THE LAND REPORT

The Land Institute

Number 13

Summer 1981

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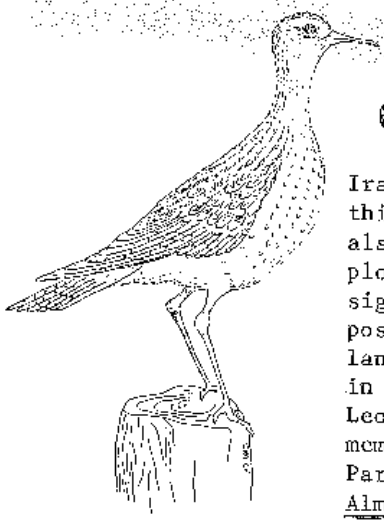
Letters to the editor are also welcome.



On the Cover

Iralee Barnard sketched this upland sandpiper, also known as the upland plover. Though a common sight on pasture fence posts in summer, the upland plover spends winters in the Argentine. Aldo Leopold described it most memorably in "May," from Part I of Sand County Almanac.

The upland plover fits easily into the agricultural countryside. He follows the black-and-white buffalo, which now pasture his prairies, and finds them an acceptable substitute for brown ones. He nests in hayfields as well as pastures, but, unlike the clumsy pheasant, does not get caught in hay mowers. Well before the hay is ready to cut, the young plovers are mowing and away. In farm country, the plover has only two real enemies: the gully and the drainage ditch. Perhaps we shall one day find that these are our enemies too.

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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.

At The Land

This issue, although labeled "Summer," reports on spring semester activities at The Land. Our summer routine is quite different.

There is no student program this season, although we frequently host college classes on field trips. Summer workers gather for informal seminars when special visitors, such as Lee Swenson and Jean Krois, are willing to hold them.

Six employees keep busy at The Land. Mark Bigelow assists Marty Bender in the Herbary and research plots, as well as helping Paul Rasch, who has taken Dennis Ronsse's place as appropriate technologist. One of Paul's main projects has been constructing a saw shed with two skylights on the west side of the building. When not in the office, Wes has been readying the frame of the hay bale house (which is on property a mile away) to move to The Land, and engineering a way to cross the river, now that our bridge is gone. Dana divides her time among the office, the garden and the kitchen, preserving fruits and vegetables with Sara Jackson's help. Cici Bigelow has helped type The Land Report and take care of the mailing list. Mari Peterson works in her office when not in Wabaunsee or Harvey Counties with the energy planning projects.

Jay Ellinghausen and Roberta Sorenson have been much appreciated volunteers in the research plots, the garden, and wherever help is needed.

Anyone who wishes to visit The Land or bring a group for a tour this summer should make an appointment by calling, (913) 823-8967.

Grants Are Received

The Land Institute has received grants from several private foundations to support its programs in the 1981-82 academic year. These include the following:

-$5000 from the Rodale Organic Gardening and Farming Research Center and $3000 from the Wallace Genetic Foundation for the perennial polyculture research,

-$3000 from the Joyce Foundation for work on Great Plains water and energy issues,

-$10,000 from the Jessie Smith Noyes Foundation for tuition scholarships,

-$16,000, also from the Noyes Foundation, for two graduate assistantships in appropriate technology and county energy planning,

-$2500 from the Center for Community Change and $5000 from a foundation which wishes to remain anonymous for general programming.

These grants support about 65% of the 1981-82 budget. The remainder must be raised through student tuitions and contributions from Friends of The Land. An explanation of the Friends of The Land and a contribution form can be found on the back cover of this issue.

A truck pulling a trailer carrying an industrial tractor with a front end loader and a back hoe caused the collapse of our bridge in March. Now visitors must cross the river two miles north.

The Board of Directors

At the annual meeting in June, members of The Land Institute elected Ivy Marsh as a new member of the Board of Directors. She succeeds John Schwartz, a former Salina physician now from Anchorage, Alaska.

Ivy is a Friend of The Land who currently represents The Land Institute on the Consumer Information Board of the Kansas Corporation Commission. She has worked on many environmental/energy issues for the League of Women Voters in Salina.

Former Board member, John Schwartz, is practicing medicine in the Anchorage, Alaska, Neighborhood Health Center, a non-profit organization which serves patients on a sliding financial scale. The Center recently moved into a new building, the first commercial passive solar building in Anchorage. Dr. Schwartz is credited with suggesting the solar ideas to the staff and the architect, James D. Clark.

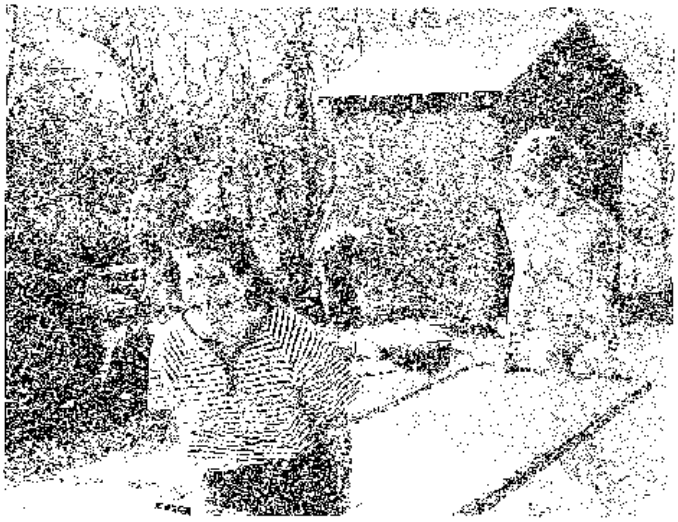
Three members of the board were reelected to another three year term. They are Gordon Maxwell, Salina physician, Wes Jackson, and Bernd Foerster, Dean of the College of Architecture and Design at Kansas State University.

From time to time, the board elects distinguished persons to the Honorary Board of Directors of The Land Institute. Such individuals must have visited The Land and participated in a special program or meeting. This year, Wendell Berry, farmer, poet, essayist and novelist, and Alan Gussow, artist and environmental activist, both accepted the invitation to become members of the honorary board. At the June meeting, the Board voted to also invite Gus Speth,

former chairman of the President's Council on Environmental Quality; Joan Gussow, chairperson of the Nutrition Education Department, Teachers' college, Columbia University; and William Irwin Thompson, cultural historian, author and director of the Lindisfarne Association. These persons, who share our concern about developing sustainable systems for human sustenance, help state our goals and values through their association with the Land Institute.

The Fall Semester

The Fall, 1981, semester will begin September 3 and end December 18. 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.



Maka Grogard and Cici Bigelow move a glass patio door during one of our clean-ups. Paul Rasch, Annie Ronsse, and Ed Newman work in background.

The Students' Kitchen

Annie Ronsse

The room off the shop area in the classroom building is beginning to look more like a kitchen these days. Partially out of the need for running water in the building and a place for the students to congregate, I felt that working on the water system and kitchen would be a good contribution to The Land.

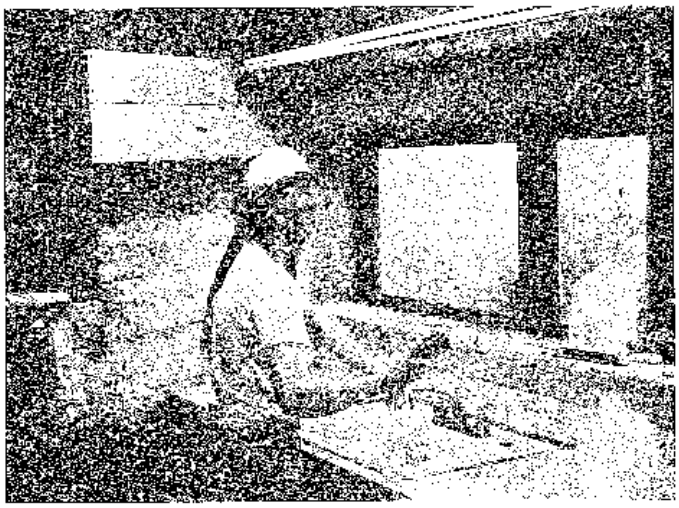
My first project was laying a formica countertop and installing a second hand sink. With a sharp blade, a file, and a lot of patience, a good countertop fit was made. Completing it was very satisfying when I recalled the reluctant formica salesman who implied that there were only a "few men" in town capable of laying formica. After I installed the sink, the next step was to bring water to the kitchen from the main valve. This process included putting a water line and faucet in the greenhouse. The plastic PVC pipe and fittings reminded me of playing with tinker toys as a kid. Although I had my problems as a novice plumber, I gained the feeling that almost anyone could learn to do her own plumbing.

The placement of the sink was such that the drain could be hooked up to an existing floor drain system that remained from the original classroom building. Once the sink was installed, I soon learned that the 1976 fire in the previous classroom building had melted portions of the drain system, leaving it unusable. At present, we are collecting waste water in buckets and recycling it to the greenhouse or outside plants. Although this system is inconvenient, it has increased our awareness of how much water we use and has cut down on unnecessary waste. I hope that a future student will undertake a project to develop a grey water system for the greenhouse.

Now that students have a sink and water, it is not uncommon during the lunch break for the kitchen to be the scene of lotteries--- lotteries for who gets to do the dishes. Being a loser in this game is where it counts!

The last phase of kitchen rennovation has been building cabinets for storage. My carpentry skills have been developing along with the cabinets. Wes had already constructed the basic framework for the cabinets. My job was to construct doors, finish them and fit them with hinges and latches. I also built two drawers.

The bottom cabinets still need to be finished, and there are many other improvements which future students can make to the Kitchen. I helped make it more of a convenient place to prepare lunch and snacks, and a place for the student community to gather for conversation and fun.



In the Classroom

Mari Peterson

The classroom experience at The Land Institute has given me a new framework for understanding some of the cultural changes taking place in Western nations. Each student that has been here has undoubtedly gained something different.

There are certain topics addressed every semester, but the manner in which they are developed depends on which books we read, what interests the students have, and the degree to which the spirit of inquiry is present in the group.

We strive for an acceptable balance between thinking and doing, between the philosophical and the technical. The reports on physical projects are elsewhere in The Land Report. Since I have been impressed with the philosophical content of the semesters, I have chosen to report on some of the ideas that have arisen this past year in the morning study sessions.

Knowing Our Limits

Most of the students who came to The Land Institute this past year were initially aware of some resource shortages and environmental problems, and felt frustrated with the conventional wisdom or ignorance on these matters. We opened both semesters with the Global 2000 Report, which has been like shock treatment, even to the most suspecting. This report defined renewable and nonrenewable resource shortages, environmental degradation and its potential consequences, and brought to light the fact that 79% of the world's population will be in the less-developed countries in twenty years, which has unsettling political implications.[2] It became apparent to each of us that we must voluntarily change our way of life as individuals and nations or suffer the consequences of continued growth in a finite world.

Our Common Ground

So we could move forward, we all agreed that nuclear power and space colonies are not realistic options for the future. We recognize that our sustenance is derived from the earth and sun--that when we run out of natural resources we cannot fall back on "man-made" substances since they are resource-based.

With the idea in mind of sustaining human life on the planet Earth as long as possible, we raised many questions about cultural values, technological alternatives, and changes in lifestyle and social/political structures.

Illusions

Why are humans misguided? What common beliefs are giving false hope, distracting people from preparing for the future? E.F. Schumacher suggests people are mislead by the belief that peace is obtainable through universal prosperity.[3] This idea is currently governing the actions of our national leaders. Schumacher points out the problems with this illusion: it implies there are no limits to growth; it rests on materialism which is fostered by greed, envy, and self-interest; and it relies on the "objectivity" of the marketplace, which he sees as merely a way of institutionalizing non-responsibility.

What I have come to understand is how our nation and others bypass ethical decision-making. Our laissez-faire economics and laissez-faire politics may have worked when we had an open frontier, but they will not work when ecological scarcity hits us with full force.

"Objectivity" enters again in the arena of scientific inquiry. There exists a presupposition that science is pure and only technological applications may be value-laden. In a book entitled The Arrogance of Humanism,[4] David Ehrenfeld criticizes the core of humanist philosophy--our supreme faith in human reason and, consequently, science and technology. Not only is nature debased in our "objectivity," but emotion and instincts are relegated to primitive, bestial flaws. Yet emotion (instinct) can be extremely valuable in understanding the whole and interrelatedness of things. Ehrenfeld goes on to say that when reason is dissociated from the human context (as in "pure science"), there is no inherent morality. Yet, I wonder if we can say that the inventors of the atom bomb are free from any implication in its use? Ehrenfeld assures us that we cannot afford to dissociate reasoning from the human and ecological contexts, but nonetheless poses the rhetorical question, "Is there survival value in morality?"

Ideals with Survival Value

Nature sustains itself
through three precious principles,
which one does well
to embrace and follow.
These are gentleness, frugality,
and humility.

Lao Tsu, Taoist
5th Century B.C.[5]

To embrace gentleness is to enjoy the simple pleasures of life.[6] It is to know the value of a sunset. It is to find happiness in cultural or spiritual pursuits.

To follow the principle of gentleness is to see ourselves in our true biological, ecological context. As Wendell Berry emphasizes, our rootedness is in the land, and we who have broken the connection must renew a relation with the land, caring for it both as a source of sustenance and heritage.[7]

A principle with great survival value that we seldom practice in modern society is frugality. To say "enough is enough" is necessary with impending scarcity. As Schumacher points out, the real challenge lies in trying to obtain a maximum of well-being with a minumum of consumption. This means we will need to value people and creative activity over objects and material consumption. Several authors have made it clear that we have side-stepped the question of "what is non-material well-being?" As Ehrenfeld says, we may be able to prolong life, but what kind of life do we offer the elderly? Schumacher notes that we may produce an ever higher Gross National Product, but this doesn't confront the issues of poverty, alienation, crime, escapism, and ugliness. To embrace frugality is to confront the issue of what makes life worth living. Any answers to this question may increase our potential for survival.

Frugality can also mean relying on local resources for local needs. The energy and resource requirements for maintaining our centralist market system of international commodities is astronomical.

Humility is being less self-deserving. Ehrenfeld is disturbed by the wave of personal selfishness sweeping over our society, causing us to assume as rights those things which are really privileges. According to psychologist Daniel Yankelovich, people have taken affluence for granted and have pursued their own self-fulfillment journeys.[8] He sees this preoccupation with self as having little adaptive value when the economy is under stress, but senses there may be a shift towards a new ethic of commitment.

It seems humility can best be shown through cooperative work, land stewardship, and other signs of our thankfulness for what we have.

Mari Peterson

If we humble ourselves, we may begin to ask, "Is this (activity, experiment) something which should be pursued?" Ehrenfeld believes we may find ourselves admitting there are some things we should not know or do. He feels the claim of "scientific truth" has become a respectable euphanism for ego. Perhaps, for example, genetic engineering should not be pursued even though we could learn many things.

It requires humility and a sense of our ecological context to say that natural objects or other life forms might have a right to exist independent of any use we may have for them.

In summary, to strive for quality and wholeness in life has survival value. More than "objective knowledge" is required if we are to understand human and natural relations. Discussions of values and philosophies regain importance as we try to determine how people live best in community and in relation to the land.

Concepts and Models

What links the values of sustainability to practical action? Are there any models for the transition?

We studied the concepts of ecology (in a general sense) from the 18th Century pastoralists to the present through Donald Worster's book, Nature's Economy.[9] With scholars such as William Ophuls and Herman Daly viewing ecology as a model for a new political economy, it is helpful to see the historical context of these ideas.

Principles of ecology are being applied in the developemnt of a "soft agricultural path." We read New Roots for Agriculture[10] and took trips to the prairie to better understand the basis for perennial polycultures. We also reviewed Joan Gussow's book, The Feeding Web, which looks at the issues of nutrition and food in a global ecological context.[11]

A second important concept is entropy from the second law of thermodynamics, which we became familiar with through Jeremy Rifkin's book.[12] Entropy is a measure of the amount of energy that has been converted from a usable to unusable form. Economic and biological activity requires energy, and in every case that energy is transformed from an available to an unavailable state. It is important, therefore, to use the minumum amount of energy needed for each task, and to avoid unnecessary energy-consuming activities.

