and Design at Kansas State University, is concerned not with the current emphasis on self-sufficiency, but on the interdependencies that can enhance a community, or, if neglected, can destroy it.

The book is divided into three parts: Vision, Expression, and Reflection. The first and third parts form a philosophical frame for the seventeen articles in the middle. There one can learn about strategies for positive social change in contemplative communities, rural new towns, urban decentralization projects, solar communities, and new approaches to agriculture. The last article in this section is by Wes Jackson on "New Roots for Agriculture."

Resettling America is interesting to leaf through because it is profusely illustrated. The 142 photographs (six of The Land), sketches, plans, and figures make Green Gulch Farm, New York City's 11th Street Project; Davis, California and New Alchemy believable places with real people running them.



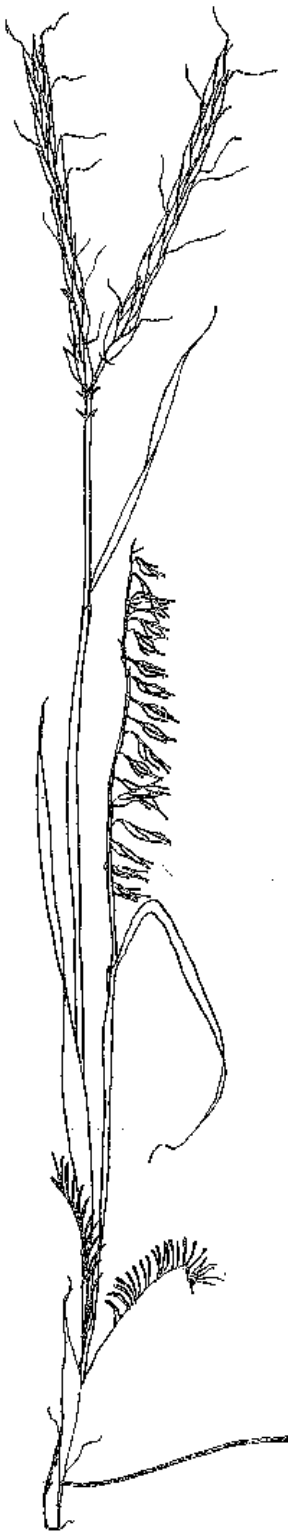
Friends of The Land help rebuild after 1976 fire.

A Sense of Place

Pioneer Women

by Joanna L. Stratton
Simon and Schuster, 1981
319 pages, 77 photographs

REVIEWED BY *Lynn Hirschberg*



Pioneer Women: Voices from the Kansas Frontier, is a collection of writings and verbal histories of the settling of Kansas as seen through the eyes of the women who were there. Although partially devoted to relating aspects of specifically womanly work and interests, women's impressions of the larger events--the wilderness, Indians and wars--are also recorded. This history fleshes out the noted dates in the past, as well as taking us through the long years of pioneering. It helps us to remember that pioneer women's backs and brains, as well as their hearts, were valued and appreciated by their partners and neighbors.

During the 1920's, the author's great-grandmother, Lilla Day Monroe, an attorney, suffragette, and the first women to be admitted to practice before the Supreme Court of Kansas, began to collect and edit autobiographical manuscripts written by pioneer women. She intended these to be part of a lengthy magazine article; then, as they grew in number, she planned to put them in an anthology. Three decades later, while rummaging in the attic of her ancestral home in Topeka, Kansas, Joanna Stratton came across the old file folders of 800 personal memoirs of Kansas women and completed the work her great-grandmother had begun.

"History Chronicles the large and glorious deeds of the standard bearers, but tells little of the men on whose shoulders they are borne to victory, and tells nothing at all of the courageous women who kept the business of the house going."

This quote from Lilla Day Monroe echoes a common misgiving women have always had with the recordings of history. Women "have made up at least half of the human race; but one could never tell that by looking at the books historians write," notes Arthur Schlesinger, Jr., in introducing the book. Pioneer Women succeeds in presenting a women's history, one that is trustable because it is taken from so many sources. It is trustable also in the fact that the informants were all women, and it was compiled by a woman historian.

The book is sectioned into five parts. The first deals with arrival on the prairie and the beginning of homesteading. Many left comfortable, "civilized" homes for the promise of a new life in the wilds of Kansas. Few knew what to expect. The second part delves into the struggles they overcame in the first years. Floods, wolves, tornadoes, drought, fires and Indians circle through their lives, and women were frequently left alone for days on end to fend for themselves and their land. Part three describes the new social order that arose on the prairie. Section four recounts the starting of towns and the subsequent problems of policing the gunmen, gamblers and horse thieves who collected there. The changes wrought on Kansas by the twenty years of the cattle driving era are recorded through women's eyes here also. The last part covers the period from before the Civil War, when Kansas itself was divided over the slavery issue, up through the prohibition and suffrage struggles conducted with much fervor and commitment by the women of Kansas.

As a newcomer to the Great Plains, I was looking for an historical perspective of Kansas. What drew people out here? From where? How did they cope at first? Pioneer Women gave me that perspective. I've begun to understand the prairie and the women and men who settled it.