Amory Lovins' concept of end-use matching--that is, matching the quality of energy to the task being done--is a method for reducing entropy. This and other guides are part of the soft energy path.[13] During the semester, the technologies of the soft path are explained by students and guests, including John Craft (wind) and Bill Dorsett (photovoltaics).

Schumacher has offered the intermediate technology model for the workplace, which has minimum material and energy requirements, and elevates the worth of the worker. Tools serve

E. F. Schumacher with Wes Jackson at The Land (March, 1977).

the worker (instead of the reverse) and complement the worker's skills and creative activity. Schumacher and Wendell Berry agree that, "if we do not live where we work, and when we work, we are wasting our lives and our work too."[9]

An interesting concept which may someday become a reality is legal rights for natural objects through the petition of a guardian. This concept is explained in Christopher Stone's book, Should Trees Have Standing.[14] If a brook is being polluted by a factory, the brook, through the guardian, can institute legal action and, with evidence showing its injuries, the court may decide to grant monetary relief to the brook, administered by the guardian.

These are the main concepts and models we discussed this past year. These ideas have given us some direction on how we might move away from a "Global 2000" disaster. They provide ideas of how we might "live lightly" on the planet.

How Do We Get There from Here?

Numerous authors whose works we discussed make it clear that we are beginning a major cultural transformation.

William Ophuls[5] shows that none of the major world nations are prepared for an age of scarcity. Robert Heilbroner[15] emphasizes that industrialism and growth are the heart of the capitalist, socialist, and communist systems, so we cannot merely trade one known system for another.[16]

William Irwin Thompson reminds us that "culture has become nothing more than an expanding economy"[17] and having reached maximum expansion, consolidation and internal restructuring must occur. The industrial myth of freedom--from rags to riches, implying "you are what you own"--is being shattered, and with it, the ego is humiliated. Likewise, the elite in the cities who control the resources at the periphery will be unsettled as we enter a period of "destructuring." Meanwhile, order and terrorism clash as we adjust to these changes.

Thompson has noted forces at work today in the transformation of our culture. The planetization of nations takes place as the threat of nuclear warfare forces us into diplomacy. The decentralization of cities occurs as values change and food and energy become more expensive. The miniaturization of technology evolves as we shift from hardware to information and out of capital and energy-intensive technologies. Lastly, the interiorization of consciousness comes as we begin to look for the source of the good life within rather than without.

Lewis Perelman analyzes the transition in terms of a Gregory Bateson pattern of schizophrenia.[18] As our energy and growth addiction

> "...for we become rich precisely to the degree that we eliminate violence, greed, and pride from our lives. When we have discovered primordial wealth we shall see something the wise have always known: the earth is, always has been, and always will be more beautiful than it is useful."
> (Williams Ophuls, pg. 244)

becomes more difficult to provide for, we start "hitting bottom" with conflicts arising (such as centralization versus decentralization, and liberty versus the general welfare.) Within the conflicts are many paradoxes. (You are told to conserve energy, and to the extent you are successful, you are punished by higher prices; or, you are asked to use more mass transit at the same time Amtrak service is cut.) As the schizophrenia develops, either enlightenment or madness may result. If the new values for sustainability are seen as worthy, then there is a reordering of society and self.

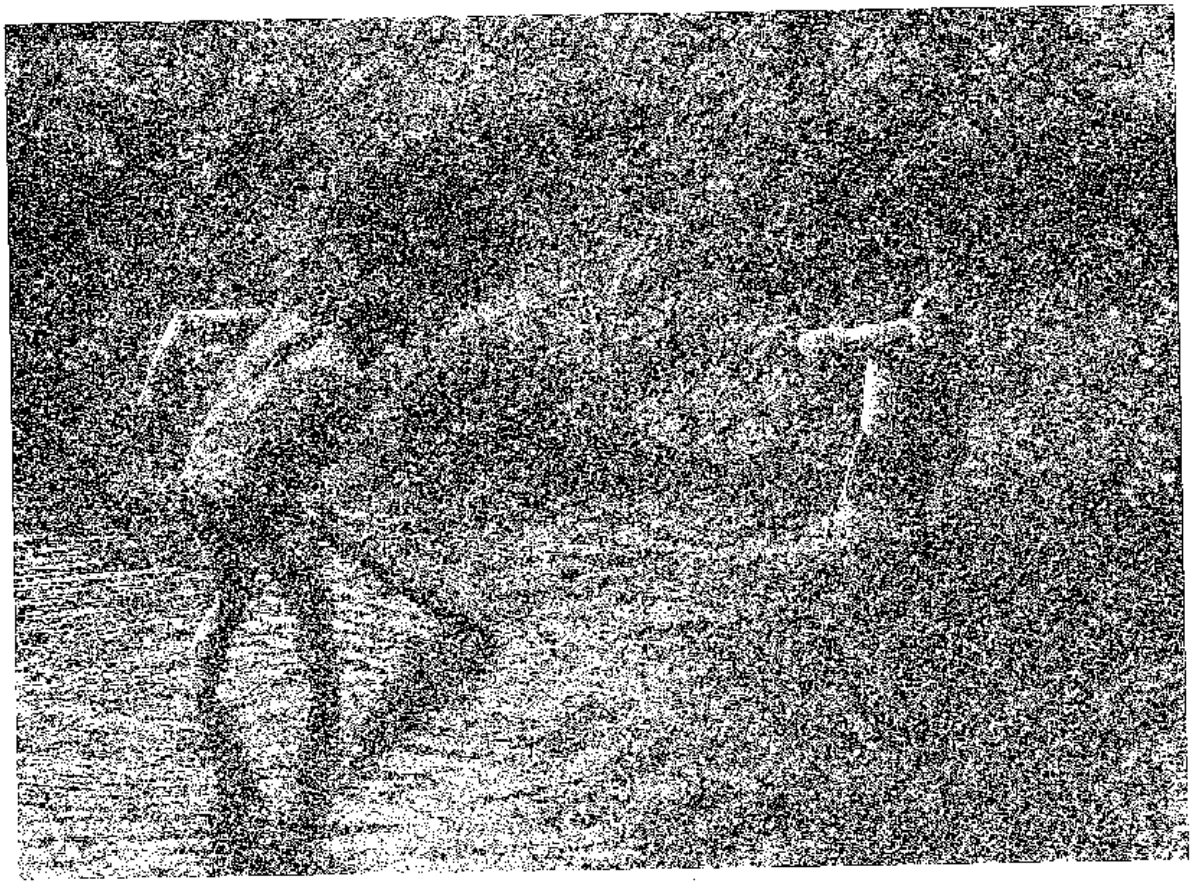
To Perelman, the positive outcome of the transition is a society with a quasi-steady-state economy, politically decentralized, with the source of wealth shifting from the factories back to the land. He also envisions greater social stratification.

The gloomy outcome is entirely imaginable. Heilbroner, Thompson, Ehrenfeld and others see the worst coming from attempts to gratify individuals' and society's egos. There is the temptation of technologies "in which we will become as gods" and we would do well to remember the outcome of the first attempt at such gratification--the expulsion from the Garden.

The most difficult aspect of the transformation will be the political changes as acknowledged by Thompson and Ophuls. We have gone for so long without a true political economy that to begin conscious, ethical decision-making anew will indeed be revolutionary. According to Ophuls, structuring the ideal political economy is wasted effort since it will have to arise from the changes first instituted by individuals and small groups.

Ophuls recognizes there will need to be more authority in the new politics since the democratic, incremental decision-making we have now, by its very nature, precludes consideration of long-term goals. To avoid placing control in the hands of a few, Ophuls suggests it may be possible to adopt a set of values to be ruled by. As such, some form of the democratic tradition may be carried on.

Certainly the fact that we are beginning to experience shortages will thrust society into the transition. Our concern, as students at The Land, has been how do we move towards the goal of sustainability and reduce the chances for a catastrophic ending? How do values change? What brings the greatest enlightenment to people: education? the power of examples? the mandate of laws? the institutionalization of ecological ethics through ideas such as legal rights for natural objects? We have no answers even though these questions have arisen more frequently than others this past year.



Should a brook have standing?

How Should We Respond?

As participants in the early stages of a cultural transformation, we need to realize that the individual changes are as necessary as the political and social changes. At The Land, we have made our first visible commitment by trying to live lives of material simplicity.

Several of the students this past year have felt that it is important to work towards a sustainable future for the town or community we live in.

Most of us agreed, that we must be aware of state and national issues and express our viewpoints, if possible, on policies that seem to be leading us in the wrong direction.

To many persons the changes taking place about them are incomprehensible. Even with the kind of understanding we may gain at The Land Institute, these changes can still seem confusing. But, perhaps we can play a role in the transition by communicating the ideal of sustainability and the values of gentleness, frugality, humility and cooperation with other people through our words and actions.

Notes and References

1. The Global 2000 Report to the President. Prepared by the Council on Environmental Quality and the State Department. (Washington: GPO, 1980).
2. We reviewed other "ain't it awful" reports during the year, including a Newsweek article on water quality and availability, and a special Amicus Journal article on air quality.
3. E.F. Schumacher, Small Is Beautiful: Economics as if People Mattered. (New York: Harper and Row, 1973).
4. David Ehrenfeld, The Arrogance of Humanism. (New York: Oxford University Press, 1978).
5. William Ophuls, Ecology and the Politics of Scarcity. (San Francisco: W.H. Freeman and Co., 1977), p. 238.
6. In a recent White House press briefing, James Watt was unable to answer two questions, one being: "What is the value of a sunset?"
7. Wendell Berry, The Unsettling of America: Culture & Agriculture. (New York: Avon Books, 1978).
8. Daniel Yankelovich, "New Rules In American Life: Searching for Self-Fulfillment in a World Turned Upside Down," Psychology Today (April 1981).
9. Donald Worster, Nature's Economy: The Roots of Ecology. (Garden City, New York: Anchor Press/Doubleday, 1979).
10. Wes Jackson, New Roots for Agriculture. (San Francisco: Friends of the Earth Books, 1980).
11. Joan Gussow, ed., The Feeding Web: Issues in Nutritional Ecology. (Palo Alto, California: Bull Publishing Co., 1978).
12. Jeremy Rifkin, Entropy. (New York: Viking Press, 1980).
13. Amory B. Lovins, Soft Energy Paths: Toward a Durable Peace. (New York: Harper and Row, 1977).
14. Christopher D. Stone, Should Trees Have Standing?: Toward Legal Rights for Natural Objects. (New York: Avon Books, 1974).
15. Robert L. Heilbroner, An Inquiry Into the Human Prospect. (New York: W.W. Norton and Co. 1974).
16. Occasionally the accusation is directed to us that if we don't like capitalism we must be for communism. Ophuls pinpointed as the basic principle of Marxism that "only social relations are problematic and that nature itself presents no obstacles that cannot be conquered with technology and appropriate social organization." (p. 208) This principle will not work with ecological scarcity at hand.
17. William Irwin Thompson, Darkness and Scattered Light. (Garden City, New York: Anchor Press/Doubleday, 1978).
18. Lewis J. Perelman, "Speculations on the Transition to Sustainable Energy," Ethics: An International Journal of Social, Political, and Legal Philosophy. Vol. 90, No. 3, (April 1980).

Action

Dana Jackson

Except for having too many children, the lifestyle of the Amish in Pennsylvania impacts the earth very little. They are less dependent upon industrial society for their livlihood and closer to the cycles of the earth than most Americans. They are also very close to the Three Mile Island Nuclear Power Plant.

Sometimes the complexity of social and environmental problems, and the capriciousness of politics, leads students to conclude that their actions are ineffective, and perhaps the best thing to do for future generations is to become more self-sufficient in food, energy and shelter, wear recycled clothes, meditate, and ignore the decision-making processes of government. That's when we tell them about the Amish.

During the first hour of every classroom session at The Land, we discuss topics brought up as a result of individual student reading. Environmental current events and energy policy on the local, state and national level dominate much of the discussion, but we also pay attention to the military budget and the effect of legislative and administrative action on the poor. When students become informed and have their consciousness raised, action follows.

Spring semester students were especially active citizens. In addition to writing personal letters and making phone calls to U. S. Congresspersons, they helped spread information on Kansas issues through an environmental phone tree. They circulated Sierra Club petitions to remove James Watt as Secretary of the Interior and wrote letters to the editor. Students from The Land helped organize activities in Salina on the anniversary of the Three Mile Island accident, taped radio programs about nuclear power, taught alternate energy seminars at the co-op, taught bicycle maintenance, and worked with city officials on wind energy regulations. They taught botany to Boy Scouts, and marched with a PAX CHRISTI group to protest increased national insecurity through more military power.

The students do not know whether their actions really made a difference in the long run. But they know it is moral to act.

PRAIRIE FESTIVAL 1981

The 1981 Prairie Festival began on Saturday afternoon, May 30, with a seminar conducted by nutrition-educator Joan Gussow; and it concluded Sunday afternoon after an address by Alan Gussow, artist and environmentalist. In the interim, the program included presentations on a wide variety of topics and ideas, with opportunities for the 365 registered participants to meet each other and discuss their projects and concerns. The entire festival reflected this year's theme -- DIVERSITY.

ALTERNATIVES IN FOOD AND NUTRITION: REFORMING AND INFORMING OURSELVES AND THE COMMUNITY

Over 150 people gathered at the picnic area under the trees for the afternoon seminar led by Joan Gussow, the chairperson of the Nutrition Education Department of Teachers' College, Columbia University, and author of The Feeding Web. In her opening address, Joan gave a broad overview of the food production and distribution system in the United States and pointed our our vulnerability.

"We may not get the food we grow in the future. The money is in the Mideast." Joan explained that while most Americans understand that the international money economy regulates the quantity and quality of food a country has, they do not realize that the U. S. could be a loser in the system, outbid by richer countries for food. Will we produce food to sell, food we can't afford to buy ourselves, as do Latin American countries? Joan pointed out that much of the land used for growing specialty fruits and vegetables is being lost to urban development. Fewer acres under production will mean higher prices, and in the future maybe only Mideastern people will be able to afford sweet cherries, artichokes, walnuts and oranges.

Joan challenged the audience to develop ideas for avoiding the food dilemmas of the future. Participants organized themselves into smaller groups to consider (1) proposals for lifestyle changes that would assure a stable, affordable, local food supply, or (2) proposals for political/social actions that could be taken by governments and individuals in order to assure that the Midwest/Great Plains Region could continue to export as needed. The proposals were ranked in importance by each small group and then presented to the entire group. Joan later compiled these reports and posted them in the gallery.

All afternoon, one could sense intellectual and emotional involvement as the seminar participants struggled with the obstacles to an ecological, sustainable food system in the U. S.

Joan Gussow

THE SATURDAY EVENING CELEBRATION

Don Wagner's "Eight Point, Six Piece, Divisible Gismo Band" playing country and bluegrass music, opened the evening program. The barnyard made a surprisingly good ampitheatre, and the audience didn't seem to notice the seventy baby chicks peeping noisily in the background as they listened intently to the two main speakers, Dwight Platt and William Irwin Thompson.

Dwight Platt was asked to speak about prairie diversity. The Land Institute believes that we must understand the ecosystem which evolved successfully on the Plains before we can create a sustainable agriculture and culture. Dwight Platt, a professor of biology at Bethel College, Newton, Kansas, is an ecologist respected for his extensive knowledge of prairie natural history, and his address (printed in this issue beginning on page 18 under the section A SENSE OF PLACE) grounded our festival in the realities of the prairie.

William Irwin Thompson, well-known cultural historian, author, and Director of the Lindisfarne Association in Crestone, Colorado, presented the second lecture on cultural diversity. Though he began by stating that people believe "The planet is a Kleenex," he concluded more optimistically by describing a cultural transformation which is leading to a greater human capacity to care for the earth. Thompson defined three cultural periods: the Mediterranean civilization influenced by Greco/Roman law and Judeo/Christian religion; the Atlantic period in which European and American shores were the centers of Protestant/industrialism; and the evolving Pacific civilization, influenced by Japan, Australia and California with a mixture of cybernetics, Eastern religions, and greater spiritualism leading us toward a realization of planetary culture.

After the speakers, the crowd enjoyed music, intermixed with speeches by prairie activists who explained the goals and projects of their various organizations. Steve Burr, National Parks and Conservation Association; Elaine Shea,

Save the Tallgrass Prairie; Terry Shafer, Kansans for Safe Pest Control; Jim Lukens, Kansas Organic Producers; Paul Rasch, Salinans for Alternatives to Nuclear Energy and the Prairieland Food Cooperative; Dick Courter, Kansas Audubon Council and the Smoky Hills Chapter of the National Audubon Society; Jerry Gillespie, Amnesty International; Mike Almon, Lawrence Appropriate Technology Center; and Pat Dreese, the new Kansas Friends of the Earth chapter, all made short presentations.

Although the formal program was over by 10:00 P.M., people strummed guitars and shared favorite songs around a campfire, some until the early hours of the morning. Jebb Bolen, Penny Oldfather, and Ken and Tom Ackley took turns keeping toes tapping.

THE SUNDAY PROGRAM

About 125 adults and children camped at The Land Saturday night. The accommodations were primitive, but a spirit of good will and cooperation prevailed.

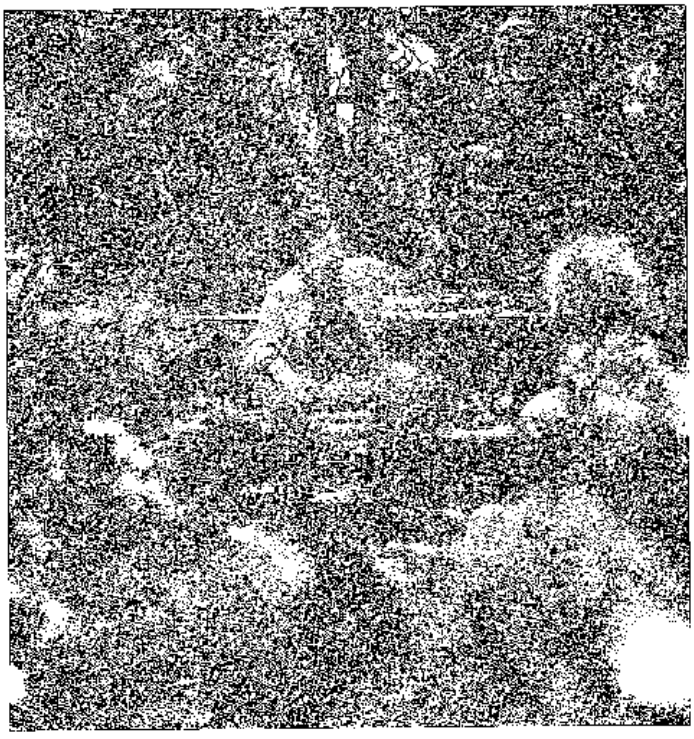
By 9:00 A.M. Sunday, the campers were joined by others interested in taking the wildflower walk with Marty Bender, learning about Prairie Restoration and Landscaping from Bill and Jan Whitney of the Prairie/Plains Resource Institute, or seeing the passive solar projects at The Land shown by Mark Bigelow, Tom Mulcrone, and Maka Grogard. There were more presentations between 10:00 and 12:00: Spinning and Dyeing Wool (Marilyn Jones), Induction Generator Wind Machines (John Craft), The Prairie Raptors (Maure Weigel), Interpreting the Prairie in Art (Terry Evans), and Community-Based Energy Planning (Diane Tegtmeier and Mari Peterson). Steve Burr led a river walk and Dennis and Annie Ronsse took children on a nature hike. Wes Jackson guided visitors through the experimental plots and explained The Land's agricultural research.

Marilyn Jones

Gus Speth

Gus Speth, former chairman of the Council on Environmental Quality under President Carter, came from Washington D.C. to attend the festival and the Great Plains Caucus on Monday, June 1. He agreed to be part of the program, so from noon to 1:00 P.M. he answered questions about the Global 2000 Report, its impact world wide, its status under the current administration, and the new organization of environmental groups called the Global Tomorrow Coalition.

Festival participants could join the group conversing with Gus Speth, or choose to meet with Joan Gussow or Bill Thompson. This was a popular one hour session, which everyone was reluctant to end, even for lunch.



William Irwin Thompson

Maure Weigel and a Swainson's Hawk.

A large crowd shared the potluck lunch, and the proverbial "groaning table" was quickly relieved of its burden. This social time was followed by the afternoon program, which was an address by Alan Gussow, an artist, the author of a history of landscape painting called A Sense of Place, and President of the Friends of the Earth Foundation.

Alan spoke about the work of the artist and the farmer, who both express our connections to the earth. He quoted several artists and poets commenting on the importance of their immediate environment to their work. (see photo on right)

Because of the influence of artists such as Alan Gussow and Terry Evans, The Land more consciously is learning to use visual images to communicate the values associated with sustainability. During the festival, two large pen and ink drawings by Alan Gussow, who was inspired by a trip to the Konza Prairie, were hung on the outside north wall of the classroom building. Terry Evans' prairie photographs were displayed in a gallery specially prepared for the occasion. The wildflower diversity sketch, which Terry created for the invitation, graced a Land Institute T shirt sold at the festival, and copies of the sketch were provided for children to color in the play area.

The annual festival has evolved out of the first prairie program in 1979, organized by Terry Evans and Jim Peterson under a grant from the Kansas Committee for the Humanities. It has become an occasion to celebrate the prairie, the ecosystem out of which agriculture and culture on the Great Plains developed. It is also a time to celebrate the people who understand human dependence upon the natural systems and work to develop lifestyle patterns and activities which are harmonious with the earth and sustainable.

The fourth annual Prairie Festival will be held the weekend of May 29-30, 1982.

Alternatives in Agriculture

Investigations in Sustainable Agriculture

Wes Jackson

Previous Land Reports have described our first efforts to establish a garden of perennial plants at The Land, which we call the Herbary. This project is part of our overall interest in finding candidates for perennial grain crops. We want to look especially at the herbaceous perennials of the Great Plains, but will include plants from other areas of the world as well. By growing them side by side in the Herbary, we think we can more fully assess the potential of each species for an agriculture based on the principles of the prairie ecosystem.

We started this project in 1979, out of our limited general funds, and have continued to add several species each year. Our efforts received a major boost the second year with a special (once-only) grant of $8000 from discretionary funds of the Noyes Foundation. The past two years we have also used some of the grant money from the Rodale Organic Gardening and Farming Center in Pennsylvania.

We now have about 150 species growing of the 1000 we hope to establish eventually. Among these plants are half a dozen or so with some exciting possibilities. The dark green Wild Senna (Cassia marilandica), a handsome five to six feet tall legume, is one of our current stars, producing the equivalent of well over 1000 pounds of seed per acre, with no human-directed selection.

Several perennial wheat grasses of the genus Agropyron have possibilities. So does the aggressive roadside legume, Illinois Bundle Flower (Desmanthus illionensis), and the perennial Maximillian Sunflower, a plant so agressive that even field bindweed competes poorly in its presence. The perennial pea vine (Lathyrus latifolius) has set an abundance of seeds for the third year in a row now.

Abundant moisture this growing season has given us bountiful growth. We have a different "show" each week at The Land as some species begin their bloom, some experience their peak, and others set seed. The Herbary is probably the favorite place at The Land for most visitors.

Our early interest in Eastern Gama Grass (Tripsacum dactyloides) persists. The experimental plots of this grass were established in 1978, before the Herbary, when we obtained 400 accessions from across the range of the species from the U.S.D.A. Southern Great Plains Field Station in Woodward, Oklahoma. Marty Bender and Mark Bigelow made numerous crosses in June and July, all of which involve combining five traits which we hope eventually will lead to higher yield.

Our interest in Zea diploperennis, the perennial Mexican relative of corn, is now fading. We had both hybrids and back crosses growing at The Land last year. The hybrid is perennial, but the first generation back cross to corn is annual. In my opinion, the main value of this recently-discovered species will be the germplasm which grants resistance to numerous diseases of corn. Seed houses will likely incorporate genes which were eliminated, probably unwittingly, as corn was genetically narrowed in the traditional push for high yield. For temperate regions, the perennial trait may be unimportant if there is little chance it can even resist freezing. This may be the case with its relative, sorghum milo, a perennial in the tropics.

Our observations of this plant and others have led us to ponder what I think is a simple but important question: what is the biology of perennialism? Or, what makes a plant a perennial? Some annual plants can be encouraged to behave as perennials by cutting them back at the end of the first year's growth. There are a number of closely-related species of the same genus, some perennial and others annual, which are interfertile. I suspect that the biology of perennialism is highly variable, which is to say that the biochemical pathways responsible for perennialism in one group may be very different than in another. Eventually, we will need a taxonomy of the different kinds of perennialism, a task I suspect will require many more than one individual's lifetime work.

During the spring of 1980 we planted another set of experimental plots south of the Indian House. We set out to determine how two species of native perennial grasses would respond when grown together in a bi-culture of three different combinations or ratios. We want to compare the yield from these plots to the yield of the same species in monoculture. We next decided to investigate what would happen if we introduced any one of several broadleaf natives into the bicultures to learn if they influenced yield. If we receive funds to hire workers to help separate and weigh seed, our fall harvest should provide useful data.

This past spring we planted out two new sets of experiments. In the first we started with a pasture consisting mostly of Indian grass, which we know was at least twelve years old, and it could have been twice that. This pasture is an extension of an adjacent brome grass pasture, currently grazed by one small horse and a milk cow. With the twenty inch wide lawn mower, we divided this pasture into plots four feet wide and twenty feet long. Four of these plots were grouped together, and a fifth was isolated and regarded as a control. The first plot was mowed;

the second, burned; the third, mowed and disked; and the fourth, burned and disked. Marty Bender then sowed fifty live seed per square foot of one species across all five conditions. This was repeated until seeds from fifty different taxa had been distributed across 250 plots (one taxon for each group of five plots).

We imagine that in a future agriculture it may be important to quickly "tie down" soil prone to blow or wash with one or two species which are exceptional for this purpose, and to introduce one or a few species at a later time. Results from this research should provide some idea of which of the four conditions is best for any one of the fifty species planted.

For the second year in a row now, we have planted seeds of a perennial and an annual of the same genus as part of what we call our "response to selection" experiment. We try to grow at least 100 live plants and harvest and weigh seed from each individual plant. We will then plant seed from the top three percent of each species next year. We hope to repeat this in subsequent years and compare the response of the perennial compared to the annual across several paired species, in order to determine if there is something inherent in perennialism (or annualism) associated with a given response. Numerous factors complicate the results, such as one plant being fully or partially an outcrosser and the other fully or partially a self-pollinizer. We hope to get our species as closely paired as possible in the future as more information is known about thier breeding strategies.

Much of our agricultural research at The Land does not require fancy experimental design. Fine-tuning for much of our work will have to wait until we have gained insight into some of the larger questions surrounding mixed perennial grain crops.

The National Agricultural Lands Study Final Report

Steve Burr

From 1967 to 1975, roughly 23.4 million acres of agricultural land was converted to non-farm uses. The land was paved over, subdivided and built on, and permanently flooded by water projects. That's over 36,500 square miles of the United States' agricultural land base irreversibly altered, and the trend continues at the rate of 3,000,000 acres a year.

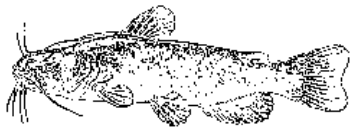
In June, 1979, the U.S. Department of Agriculture and the President's Council on Environmental Quality embarked on a study of the availability of the nation's agricultural lands, the extent and causes of their conversion, and ways in which these lands might be retained for agricultural purposes. The product of their joint effort is the National Agricultural Lands Study, a combination of interim reports and final assessments of data gathered over an eighteen month period and summarized in the Final Report. A citizens' action guide will also be available in the next couple of months.

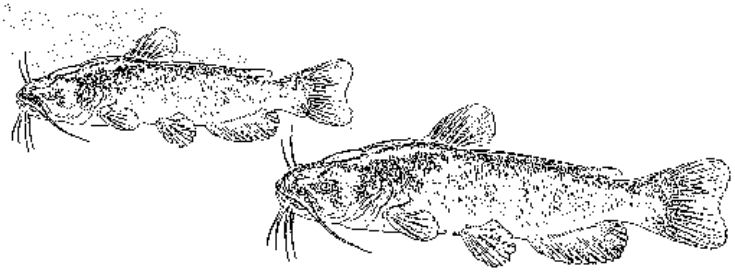
The study provides background information on the U. S. agricultural land base, discusses regional perspectives of land conversion and describes competition for agricultural lands. It reviews current efforts to protect farm land and makes some recommendations for action. The recommendations emphasize the primary role of states and local governments, and the supporting roles which can be played by federal agencies. The report recommends that federal policies which encourage conversion of agricultural land to other uses, through direct or indirect subsidies, be modified, and positive incentives be designed to encourage development away from good agricultural land.

Copies of the Final Report and other National Agricultural Lands Study materials can be obtained from Mr. Howard Tankersley, Chief, Land Use Staff, U.S.D.A. Soil Conservation Service, Room 6117, South Building, Washington D.C. 20250.

Experiments in Aquaculture

Ed Newman





During the spring semester, I worked on two aquaculture projects at The Land. My objectives were (1)to illustrate another way to provide food as part of a diversified food raising system, (2) to develop systems using already available materials with as little additional cost as possible, (3)to see how many fish these systems could sustain and allow to grow.

The Barrel System

There are many 55 gallon drums sitting idle in this country. Unfortunately, many contain highly toxic materials which could be released into the environment, a problem not soon to be resolved. Yet many other barrels are used for bulk food items, alcohol and other products that can be cleaned out and used safely for raising fish. I've read about people who have used 55 gallon drums to grow fish and were successful, but these accounts did not contain many details. These drums have also been used as containers for biofilters and may even be usable as settling tanks for an aquaculture system.

Two 55 gallon barrels became holding tanks for fish in my first project. Before I had the system completely thought out, a local farmer offered me free bullhead catfish from a drained pond. The fish which I caught from a puddle were already in a stressed condition from limited oxygen supply, overcrowding, and high water temperature. I brought them back to The Land and immediately put 50-75 fish, ranging from two to seven inches in length, into each barrel. The next morning I attached a 4.3 watt aerator, much needed by the fish who were gulping at the surface.

Problems with this system compounded immediately due to inadequate preparation before stocking the fish. The system was too small to absorb the increase in decomposition of organic material the introduced food scraps caused, and to a lesser extent the fecal matter from the catfish. This caused the accumulating sediments in the bottom to anaerobically decompose. Bullheads normally dwell at the bottom of where they live, in this case the bottom third of the barrel. The oxygen level was too low to accommodate the fish, first at the lower depths of the barrel, and then throughout. I deduced this by the fact that the fish were again gulping at the surface. The light penetration of the water was also decreasing. After losing about fifteen fish, I reduced the number to thirty two between the two barrels.

My other mistake was transferring the bullheads from the water they were in to a colder temperature water (well water) than they were able to adjust to immediately. Some died that first day or two as a result. After that I put fresh water into the barrels and let it warm to air temperature, approximately twenty degrees Centigrade. My next transfer of fish was gradual, and the fish were easily able to adapt to the barrel water temperature.