(WATER RESOURCES - Continued from pg. 13)

tatives of many different citizen, farm, and environmental organizations met in Rapid City, South Dakota. This caucus, organized by the Nebraska Center for Rural Affairs, was a follow-up of the meeting held at The Land Institute on June 1. Although the representatives from Wyoming, South Dakota, Nebraska, Kansas and Texas discussed a wide range of agricultural and energy issues, the depletion of the Ogallala was a central topic. On November 7-8, leaders from the Sierra Club across the Great Plains met at The Land Institute as an ad hoc water committee. The participants reported on water development issues within their own states and discussed how it affected agriculture. The committee resolved to begin educating the national Sierra Club membership about water resource problems on the Great Plains.

One important question has kept coming up since we began the Great Plains in Transition study at The Land Institute: Is it possible for such a large geographical area to develop a regional consciousness? All we can say at this point is that some people in the region already have it.

Announcements

APPROPRIATE TECHNOLOGY POSITION OPEN

The Land is searching for a person to fill the internship position of appropriate technologist second semester. The job would begin on February 1, 1982.

Duties: general maintenance of tools and equipment, assisting students with appropriate technology projects, some construction.

Requirements: Familiarity with philosophy and spirit of appropriate technology, interest in solar and wind energy technology, comfortable with tools and equipment.

Salary: stipend available.

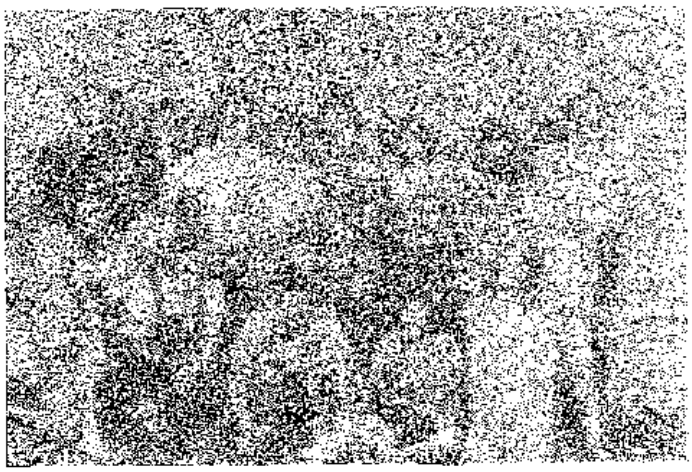
To apply: Direct inquiries to The Land Institute, Rt. 3, Salina, Kansas 67401.

VISITOR POLICY: Appointments can be made to visit The Land, preferably between 1:00 and 5:00 P.M. on week days. Special arrangements can be made for class field trips. (best in spring)

NOTICE OF SPECIAL EVENTS: When a workshop, seminar, discussion evening, or special speaker is presented by The Land, flyers about the event are sent to Kansas people on the mailing list. Anyone from other states can receive these notices also by request.

THE LAND LIBRARY: Friends of The Land and Smoky Hills Audubon Society members are welcome to use the library. Afternoons are best. Please call (823-8967) before you come.

LOST AND FOUND: A small child's brown swede shoe was found in the driveway after Visitors' Day.

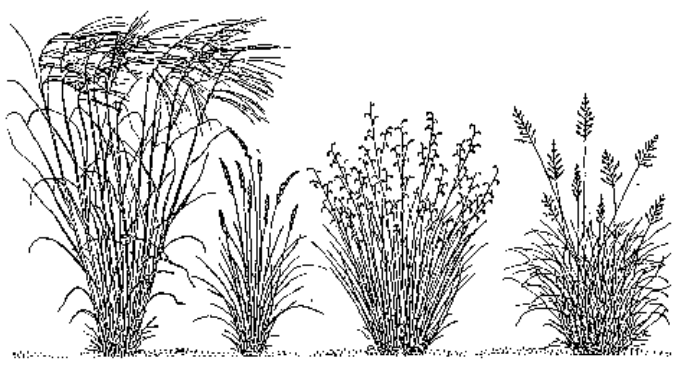


June 1, 1981, the last day this entire group worked together at The Land. Where is everyone now?

BACK ROW: Dennis and Annie Ronsse, teaching in an Eskimo village in Alaska; Fred Vogler, working in Alaska; Maka Grogard, working for the Center for Renewable Resources in Washington D.C.; Paul Rasch, appropriate technologist at The Land; Cici Bigelow, Doane College, Crete, Nebraska; Ed Newman, Meadowcreek Project, Fox, Arkansas; Dana and Wes, The Land.

FRONT ROW: Mark Bigelow, Doane College; Marty Bender, The Land; Tom Mulcrone, Jordan Energy Institute, Grand Rapids, Michigan; Terry Evans and Mari Peterson, The Land.

Information about the student program can be found on page 2 and 3 of this issue.



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_____$15 _____$25 _____$50

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Friends of The Land

The Friends of The Land have been extremely important to The Land Institute. Many helped collect materials to build the first building; many donated time and labor after that building burned to help start reconstructing the class room/library/shop. Friends donated books and money to help develop another library. The Land needs these friends, and new friends too.

The Land Institute is a private, educational-research organization, financed by student tuitions and private gifts. Contributors receive THE LAND REPORT, any special publications, and notices of interesting events at The Land. The Land Institute is a non-profit organization, and all gifts are tax deductible.

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