It was necessary to again reduce the number of fish to fifteen in one barrel (2-4.5 inches) and ten (3-6 inch fish) in the other. This stabilized the oxygen demand, but as time passed, the water quality gradually worsened again. When the ammonia smell began to become easily detectable near the surface of the water, I diluted the tanks with fifteen gallons of fresh water. Then routinely, every two to four days, I siphoned five gallons of sediment off the bottom with a hose before it advanced too far in decomposition, and replaced the five gallons with fresh water. Still the load of suspended solids continued to increase, keeping light from penetrating more than about six inches. To save the system, I put a clamped hose at the bottom of the barrel to more easily suck out the sediments without dispersing them into the upper layers of the drum.

Dilution of the barrel system defeats the purpose of using the barrels as thermal mass in winter for heating the airspace in the solar green house. But without a filter or settling tank, the capacity of the drums to support fish is limited and may turn out to involve more maintenance than it is worth giving. But if I had time to experiment more with barrel aquaculture in the greenhouse, I think I might develop a viable system.

Possible Future Improvements

A biofilter and/or a settling tank could be applied to the barrel system to sustain favorable water conditions for the fish. Water quality testing would be of great help, although testing equipment is fairly expensive. But with the aid of water tests, measures could be taken to improve the conditions of the water more precisely.

Another improvement could be a trickle biofilter system attached to the barrels and pumped into a hydroponic trough angled to drain back into the fish barrels. Plant roots would be submerged into the trough to further denitrify the water after the trickle biofilter. Another helpful device would be one to keep solids suspended in the barrels to lessen the likelihood of anerobic decomposition. The electricity to run this device and the aerator could come from the battery bank outside the greenhouse which is charged by the Jacobs wind generator.

That Dammed Stream

My second aquaculture system, in a stream by the south border of The Land, has been much more successful than the barrels, primarily due to natural forces having more of a hand in maintaining it than I. I wanted to stock fish in the already-made pools behind the two beaver dams upstream, but they weren't on The Land's property. So I built my own beaver dam out of sticks and mud, readily available materials. After I completed the dam, the beavers placed more mud on one side of it. They also chewed down some of the trees around the filled channel and used them to build their dam higher since some water backed up on it. My dam was approximately two feet high and six feet wide with a seventy to eighty feet long channel.

In addition to the five hundred yellow and black bullheads, I also put a few bullfrogs and green sunfish into the pond. Stone Rollers and crayfish were present in the creek already.

The flora and fauna already in the stream provided food for the fish. They might need supplemental feed to grow more quickly however. Leo Pachner in "Taking Stock of Your Fish," (Living Alternatives, June, 1981) stresses the importance of supplemental feed beyond what a natural of semi-natural water containment can provide. He says this would augment the growth of the fish considerably.

Although care should be taken not to overburden the channel with too much uneaten decomposing food, a trickle of water constantly recharges the channel and oxygenization and denitrification will probably not be a problem.

I regret not being able to follow up on these aquaculture projects. The semester was over too soon. However, future students can learn from my mistakes and perhaps continue experimenting with aquaculture at The Land.

Building a Solar Growing Frame

Maka Grogard and Fred Vogler

At the beginning of each semester, Land students look around the property and go through a list of potential projects they can do. Often finishing projects started in previous semesters is given high priority. As all Land students probably discover at one time or another, projects take longer than expected due to variable weather conditions, visitors, delays in obtaining materials, and mistakes. One such unfinished project was started a year ago by a student who left in mid-semester. The student was interested in building a Solar Growing Frame and got as far as digging the hole. Located on a prominent part of the property, this four feet by eight feet hole seemed to beg for completion.

As soon as we decided that this would be our project, we began studying the planbook called Rodale's Solar Growing Frame. The first part of the book tells how the frame works and how to use it successfully, and the second part gives explicit, step by step instructions with illustrations and photos and blueprints, on how to build it.

Gathering materials was our first task. Since cost was an important factor, and because we wanted to do as much of the job ourselves as possible, we spent a lot of time on on the phone checking prices before buying anything. We finally decided to use reclaimed 2" X 8" lumber ripped to size to reduce our cost. A local concrete company donated half of the 6" concrete blocks we needed, and those we purchased were seconds. We bought the hardware from a local store and ordered the glazing through an alternative energy shop. It was shipped from an Eastern company and took longer to arrive than we expected.

The construction phase was the most time-consuming, but it was here that we learned the most. First we prepared all the wood. Some of the wood we ripped was termite ridden and had to be discarded, but most was usable. After cutting it to size, we applied two coats of Olympic Wood Preservative for protection from moisture and rotting.

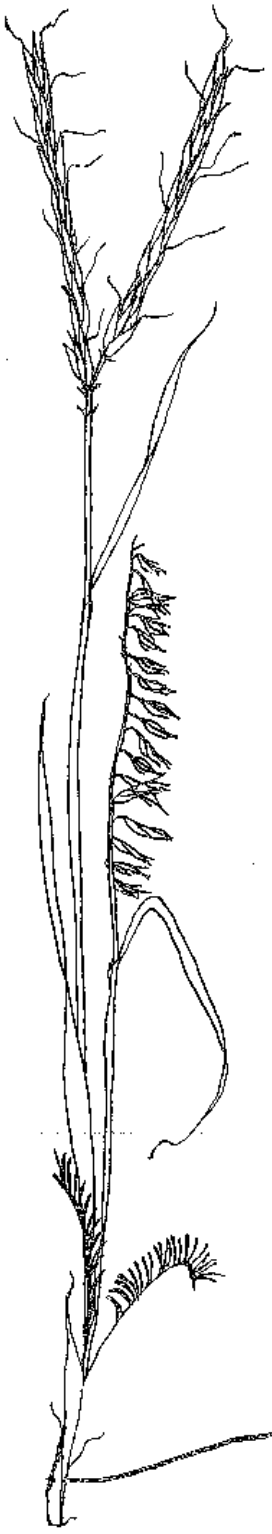
Next came the foundation. After leveling out a five inch bed of gravel for better drainage, we started to lay the concrete blocks. The Rodale Planbook recommends that unskilled people not undertake a standard block and mortar foundation, but we did. Instead, it suggests a relatively simple, but more expensive, method that basically consists of putting up the blocks and then slapping a layer of special cement on both sides of the wall. It is a self-bonding cement and doesn't require advanced knowledge of squares, levels, and different cement mixtures. Unless one is extremely adventurous and doesn't mind a little frustration, it is best to stick to their

(CONTINUED ON PG. 22)

A Sense of Place

A Celebration of Prairie Diversity

Dwight Platt



If man were to design a prairie, he might begin by designing one "best" grass with which to construct it. Yet nature, in its design, includes many species of grass in one prairie grassland. This evening we want to examine and to celebrate this natural prairie diversity.

Diversity is a continuum from monotony, a system with all elements the same, to extreme diversity, where each element is different. Diversity is complex with different components or measures of position along this continuum. One component is variety--the number of kinds; another is equitability--the evenness of abundance of the various kinds. Two plots of prairie each with fifty species of grasses have equal variety of grasses. But they may differ in equitability; a plot with sixty percent of the grass plants of one species is less diverse than another with no more than ten percent of any one grass species.

It may seem visionary to celebrate prairie diversity. For to many European settlers first looking over the rolling prairie stretching to the horizon, the landscape appeared monotonous. Literature about the prairie has many references to drabness and monotony. But some observers of the prairie have recorded impressions of its diversity, including the following:

> The tallgrass prairie dazzles the eye with an unending array of blooming plants, and this spectacle, with some seventeen new species coming into bloom each week, lasts from March until October (Duncan, 1978).

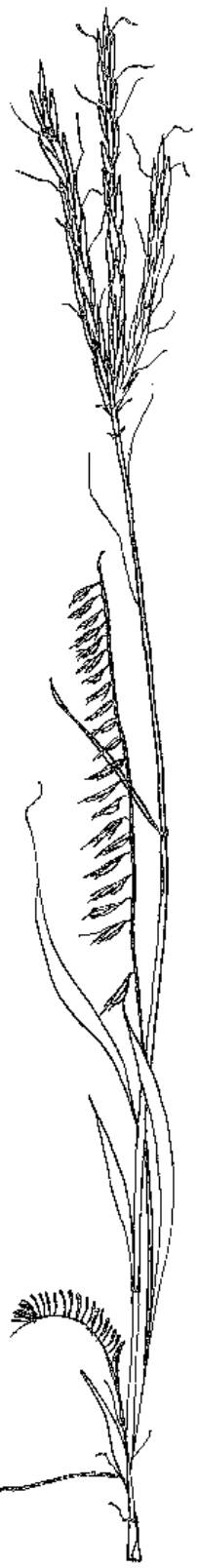
> The black prairie (soil) was built by the prairie plants, a hundred distinctive species of grasses, herbs and shrubs; by the prairie fungi, insects, and bacteria; by the prairie mammals and birds, all interlocked in one humming community of cooperations and competitions, one biota (Leopold, 1970).

Our celebration may also seem out of place because the biological diversity of the prairie is only moderate. Wind pollination, the reproductive strategy of the dominant prairie plants, grasses, would not work if prairie had the diversity of a tropical jungle.

But the diversity of the prairie seems worthy of celebration because it is so different from the familiar managed grasslands--agricultural fields. Our technological and cultural systems have produced simplified, orderly systems; nature, with the evolutionary tendency of life to diversify, stands in sharp contrast.

There are many dimensions of prairie diversity. Diversity is evident in horizontal space at various scales of observation. Looking across the prairie from horizon to horizon one often gets an impression of monotony. But if we expand this vision to a larger scale, viewing in our minds the whole mid-continent grassland from Canada to Texas and Colorado to Ohio, we note obvious variation in the prairie community caused by gradients in the physical environment: from south to north, gradients in temperature and length of the growing season; and from east to west, a gradient in moisture availability. Changes in the plant community are so obvious that ecologists divide the grassland into tall-

(text of Prairie Festival address)



grass, midgrass and shortgrass prairie. In addition to this, easily observed species (like little bluestem) range throughout much of the prairie (McMillan, 1959).

At a moderate scale of horizontal space, we observe topographic diversity. The landscape rolls and prairie plants and animals change in relation to topographic change. In contrast, a wheatfield may be rolling, but wheat grows on the uplands, on the slopes and on the lowlands. At a smaller scale, a few square meters of prairie, there is a mosaic of many different species fitted together in spatially changing microenvironments.

A second dimension of diversity is layering in vertical space. Above ground are the green or producer layers--the photosynthetic region in which all energy for the prairie is captured. This is a series of layers because light, temperature, humidity and wind vary from the top of the vegetation to the ground surface; some plants and animals are restricted to specific layers. Below the producer layers are the decomposer layers in the soil, where recycling of matter occurs in the prairie.

Third is time-related diversity. Different species share the same space at different times. The prairie community fluctuates in composition as the climate changes from year to year. The prairie changes from spring to summer to autumn; seasonal communities succeed one another. A period of active growth in prairie plants is often followed by reproduction and then dormancy; then other species take over. And there are daily periodicities. The prairie during the day is different from the prairie at night.

A fourth dimension of diversity is in ecological function, as each species fits its own unique niche. This is the diversity of the food web and of other interrelations among species. This diversity is limited by the limits of the trophic system--the number of species that can be supported by the flow of energy and matter in the ecosystem.

Thus by differentiation in space, in time and in function, many different forms of life share the landscape we call prairie. The lesson to be learned from exploring prairie diversity is that there is no one best grass, no one best forb, no one best beetle, no one best grasshopper. There are many designs, each good in a particular context--the niche it fills in the prairie. Man often judges the "best" by short term analysis of limited simple parts of a system; nature works through the ebb and flow of life over long time spans within the holistic life system.

Kenneth Watt (1972) discussed the values of diversity and the trends toward simplicity in our modern world. He maintained that diversity promotes stability, diversity is insurance against risk, diversity promotes more efficient capture and use of energy, and diversity promotes human psychological well-being. The first three of these values were probably significant in the evolution of diversity in the prairie ecosystem.

A positive relation between diversity and stability is often quoted as a basic maxim of ecology, but in the ecological literature there is much controversy and contradictory evidence on this relation. Much of the controversy results from the confusing use of the terms diversity and stability for a number of concepts. In my opinion, greater diversity per se may or may not add to sta-

bility; however, simplification of successful diverse systems usually results in decreased stability, especially when stability is defined as the long term sustainability of the system. Conversely, the most diverse community may not result from conditions of maximum stability. A moderate degree of disturbance may result in a more diverse community, e.g., a prairie periodically disturbed by fire.

The variety component of diversity is more important than equitability to the long term sustainability of a prairie community. A rare species no longer is present. As a prairie fluctuates from moist to dry years, the numbers of various species and the equitability of the system at any one time are not important. The presence of species with adaptations to various moisture levels is important.

Diversity of options insures against calamity. A predator with many potential foods insures against the risk of food scarcity. But there is a tradeoff because maintaining options lessens the opportunity for the species to specialize and become efficient.

An ecosystem composed of specialized species with narrow food niches can be more diverse than one with generalized species; because species must reduce competition for resources to coexist in the same ecosystem. On the other hand, there is less risk of overpopulation of a component species disrupting an ecosystem if there is a diversity or redundancy of population control mechanisms, e.g., a number of potential predators on a prey population. Successful species generally evolve some compromise between diversity of options and specialization; for ecosystems this means some compromise between diversity of population regulatory mechanisms and specialization of niches.

In a simple ecosystem, like a field of winter wheat, solar energy is captured efficiently when photosynthesis of wheat reaches its peak; no

Iralee Barnard, DWIGHT PLATT, and Dana Jackson listen intently to Gus Speth during the Sunday morning session at the Prairie Festival.

"...there is no one best grass, no one best forb, no one best beetle, no one best grasshopper."

energy capture occurs from June to October when the plowed field is bare. One grass, wheat, grows in all microenvironments, those where it grows well and those where it grows more poorly. In a diverse ecosystem like the prairie, some kinds of plants are actively photosynthesizing throughout the growing season, and each microenvironment has plants that grow well. Eugene Odum (1975), in comparing natural ecosystems and agricultural ecosystems, pointed out:

> The real difference in these two classes of systems is in the distribution of the energy flow...; man works to channel as much energy as possible into food he can immediately use, while nature tends to distribute the products and to store energy as a "hedge" against bad times in... "a strategy of diversification for survival.

The fourth value of diversity suggested by Watt, human psychological well-being, is beyond the scope of this discussion. However it is certainly an important reason for attempting to preserve some of the diversity of the prairie.

Tonight we celebrate the diversity of the prairie. We also want to celebrate the people and institutions, such as Wes and Dana Jackson and The Land Institute, who are attempting to use natural ecosystems such as the prairie to develop models that will provide a sustainable future for the human species.

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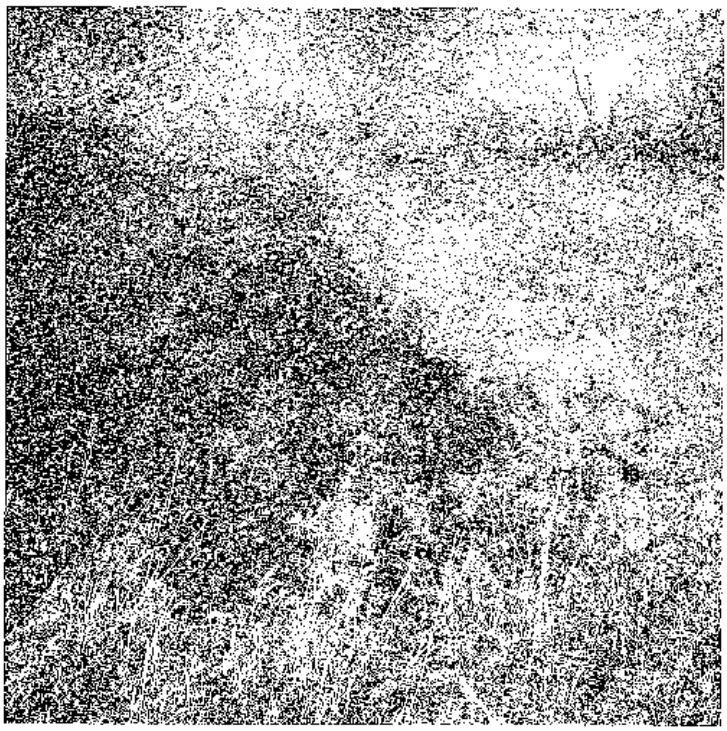


A Prairie Burn

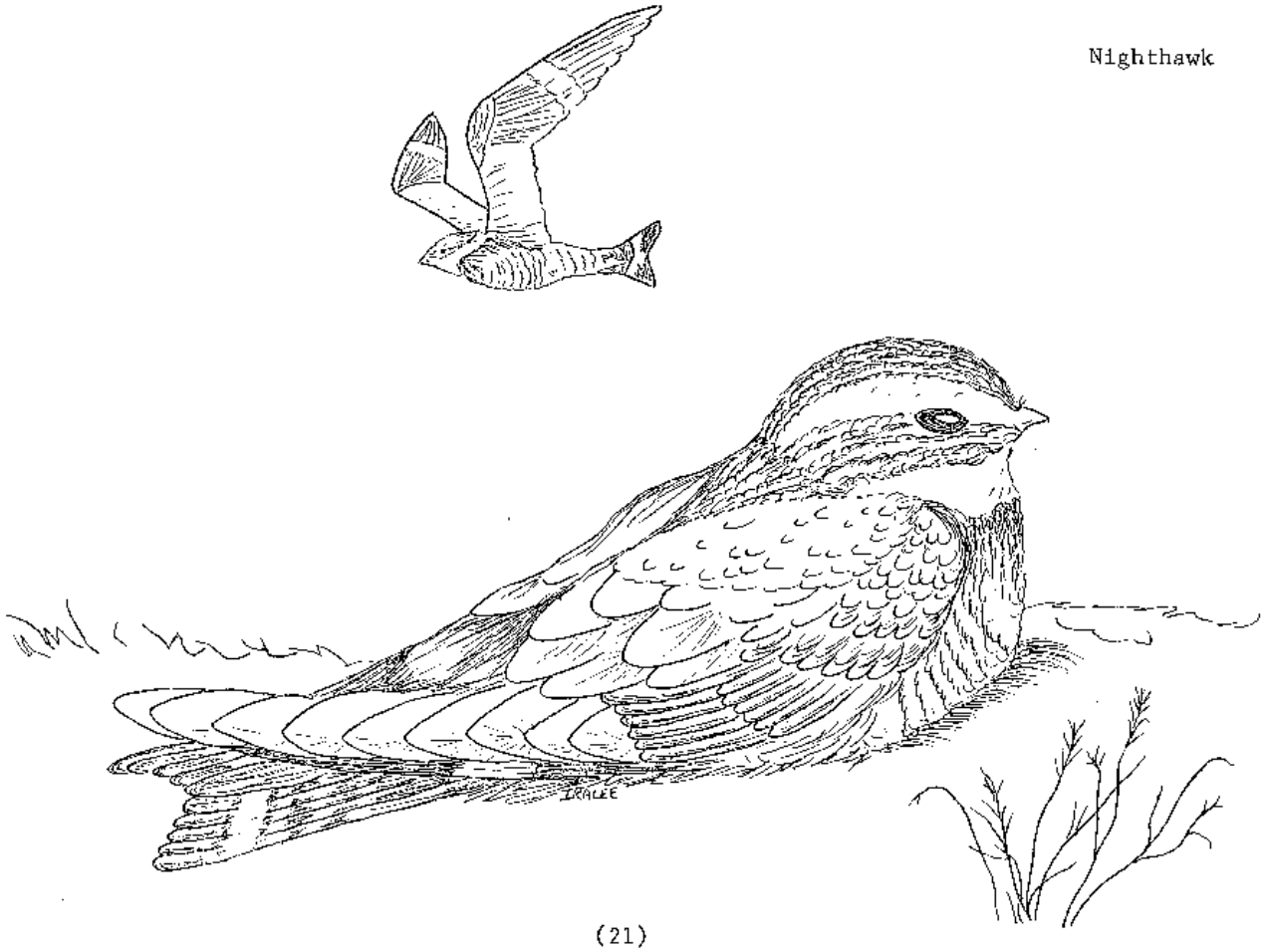
Maka Grogard

Red flames strike,
dancing, ripping through prairie thicket;
Singeing, soaring,
The line of fire spreads quickly;

Billowing, encompassing clouds of white,
gray, brown and black rise in the air...
Intimidating hues on an open canvas.
Engulfment ensues, recedes, then
envelopes again with dynamic resurgence.

Destruction begins,
sumac, bushbrush, hedgeapple falter
under the intensity,
Wild animals with wild looks flee,
Understanding fear but not reason.

Quelched finally in its barrage, this fire
will lead to replenishment,
a rebirth,
and balance on the prairie.



Nighthawk

(SOLAR GROWING FRAME, continued from pg. 17)

By Maka Grogard and Fred Vogler

method. We discovered that laying a block foundation on sand is not as easy as it sounds. While waiting for the wall to cure, we put in the anchor bolts and then installed 1½ inches of styrofoam insulation in the bottom and around the outside edges.

Assembling the frame was the most rewarding because we could finally begin to see ourselves progressing toward a finished product. The bracing and inner walls went together fairly well, but we discovered that we needed smaller nails for the older wood as the boards tended to split. Another 1½" insulation was fit between the studs, and with the sill plates in place on the foundation, the walls were ready to go up. Before putting on the outer skin, we put a row of flashing along the top of the sill plate to protect it from the weather. Then we painted. The inside must be white for better diffusion of light, but the outside can be any color and we used a brown. After filling the soil bed, we installed the insulating shutter (a 4' by 8' sheet of Thermax) and the doors. The last step was to weatherstrip the frame opening and caulk all the seams and glazing.

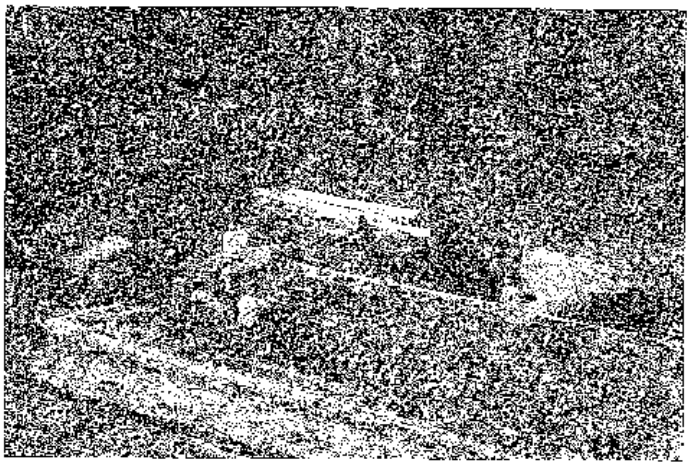
Preparation of the soil mixture going into the frame is very important for vigorous plant growth. Since low soil temperatures are expected during the winter growing season, the soil should be light and well-aerated to allow for proper drainage. Soil that is rich in nutrients and organic matter is important so the plants can stay healthy and ward off plant diseases. The Planbook recommends soil test kits to keep tabs on the pH. A good soil mixture would include one part topsoil, two parts compost or well-rotted leaf mold plus one part well-rotted horse manure. Sand or peat can also be added to lighten the soil and aid drainage.

Rodale recommends planting salad vegetables during the cold months for several reasons: (1) they produce leaves under relatively low energy conditions, (2) one eats almost everything the plant produces, so obtains a high yield, (3) salad plants are shallow rooted and don't grow so tall that they shade other plants, and (4) there are plenty of salad varieties to choose from that do well under cooler temperatures. Examples are varieties of Chinese cabbage, lettuce, spinach, kale, chickory, endive, parsley and Swiss chard. Plants that love heat, space, or produce roots should be avoided. Next fall and winter, Land students will be able to try many of these salad greens in the growing frame.

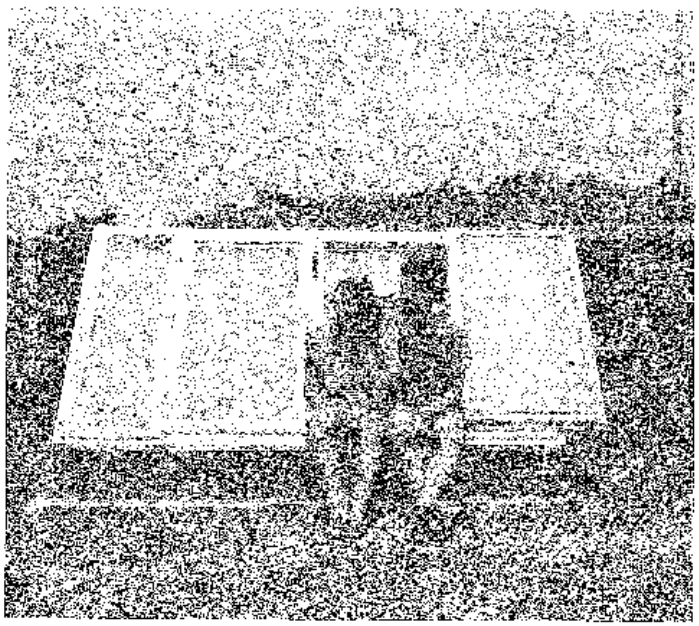
Building a well-insulated growing frame has many advantages over a greenhouse for homeowners. It is smaller, less expensive, and can be accomplished by two people with very basic carpentry skills in a relatively short amount of time. Rodale has estimated material costs for completion to be around $280. Our material costs ran around $360, and that included using reclaimed wood and buying all paint and preservatives on sale.

Rodale's Solar Growing Frame can be obtained from Rodale Press
Organic Park
Emmaus, Pa. 18049.

The Horticulture Department at Rodale's Organic Gardening and Farming Research Center has produced two reports relating to the use of the growing frame which we obtained. Before the students plant anything next fall, we are recommending that they read "Summary of Cool-Weather Crops Tested 1979-80 for Solar Structures," and "Design Elements in Solar Grow Frames and Horticultural Adaptations for their Winter Use." These can be obtained from the address given above.



Long days of hard work----



-- and project is completed!

Beginning Beekeeping

Annie Ronsse

The white hive box has intrigued several Land students this past school year. We have discovered the sport of "bee watching" and the pleasures of eating fresh comb honey. For a number of years before last fall, the beehive was kept in the south woods near the river. After the fire in 1976 and the ensuing demands of construction, the bees were left untended. When we opened the hive for a share of honey, we found an unorderly array of comb and most of the frames unmovable. This spring has been a time for us to renovate the hive equipment and for the bees to rebuild comb.

The hive was moved near to the classroom building in a small sumac thicket on the east edge of the woods. This is a good location as the bees will receive ample winter sun as well as shade through the hot summer afternoons. Having the hive so close to the classroom building has not been a hinderance. The sumac between the path and hive make it necessary for the bees to fly up high over the path in order to leave the hive and people on the path have little chance of being stung.

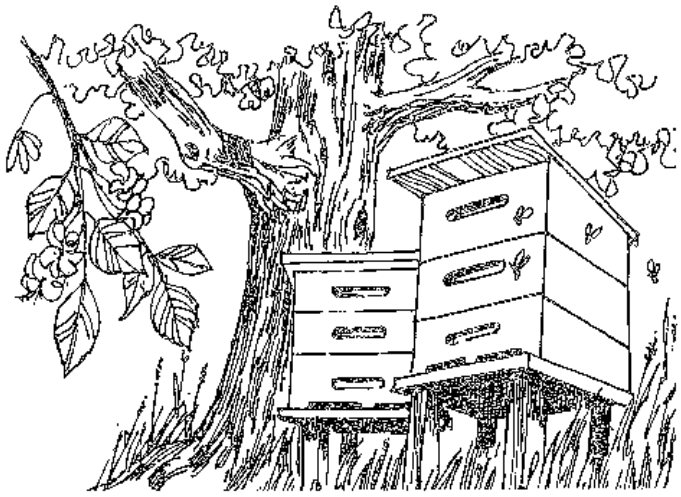
We took the opportunity with a slightly overcrowded hive to order a new queen and split the hive into two colonies. Most authorities agree that it is an advantage for the beginner to have two hives. For example, before winter a beekeeper can transfer brood or honey to the weaker hive in order to strengthen it. At the end of May, the two hives seemed to be thriving.

One of the great benefits of bees can be observed in the garden or the herbary, where honeybees play an important role in plant pollination. Having the hive closer to the garden and crops will in turn allow for better honey production as well as increased fruit production for the insect-pollinated crops.

Beekeeping in Kansas

Honeybees (Apis mellifera) were introduced into Kansas before 1828 near Kansas City. The number of colonies in Kansas peaked at approximately 100,000 in 1910 when the alfalfa acreage was also near its peak.[1] Most of Kansas' honey is produced in the eastern half of the state and the Garden City area. As of 1980, the Kansas State Board of Agriculture reported Kansas colonies numbering near 43,000 with an average of 50 lbs of honey production per hive.

With sufficient nectar and pollen plants in a locality, a knowledge of bee behavior, a hive box, and some basic beekeeping equipment, a person could be well on the way to supplying his or her own honey needs. The local library may be a good place to begin. Some practical books or bulletins about beekeeping include the following:



How to keep bees and sell Honey. Walter T. Kelley, Clarkson, Ky. Various eds.

ABC and XYZ of Bee Culture. A. I. Root Co., Medina, Ohio. Various eds.

First Lessons in Beekeeping. C. P. Dandant. American Bee Journal, Hamilton, Ill. Various eds.

The Hive and the Honey Bee. Roy Grout. American Bee Journal, Hamilton, Ill. (Rev. 1975)

Starting Right with Bees. A. I. Root Co., Medina, Ohio. Various eds.

[1] Bee Culture. N. Kauffeld and H. Knutson. Bulletin 357 revised, Agricultural Experiment Station, KSU Manhattan, KS. Feb. 1976

"Beekeeping in the United States." Agriculture Handbook No. 335, Superintendant of Documents, U.S. Gov. Printing Office, Wash. D.C. 20402. Price $2.15.

A Complete Guide to Beekeeping. Roger A. Morse. E.P. Dutton & Co., Inc. New York. 1972.

Beekeeping. J.E. Eckert and F.R. Shaw. Macmillian Co., New York. 1970.

The state apiary inspector for Kansas is Gary Ross (Division of Entomology, 901 Kansas Ave., Topeka, KS 66612, phone 913-296-3016). Besides administering the Kansas Apiary Inspection Act, he investigates pesticide damage to apiaries, and prov des information to the public. The inspector also offers educational seminars in various localities throughout the state.

The Langstroth 10-frame hive body is the standard hive box of most apiculturists. If not self-made or acquired from a present beekeeper, the hive boxes can be assembled from parts ordered from bee equipment manufacturers. A new beekeeper can obtain a list of bee equipment manufacturers and local dealers from the state apiary inspector.

Many times the advice of an experienced beekeeper can be helpful to the beginner. A way to locate beekeepers in Kansas is to contact the state or regional beekeeping associations.

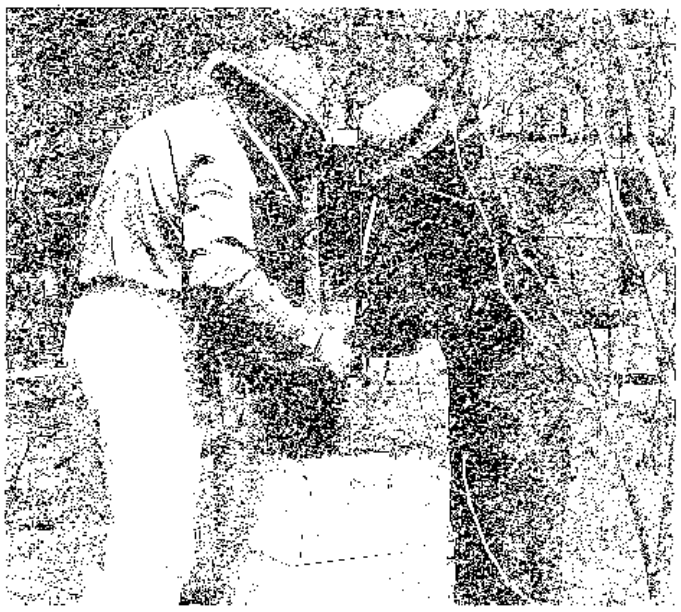
KANSAS BEEKEEPERS' ASSOCIATION
(Quarterly Newsletter)
Secretary: Duane Levin
Stuttgart, KS 67670

Regional Associations:

NORTHEASTERN KANSAS BEEKEEPERS' ASSOCIATION
Maynard K. Curtis
1861 North 32nd Street
Kansas City, KS 66104

FLINT HILLS BEEKEEPERS' ASSOCIATION
Karen Nicholson
Rt #1
Emporia, KS 66801

CENTRAL KANSAS BEEKEEPERS' ASSOCIATION
Nancy Reynolds
Box 363
Concordia, KS 66901



The Great Plains in Transition

Great Plains Project Begins New Phase

Dana Jackson

In 1979, we began thinking and writing about the Great Plains as a region in transition. Much of this area is arid, and agriculture is dependent upon mining the Ogallala Aquifer through center pivot irrigation. In some areas, groundwater levels are declining significantly, just as natural gas, fuel oil and electricity prices for pumping the water are rising, and irrigation is becoming too expensive for the farmer. But industry can afford to pump the water, even at lower levels. Will the Great Plains become an industrial area, using water from the Ogallala Aquifer and energy from the nearby Rocky Mountain coal and oil shale? Without irrigation, will the current cornfields and cattle feedlots become short grass prairie again, or desert?

We concluded in Land Report no. 9, Winter 1979: "Past developemnt has forced the land to meet the expectations of the people through the mining of water and soil. The future of the Great Plains is in jeopardy if we do not change the course of development and force a vision of a sustainable future based on humans meeting the expectations of the land rather than vice versa."

On November 1, 1979, 25 people met at The Land Institute for a one-day meeting to discuss how options promoting sustainability on the Great Plains might become a part of a regional consciousness. They made tentative plans for a major conference to be held in the fall of 1981. This was to be extensively publicized and involve a broad spectrum of Great Plains scholars, government officials and communities. Following the conference, a readable summary of the proceedings was to be widely distributed.

The Youth Project gave The Land a planning grant for the project. As we studied water and energy issues on the Great Plains and did more thinking about the conference, we realized that 1981 was too early. In the meantime, studies by the Army Corps of Engineers on the feasibility of transferring water from the Missouri, Arkansas and White Rivers to the Ogallala broadened our area of concern to include the Missouri River Basin. (See Land Reports 10 and 12) It became clear that it would be necessary to convene small gatherings or caucuses of people working on water and natural resource issues in the region prior to undertaking the large-scale conference we had first envisioned.

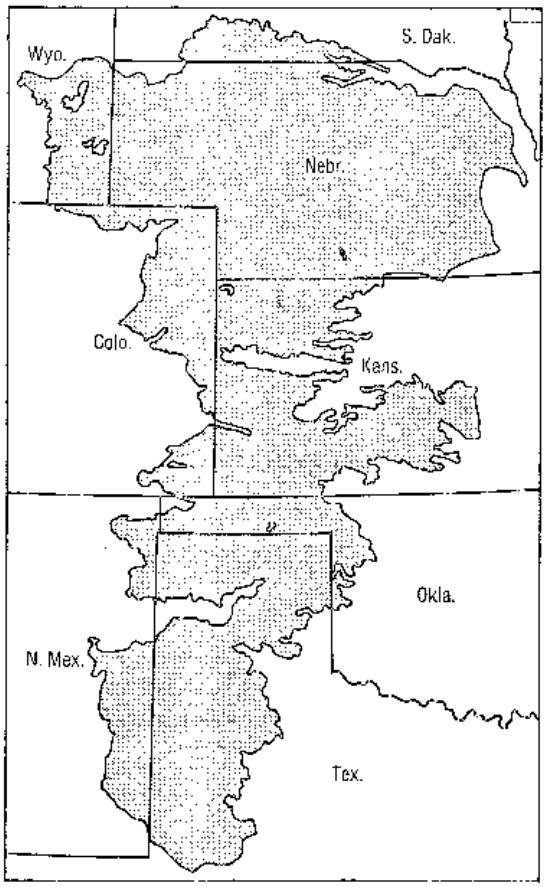
The first caucus was held at The Land Institute June 1 with about fifteen persons representing various organizations and foundations. Those attending were Steve Burr, Salina, Kansas, The Kansas Audubon Council and National Parks & Conservation Association; Don Pierce, Columbia, Missouri, Friends of the Earth Midwest; Ron Henricks, Lawrence, Kansas, consultant on regional energy issues; John Pratt, Minneapolis, Minnesota, The Youth Project; Wes Jackson, The Land Institute; John Simpson, Shawnee Mission, Kansas, The Land Board of Directors; Craig Kennedy, Chicago, Illinois, The Joyce Foundation; Gus Speth, Washington D.C., the Global 2000 perspective, Jeff Knight, San Francisco, California, Friends of the Earth; Karl Stauber, Toledo, Ohio, The Needmor Foundation; Rose McCullough, Lincoln Nebraska, Sierra Club; Marty

Strange, Walthill, Nebraska, Center for Rural Affairs; John Norton, Dickinson, North Dakota, Dakota Resources Council; Bob Warrick, Meadow Grove, Nebraska, Center for Rural Affairs, Mark Bigelow, Land student, took minutes.

Marty Strange chaired the meeting, and the group worked out a strategy for continuing the Great Plains in Transition Project. In order to develop a regional perspective on diverse issues and define interrelated issues, they decided to first inventory groups working in areas that would affect the development of a sustainable agriculture. This would include threats to agriculture through energy development, loss of prime agricultural land to urban and industrial use, and the further centralization of agricultural production, as well as efforts to develop alternatives through organic agriculture, new crops, and renewable energy technologies. There will be another caucus of individuals representing the groups and issues inventoried held in the fall.

The Joyce Foundation and the Youth Project have pledged funds for the next phase, which will be administered by the Center for Rural Affairs in Walthill, Nebraska. The Land Institute looks forward to working with a broad representation of concerned groups in the region towards a sustainable agriculture and culture.

The Ogallala Aquifer **



**Pg. 95, Desertification of the United States.

Desertification of the United States

by David Sheridan
Council on Environmental Quality, 1981
142 pages, 14 illustrations, 27 photographs

REVIEWED BY *Marty Bender*

Desertification of land in the arid West has received little attention and yet has far-ranging implications on the nation's food and energy supplies and environment. David Sheridan has synthesized the available scientific information on desertification in the U.S. into a very readable book with sufficient explanations of agricultural practices so that the layman can comprehend their significance.

Desertification is defined in the book as an impoverishment of ecosystems toward a more desertic condition and reduced biological productivity, as a result of human interaction. Its major symptoms are 1) declining groundwater tables, 2) salinization of topsoil and water, 3) reduction of surface waters, 4) unnaturally high soil erosion and 5) desolation of native vegetation. The existence of any one or more symptoms means that the arid area (defined as land that receives 20 inches or less precipitation per year) is undergoing desertification. The book contains good photographs of such symptoms as arroyo cutting, salinization, channels filled with silt, abandoned irrigated cropland, and the effect of wind erosion on overgrazed rangeland. There are informative illustrations showing the location of deserts, arid lands, areas of groundwater overdraft, and areas of desertification in the U. S.

Being familiar with the prevalence of rangeland plants that are indicators of overgrazing, I was not too surprised to see that the land between the Rockies and the 98th meridian (which lies west of Lincoln, Nebraska and Dallas, Texas) is considered to be experiencing moderate desertification, with western Texas and the Oklahoma Panhandle undergoing severe desertification.

The overall land area affected by desertification in the U. S. is surprisingly large. It has been estimated that in the arid West about 225 million acres (approximately ten percent of the U. S. land mass) have experienced severe or very severe desertification. Humans have stretched the capacity of natural resources in the arid West for short-term gains through overgrazing and the use of water.

Overgrazing has been the most potent desertification force in the U. S. in terms of total acreage affected. In many areas of the arid West, overgrazing plays a major role in soil loss by wind erosion. The author focuses on three areas that have been plagued by overgrazing due to federal policy. One is the fifteen million acre Navajo Agricultural Products Industry, and the other two are public rangelands managed by the U. S. Bureau of Land Management (BLM). There is

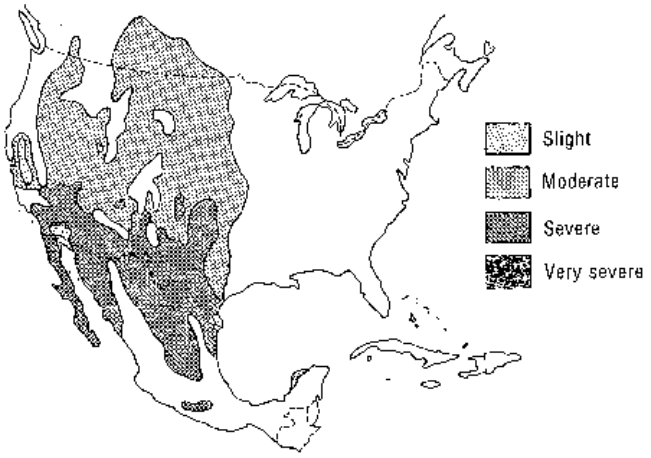
heavy overgrazing on the Navajo and other Indian reservations because Indians are among the poorest in the U.S. and must squeeze the land to make a living. Federal efforts to control grazing have met bitter opposition from livestock owners, as evident in the Sagebrush Rebellion, which seeks to turn BLM land over to the states in order to eliminate federal control of grazing.

It is my opinion that overgrazing will become more prevalent during the Reagan Administration, because the Secretary of the Interior, James Watt, wants to create a good neighbor policy for the BLM, and the appointed BLM head, Robert Burford, as speaker of the Colorado House two years ago, was a leader in a legislative effort to legitimize the Sagebrush Rebellion.

Humans have unsuccessfully dealt with the fundamental deficiency of the arid West, which is the scarcity of water, through the use of groundwater mining, dams, and water transfers. Irrigated agriculture has enabled the arid West to produce about twenty percent of the nation's total agricultural output, but at the expense of the region's soil, water, and vegetational resources. Sheridan examines many forces of desertification in five specific areas within the arid West: the Wellton-Mohawk Irrigation District in southwestern Arizona, California's San Joaquin Basin, the Santa Cruz and San Pedro Basins in south central Arizona, Crowley and Kiowa Counties in Colorado, and Gaines County in Texas. Large areas of the nation's most productive irrigated cropland in some of these places are suffering from salinization. Possible remedies could involve much political conflict or large amounts of capital and energy.

Sheridan notes that the federal government is subsidizing irrigated agriculture in the High Plains so that it is rapidly depleting the vast, but finite, supply of groundwater in the Ogallala Aquifer. Federal tax policy grants High Plains farmers a depletion allowance on pumped groundwater, a tax break similar to that which the oil

Status of Desertification in North America



industry enjoyed for many years, and which the mineral extraction industry currently enjoys. The more water the farmers consume, the less tax they have to pay. From this and other instances, Sheridan concludes that federal subsidies are a major force behind the desertification of the U.S.

Soil conservationists are concerned that rising energy costs and lowering water levels will lead to the abandonment of once-irrigated cropland, and it will become a prime source of dust storms and weeds. For example, in the Pecos River Basin, in Reeves County, Texas, higher natural gas prices on the intrastate market made the pumping of groundwater uneconomical, so that 190,000 acres of cultivated land has gone out of production with no one willing to pay the price of converting it back to rangeland.

In considering solutions to desertification, Sheridan defines four categories: 1) structural, high technology (dams, canals); 2) nonstructural, high technology (weather modification); 3) nonstructural, soft technology (water conservation); and 4) nontechnical, nonstructural (regulatory policies).

Sheridan believes that the USDA should devote more effort to soft technologies for irrigated agriculture, such as water conservation through devices which constantly monitor and supply the crops' moisture needs, or the genetic improvement of crop species by crossbreeding with their wild cousins to give them drought and salt resistance. It is for this reason that plant geneticists view with such alarm the continued destruction of wild plant species in arid areas by overgrazing and off-road vehicle use.

Sheridan concludes the book:

> "If the United States is, as it appears, well on its way toward overdrawing the arid land resources, then the policy choice is simply to pay now for the appropriate remedies or pay far more later, when productive benefits from arid land resources have been both realized and largely terminated."

1981 Grasslands Institute

Iralee Barnard

In the heart of Michener's Centennial country, eastern Colorado, a group of forty people met for a week in June to study the short grass prairie of the Pawnee National Grassland. Sponsored by the Denver Audubon Society and the University of Northern Colorado, the institute covered every aspect of the natural prairie ecosystem.

Outstanding leaders guided group sessions in history, art, dance, geology, archeology, range management, plants and grasses, birds and mammals, entomology and meteorology. Periodic field trips and an overnight sojourn to Twin Buttes gave the participants an intimate experience with the prairie grasslands. Visits with two local ranchers, mining representatives, and U.S. Forest Service rangers who manage the Pawnee Grassland brought out the land use issues of the area.

This is an annual institute with attendance limited. For information about the 1982 session, write the director, Ed Butterfield, 17410 East Nichols Place, Parker, Colorado 80134.

Prairie Camping

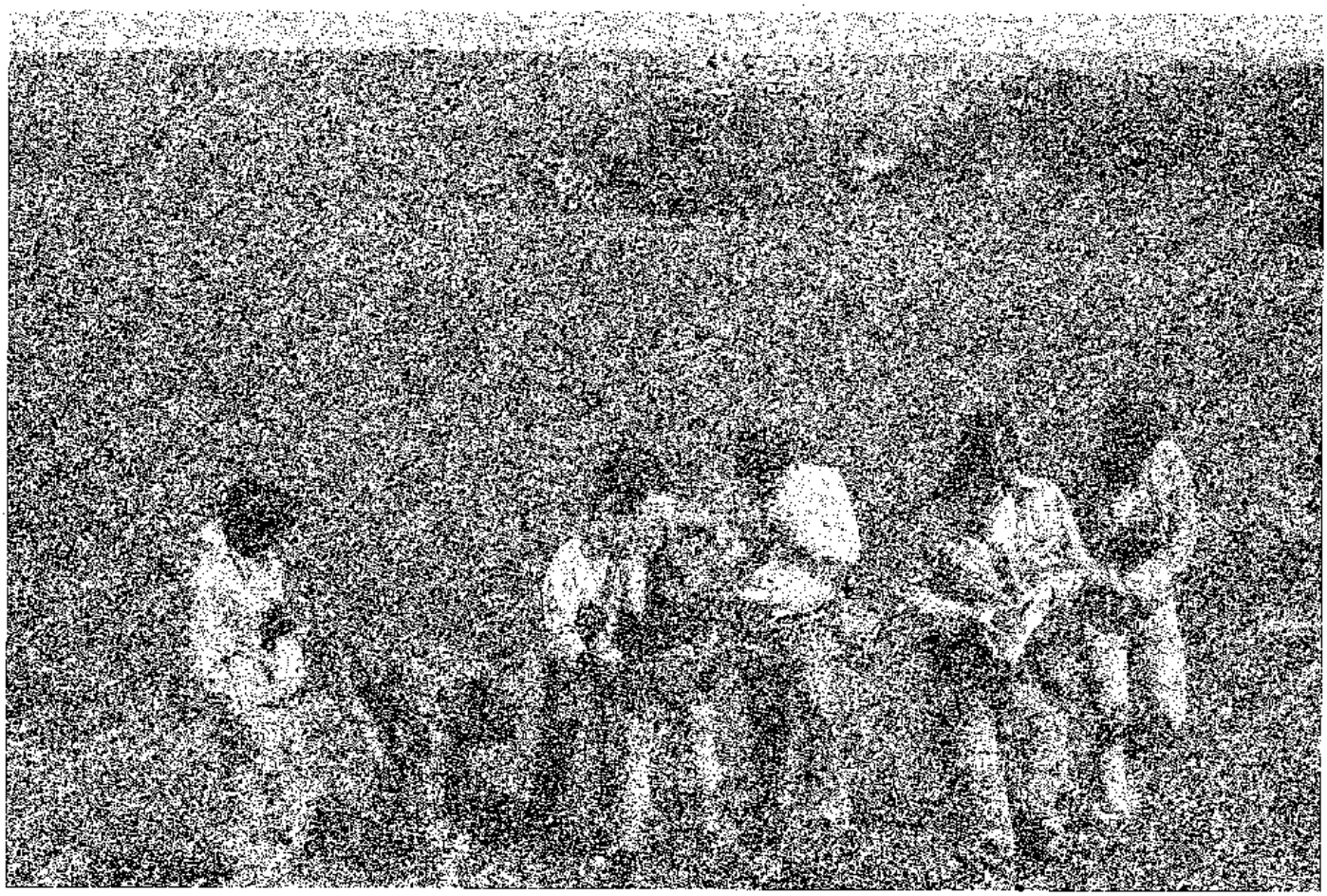
Dana Jackson

Dennis and Annie Ronsse coordinated a prairie ecology study for students at The Land during the first two weeks of May, which culminated in a short camping trip. After presentations on the geology, basic flora and fauna, paleontology, and general ecology of the prairie in the classroom, students were eager to experience the prairie.

The first stop on the trip was the Maxwell Game Preserve in McPherson County. Randy Clark of the Kansas Fish and Game Commission took everyone in his pickup truck to the middle of a buffalo herd. The buffalo were eating grass and ignoring the spring forbs all around them.

We camped on unfenced rangeland in the Flint Hills of Chase County by a clear, natural spring. Nighthawks and Upland Plovers were common sights. Yellow Evening Primrose and Beardtongue were showy in the midst of the short, young bluestem. In addition to birding and botanizing, the group studied the life of the stream and looked for fossils.

The trip home was by way of Hutchinson, Kansas, where we studied a sand prairie.



Transformations

Cici Pfingston Bigelow

Plans for the future seldom turn out as expected. As soon as I knew I was coming to The Land Institute, I figured that I would work in the greenhouse and probably build some kind of solar collector. In fact, I ended the semester doing neither of these. My project became the transformation of a shed, which had been used to store batteries, into a space suitable as an office. Actually, I started out to build a stove from a 55 gallon drum, then fixed up a place to put it.

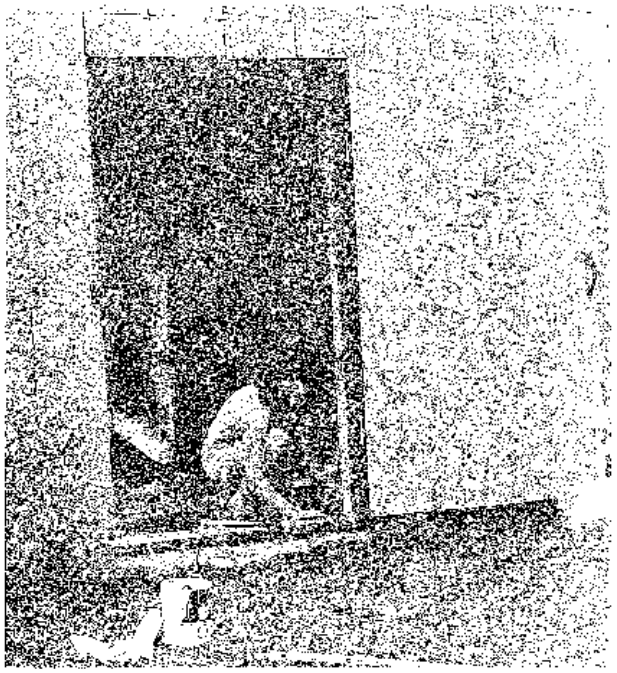
The first step in making the stove was to clean out a drum, and from all the drums stacked up next to the barn, I picked the one with gasoline in it. Ed Newman and I thoroughly washed the barrel, but then decided it should be burned out as well. For a wick we made about a twenty foot length of rolled newspapers and pushed it through a small opening in the top of the barrel. Ed was the brave soul who lit the wick, and we all ran (a few other students had gathered to watch the event) behind a small hill.

Instead of the drum going off like a rocket as we expected, we saw only a few flames and heard a barely audible "whoosh." But Ed and I were still wary, so we abandoned that drum and chose one which contained dried remnants of tomato sauce.

The stove went together fairly easily. The caste iron parts for the door, legs, and collar came in a kit from True Value Hardware for about $55.00. One of the most exciting days at the Land was when I learned how to use welding equipment to cut the openings for the door and flue. Realizing I could weld successfully gave me confidence to learn other traditionally male skills that I needed to complete my project, such as drilling in order to make screw holes. Besides the kit, I bought fireproof gasket rope to prevent air leakage and secured it between the door and drum, and between the collar and drum. Before the legs were screwed on, Ed and I formed three supports needed between the legs to make the stove more stable. These were made from the aluminum frames of sliding glass doors. The glass had been used to glaze solar collectors and the greenhouse in past semesters.

When the stove was essentially finished, Ed and I took it outdoors and lit a fire to burn out the traces of tomato paste left in the drum. I was very pleased to see that this modified drum was acting very much like a stove!

Since it was already known that the purpose of this stove would be to heat the former battery shed, and future office, only one question remained to be answered. Where should it be in the building? After dragging the stove around the floor of



the shed for awhile, I figured it used the least amount of space in the north-west corner. This decision was made with the knowledge that the stove had to be eighteen inches away from any burnable surface, the walls in this case. The platform the stove would sit on would also have to extend eighteen inches beyond the south and east surfaces of the stove.

After spending a few weeks' worth of afternoons on the stove, it took another five afternoons to make the platform. I made a wooden frame out of 2x4s, nailed it to the two walls, and proceeded to pour concrete about one inch deep in the rectangle. I laid brick in this area, using sand underneath the bricks to bring them level with the wood, and then filled in the cracks between the bricks with sand. I was having so much fun making the bricks fit in a semi-artful design that I forgot to use the level as frequently as I should have. The platform ended up with a nice little gopher-type hill in one corner. Luckily, it was easy to remove the raised bricks, and scoop out some sand.

After the stove was finished and on its platform, I began fixing up the battery shed. Some of the little jobs included repairing sheetrock and cracks in the concrete floor, painting the walls and ceiling, and building a door (not such a little job). I made the door from scrap wood, insulation, and hinges, and a purchased door latch.

One stage of the battery shed's transformation included its role as an art gallery for the 1981 Prairie Festival. Terry Evans supplied some of her beautiful prairie photographs, and together we hung them against freshly painted walls. It was delightful to see that little shed in such splendor!

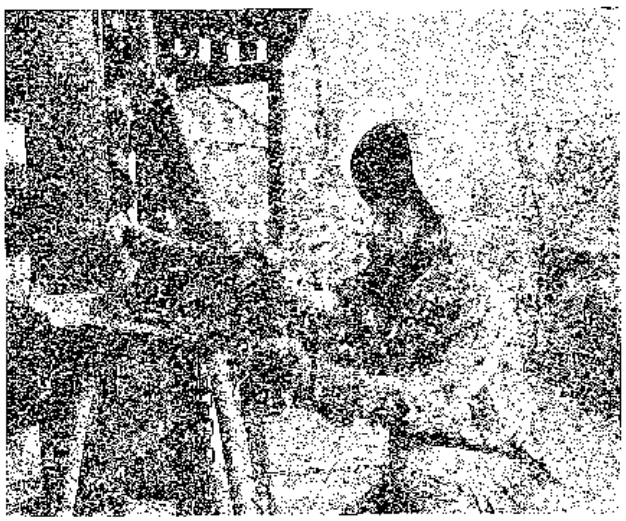
I feel great satisfaction seeing the formerly unused drum sitting as a stove in the small building, waiting for next winter to help provide warmth for whoever will use the office. I also get pleasure in opening and closing a door that used to be pieces of unused wood and insulation. This is when I find myself indulging in some pride, although these accomplishments are far from perfection. What I value the most are the skills and experience I've gained. I expect to apply them toward building a house of my own which will have the smallest impact possible on the Earth.

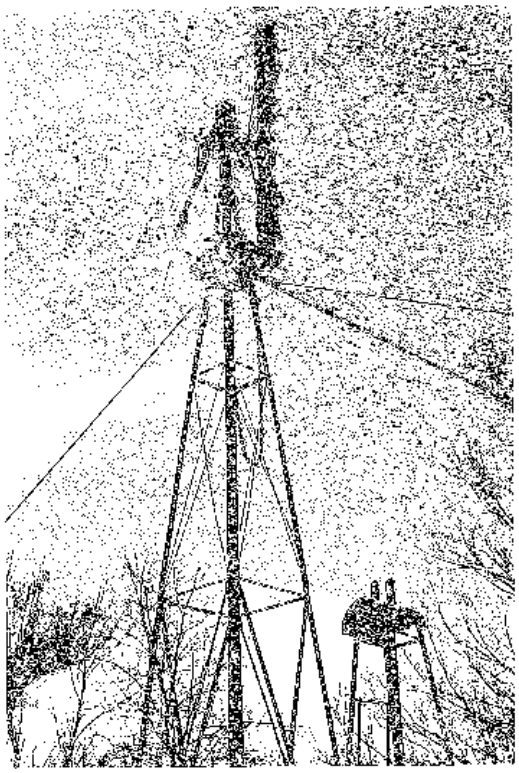
Wind-Powered Water

Dennis Ronsse

One of the continuing work projects this spring has been the revitalization of an old Aermotor Windmill. Earlier work on this machine was detailed in a Summer, 1978 Land Report article by Tom Moore. Since that time a powerful north wind brought the mill down to a convenient height for close inspection. The cost of this convenience was not small, as the tail, tower, and fan were contorted into asymmetrical shapes, unfit for existence above ground level.

The windmill, a "602" Aermotor with an eight foot fan, was manufactured between 1916 and 1933. This was one of the earliest windmills designed with a crankcase (oil bath) for lubrication of working parts. According to Lindsay Baker in an article in Ag History (January 1980) called "Turbine-type Windmills of the Great Plains and Midwest," Aermotor was also the first company to manufacture an all steel wheel, scientifically designed and tested by Thomas O. Perry for the U.S. Wind Engine and Pump Company. Though Aermotor has long been a favorite among ranchers for its ability to operate in a small breeze and provide forty years or more of service, there are other windmills of comparable quality. Of the multitude of old windmills around the country, I know of at least five brands which have replacement

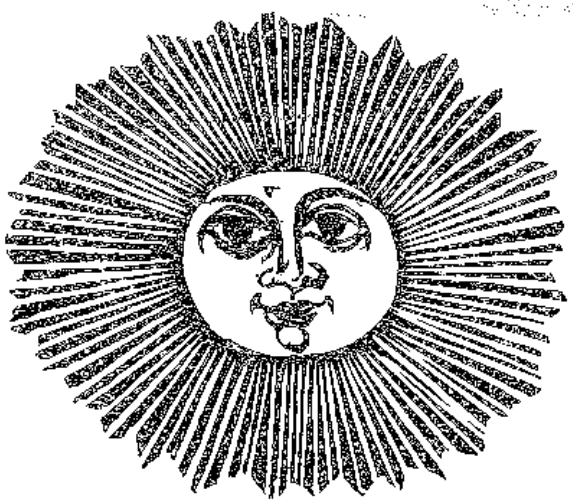




parts available to one extent or another: Dempster, Aermotor, Fairbury, Monitor, and Michler. The last mentioned is manufactured locally and gaining popularity.

Aermotor no longer manufactures parts specifically for the "602" model; however, many parts for the "702" (1933-1981) are interchangeable. I was fortunate enough to find another "602" containing some healthy spare parts, and with some swapping now have one gear box ready for pumping. The fan, after two attempts, is also ready for the wind. Being composed of six sections, the fan is nearly impossible to "true" if one (much less all six) of the sections is not shaped in the appropriate arc. Bent fan sections, for this reason, can often be purchased for nothing. However, with some patient work and luck a functional turbine can be reshaped. New eight foot fans are about $400.

Presently, the mill stands centered above the well with tower legs implanted in cement a and bolted to anchor pipe. Mike Brooks of Ellsworth donated a 2½" bore X 12' stroke well cylinder (pump), which is waiting to be put in water. A future project will be to locate a 3-way pump to operate in conjunction with the well cylinder. Our long range plan is to raise water to ground level where a 3-way pump will then push the water uphill to storage tanks near the "Indian House." From these tanks, one portable, the other stationary, agricultural research plots will receive "drip" irrigation. This setup will in part replace the present system of electric pump and sprinkler irrigation. Wind will displace the need of electricity, and drip irrigation will conserve water.



Out of Conviction

Dana Jackson

One strategy in the fight to halt nuclear power plant construction and get electric utilities to promote conservation and renewable energy sources is to purchase shares in an electric utility company and present stockholder proposals at the annual stockholders' meeting. The corporations cannot ignore them because the rules under the Security Exchange Act of 1934 make it possible for stockholders to have issues placed on a proxy ballot and to present their proposals in person at the annual meeting.

Anyone who decides to buy stock and submit a proposal should begin the process months before the company's annual meeting. The company must receive proposals ninety days in advance of sending out proxy statements. The annual meeting of Kansas Gas & Electric, the company building the Wolf Creek Nuclear Generating station near Burlington, Kansas, was set for May 27, 1981. Paul Rasch, a Land student, and two friends of The Land, Marge Streckfus and Ron Force, began acquainting themselves with the rules of the Security Exchange Commission and writing their proposals early in December, 1980.

Utilities are usually controlled by large banks and financial institutions who own thousands of shares of stock. The top five investors in Kansas Gas and Electric are New York investment companies: Merrill Lynch, Pierce, Fenner and Smith Inc. (920,159 shares); Dean Witter & Co., Inc. (620,889 shares); DRP Co., c/o Irving Trust Company (448,195 shares); Kidder, Peabody & Co. (382,956 shares); and E.F. Hutton & Co. (175,024 shares). Only one fourth of the nineteen largest investors are Kansas-based firms. Fourteenth on the list is the Kansas State University Endowment Association, with 49,300 shares.

Why would a person owning <u>one</u> share try to influence the decision making process of a utility, considering the impossibility of overruling management policy? The only purpose of a stockholder proposal is to bring certain company actions to the attention of the public and raise social and environmental issues. The whole process takes courage, dedication and perseverance.

Paul Rasch, Ron Force and Marge Streckfus each submitted a stockholder resolution to Kansas Gas and Electric Co. The latter two were co-sponsored by the Nazareth Convent and Academy Corporation of Concordia, Kansas (2,500 shares). Paul proposed that the board of directors and management officials of KG&E be asked to resign for reasons of poor fiscal management. He maintained that the large investment in nuclear power by a relatively small utility placed an enormous burden on it and created economic problems. Marge Streckfus, a Salina realtor, recommended that the construction of the Wolf Creek Nuclear Plant be stopped and gave reasons relating to safety and financial risk. Ron Force, a clinical and research psychologist, presented a resolution that the company should invest a significant portion of its capital to "encourage greater energy productivity through improved energy efficiencies and the development of renewable energy sources." He pointed out that a number of utilities already are following such policies as rate structures that reward conservation, accelerated load management programs, education programs informing consumers of conservation potential, and efforts to develop cogeneration and increasing energy efficiency in industry. (A prime example is Southern California Edison. On the cover of the 1981 stockholders' report, the company declared: "Your company made a major policy commitment in 1980 to the accelerated development of alternative and renewable energy sources.")

Paul's proposal was rejected by KG&E. He appealed to the Securities Exchange Commission, but they decided that under the rules KG&E could properly reject it. KG&E accepted the other two proposals and printed them on the proxy ballot. The rules require that proposals be no longer than two hundred words and supporting statements not over three hundred words. KG&E reproduced only one hundred eighteen of Ron's two hundred four words, and then proceeded in their opposing statement to respond to points in the material which was omitted!

Anne and Tom Moore of Lawrence, Kansas, submitted similar proposals last year. Marge and Ron were allowed to introduce them again because the Moore proposals had received at least three percent of the vote. In order for such proposals to be brought up again in 1982, they had to receive at least six percent of the vote in 1981. Marge's proposal to halt construction of Wolf Creek received 800,000 votes, or about 5.7% of stockholder votes. Ron's proposal to invest money in conservation and renewables received over a million votes, qualifying it for a hearing again next year.

The stockholders' meeting was very cut and dried in 1980. Knowing, of course, that the resolutions had already been defeated by proxy vote, KG&E gave the Moores the five minutes required by the rules to present their resolutions, then the vote was taken with no discussion before or after. This year the company did allow dis-

cussion, after the vote, and after a forty minute slide show promoting the company, but each person was permitted to speak only one time. The news media was confined to the back of the room during the meeting.

There were a few other people among the two hundred attending the annual stockholders' meeting who questioned the wisdom of starting Wolf Creek in the first place and wondered aloud if The Board of Directors were really competent businessmen, but for the most part the audience was pleased when the discussion section of the meeting came to a close.

The real audience for the presentations, however, was intended to be those watching that day's TV news or reading the newspapar. Following the meeting, newspaper and TV reporters questioned Ron, Marge and Paul, and they were able to give more data and discuss the reasons behind their proposals. Since they cound not cover the stockholder meeting well from the back of the room, most of the TV reporters used content from the news conference for their stories. It was clear on the evening news that these three were intelligent, well-informed people, genuinely concerned.

The Investor Responsibility Research Center, Inc., organized in 1972 to "provide impartial, timely information on the social and environmental questions raised in sharcholder resolutions proposed to major corporations," asked Paul, Marge & Ron to fill out questionaires relating to their stockholder resolutions. "What led you to propose your resolution? Did you operate as an individual or as part of an anti-nuclear alliance?" they asked. The following is Ron Force's reply.

> I have been a member of the Fellowship of Atomic Scientists and the Union of Concerned Scientists. I help support Sierra Club, Audubon Society, Costeau, Friends of the Earth, and The Land. I also belong to Salinans for Alternatives to Nuclear Energy, a group of some thirty members. I've been influenced by Quakers and belong to a Presbyterian Church. I read Science, Science News, etc.
>
> I favor life over death. I favor future generations over myopic profit-taking and to hell with the majority who will have slow leaks or all-at-once radiation, even though, by opinion polls, they don't want atomic power. Through energy productivity without risk, we can have all we need. Fission-derived heat is too big for our britches, and the act of children who, like sorcerers' apprentices, act on impulse before knowing a safe disposition of spent fuel. David Lilienthal, the first chairman of the United States Atomic Energy Commission, said, "Once a bright hope shared by all mankind, the rash proliferation of nuclear power has become the darkest cloud overhanging our country."
>
> I co-sponsored the resolution because the stones cry out for deflecting this error. Why are not many others speaking out? Do they understand? I went to a college which taught we don't have to be sheep and stand still while we are being shorn. I gave my presentation as an individual of my own responsibility and out of conviction.

Efforts to Lessen Heat Loss in the Greenhouse

Tom Mulcrone

The highest part of the greenhouse is the sloping glass ceiling. Much of the heat collected during the day is radiated at night by the active and passive rock storage, as well as the brick floor located inside. This inside heat rises and is exchanged with the cold night air through the ceiling glass. The interaction between two different temperatures passing through a medium is commonly identified as conduction. The colder and windier the outside air, the more that conduction will take place.

Since conduction is one of the largest problems in the greenhouse, we set out to lessen conduction in our spring semester project. The project had two parts: 1)to transfer the glass from aluminum frames to wooden frames, and 2)to build insulating shutters.

Before we began working on the greenhouse, fourteen single pane, aluminum-cased windows (patio doors) were laid on top of each other to form a ceiling of seven double panes. Sandwiched in between each double pane was a foam padding on the aluminum casing. Also, there was one double-paned patio door used. It was vacuum-sealed at the factory, and its dead air space between glazings is efficient in preventing conduction. But, since aluminum is a good conductor, the casing around the window lost heat to the outside. We slowed this conduction by encasing the windows in wood, a slower conducting material.

The seven double pane windows had the desired air gap between each pane of five eighths of an inch to three quarters of an inch. Since no moisture collected in that space, we knew that air passed in and out between the sandwiched foam padding connecting the aluminum casings. Without a tight seal and a dead air space, the double windows were losing heat through conduction.

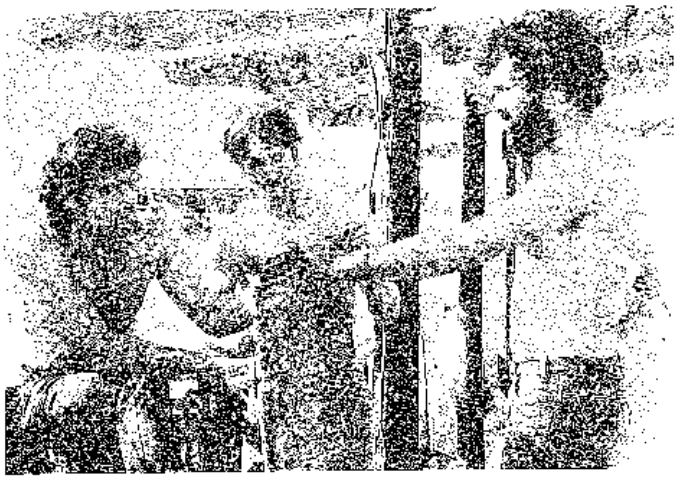
After taking the windows out of their aluminum casings, we placed pairs of window panes five eighths of an inch apart into grooved used rafter board, cut at desired lengths and widths. The boards received three coats of paint to help prevent air leakage (approximate life of paint, eight years). Then we placed six packets of silicon gel in the five eighths of an inch gap. These packets were to absorb the moisture already present in the air gap when sealing the exterior window frames. Lag bolts in the frame corners hold the double panes tightly together. Then we spread a bead of silicon caulk (approximate life of ten to fifteen years) along the glass and wood edges to seal moisture and air out of the inside glazing. Inserting silicon packets in the air space between window pane is commonly known here at The Land as the Ronsse-Mulcrone method. Earlier in the semester we

constructed a vertical, triple pane window for the shop in this manner. As of this writing, no moisture is visible between the panes, which means we achieved a tight seal.

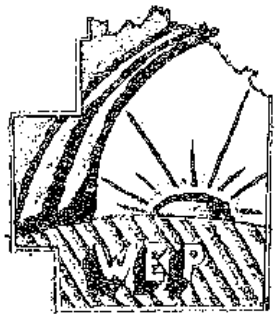
We were pleased when all seven double glazed windows for the greenhouse were completed and installed on the ceiling in the greenhouse. The next day, to our chagrin, six of the windows contained moisture. Moisture condensed on the seventh window two days later. After some feeble attempts to remove the moisture, none of which were successful, we finally, reluctantly, decided to pull out the bottom glass, remove the soaked silicon packets and make a single pane. A possible reason that moisture condensed inside the glazing was the use of old rafter wood as frames, which could not completely seal out moisture.

The second part of our project was to lessen the conduction of heat out of the greenhouse at night by the construction of shutters to cover the glass. The shutter we designed has a wooden frame similar to a picture frame, backed with plywood for strength so warping doesn't take place. Thermax insulation sets inside the frame, its silver side exposed to reflect additional sunlight into the greenhouse when it is raised. The shutters can be raised to various heights and secured, thus allowing as much light in as is desired.

We hope next year's students will replace the vertical aluminum framed windows with wood enclosures, and construct insulating shutters to cover them at night. A first hand education about heat conduction, glazing, seals and condensation awaits those whochoose improving the greenhouse as their project.



Tom Mulcrone, Paul Rasch and Mark Bigelow.



Investing in People

Diane Tegtmeier

The Wabaunsee Energy Project, after a year of data gathering and analysis, is experiencing the kind of community spirit and support we expected would result from people working together on a common problem. The Land Institute and the Mid-America Coalition for Energy Alternatives (MACEA), in our first county energy planning effort, emphasized involving citizens from all sectors of the community, and we are now certain that this is what is necessary for acceptance of the plan.

We've also begun to see that this involvement is nurturing a sense of community among the energy project workers that will help other local efforts as well. The project sponsored a workshop called "Energy Alternatives for the Home," which was given both in Alma and Eskridge. It featured a film on passive solar applications, talks by local energy innovators, and discussion with Lane Pierce from the solar office of the Kansas Energy Office. Many people helped promote the workshops. School children made posters, and adults wrote articles for newspapers and church bulletins and distributed leaflets in public places. The response exceeded expectations in both attendance and interest. Everyone found the presentations by local people about their experiences with solar applications the most interesting. Several people brought their own home designs and ideas to discuss with Lane. After the workshops were over, participants stayed to continue visiting and exchanging information. Those in the community who did not attend heard so much about the workshops in the following days that they were asking when the next ones would be held.

There was also good participation in another energy project activity. Eighty-three students from Wabaunsee and Mission Valley High Schools entered a contest to design a logo for the Wabaunsee Energy Project. Five judges, representing several towns in the county, had great difficulty choosing winners from many attractive, creative designs. Fred Beaver's winning logo, produced in Karen Schmidt's Wabaunsee High School art class, will be used in all project publications.

A good opportunity to gain support for our project arose when the Alma and Alta Vista Chambers of Commerce held a joint meeting. They announced the winners of the logo contest, and I made a presentation about the results of the energy project data and its impact on the business community. In the question/answer period following my talk, a man working for Kansas

Power and Light Company challenged my statements concerning money leaving the community in energy bills and gave examples of the good KP&L was doing for the community. That allowed me to explain that making it unnecessary to build more expensive power plants would help KP&L, and that the money sent out of the county wasn't available to keep local businesses going and people working. The active discussion, which included comments about saving some of the six million dollars in gasoline costs by shopping locally, helped me win approval for the project from the businessmen. Several rose with statements of support. One defended the credibility of the data by saying that it was not collected by me, but by citizens in the county. Had a number of these businessmen and women not been involved in the project, that support would not have been there.

Marty Strange, Director of the Center for Rural Affairs in Nebraska, stated recently that to work with and invest in people was risky business, but one he preferred to risky technologies. Our recent experience in Wabaunsee County confirmed that for Mari Peterson and me. We never knew how many people would come to the workshops, or whether more than one woman would ask, "Why are you picking on Wabaunsee County?" Sometimes things did not get done or took longer than we'd hoped. More disappointments will surely follow. However, in the published reports on county energy plans, it will be hard to chart the new friendships formed by people working together and using skills and talents they didn't know they had. People have found that they could gather data, explain energy technologies and organize community events. Investing in people in Wabaunsee County has already paid off.

Alternatives in Nutrition

Trash a la Mode

Maka Grogard

"Trash" is not a word with positive connotations; it invokes images of piles of scrap metal and heaps of plastics and paper being bulldozed into landfills. If questioned about trash, the mainstream of American society would probably have very little to say on the subject, except perhaps to direct the questioner to the nearest trash receptacle. A typical load of American family garbage contains 35% paper, 16% yard matter, 15% food, 10% each glass and metal, and 14% other materials. Although much of this material could be recycled, once it gets labeled "trash," it is then worthless material to be discarded. Although there are signs that attitudes are changing, we still live in a throw-away society, unable to relate to where and how products are produced and unconcerned about where they end up. But the purpose of this article is not to sermonize about how much Americans waste; it is to describe an activity called "trashing," the act of collecting trash.

My first introduction to trashing came when I was little. My brothers and neighborhood playmates would occasionally come across the garbage pile of a neighbor who was moving out of town. We were usually overjoyed at the prospect of going through their heap to find goodies to take home. Our mothers never seemed to share in the enthusiasm over our newfound treasures spread out all over the kitchen table, but this never stopped us from salvaging other people's garbage.

Later on, when we all hit the junior high scene, we began to look upon trashing, or even visiting the local thrift shop, as undignified and degrading. Heaven forbid if our friends were to see us digging through a trash can or entering the local Good Will shop. Everyone wanted new items from "nice" stores.

We we got older, we became more pragmatic. Comfort began to replace vanity and values changed. In college I became active in the campus recycling center, and thrift shops seemed to me downright fashionable places to buy clothes. Prime motivation at this time was more financial than ecological, but we did realize we were beginning to step outside the normal consumer route dictated through advertising.

When I came to The Land Institute, I found that the students were taking the salvage-recycling-trashing ethic to heart (and stomach) in a way most people never seriously consider. They were "trashing" the local grocery store dumpsters for discarded food and non-food items, often several times a week. This has turned out to be a practical way to supplement our diets while cutting food costs. Usually the quality is satisfactory, save for small imperfections in vegetables and fruits that are easily removed. Land students are not the only people trashing; we have met an elderly person on a fixed income, and there are probably others.

What items do we find? The following is a list of food items recovered during a typical winter week at a local dumpster.

6 quarts cottage cheese
6 quarts yogurt
2 lbs. potatoes
5 lbs. apples
1 lb. radishes
3 lbs. tomatoes
4 lbs. cauliflower
fresh parsley
12 loaves bread or bread-related items (rolls, biscuits)
10 onions
5 lbs. oranges
3 lbs. parsnips
1 lb. sweet potatoes
4 lbs. broccoli
1-2 green peppers

Sometimes we find large quantities of food. In two nights we carried away 500 pounds of bananas.

Due to dating policies, dairy products, such as yogurt and cottage cheese, are often on the shelf one day, and in the dumpster the next; however, they can still be used for five to seven days after the date stamped on the package. We have learned to make various casserole dishes based on cottage cheese, like lasagne.

Some grocery chains don't throw garbage outside, but keep indoor garbage disposal systems running. One student noticed an employee dumping thirty dozen eggs, two dozen at a time, down the disposal. From there the waste goes to the sewer, local water treatment plant, and finally to the Smoky Hill River. The student timidly asked to have the eggs and was refused. He finally convinced the employee that they would be used on a compost pile and was allowed to take them. We all enjoyed egg-based dishes that week. The eggs were not spoiled, just outdated.

Some wastage and spoilage in grocery stores is inevitable. But a percentage of this waste could be prevented if some laws were amended to allow food distribution centers (sometimes called food banks) to supervise and distribute food that would otherwise be thrown out to needy families.

We have often found non-food items worth taking home in the grocery store dumpster. Slightly damaged packages of pencils, crayons, paper plates, cups and napkins, aluminim foil, plastic bags, cleaning products and flashlight batteries were recovered. We even found five, 200 Amp fuses that were brand new and cost over $10 each if purchased in the store.

Land students frequently look for non-food items in residential trash. One group furnished most of their house, including kitchen utensils, from a residential trash haul. Even with the popularity of garage sales as a way of handling the spillover from affluence, people still throw away an amazing amount of "goods."

Trashing is not an alternative in waste management for the whole society. Trashing has taught Land students not only the need to search for sustainable alternatives in waste management, but the tremendous need to search for alternatives in resource management. Moving from a consumer society to a conserver society is the only long range solution.

(In photo at left, Maka sorts vegetables and fruits from the dumpster.)

Prairieland food cooperative

Paul Rasch

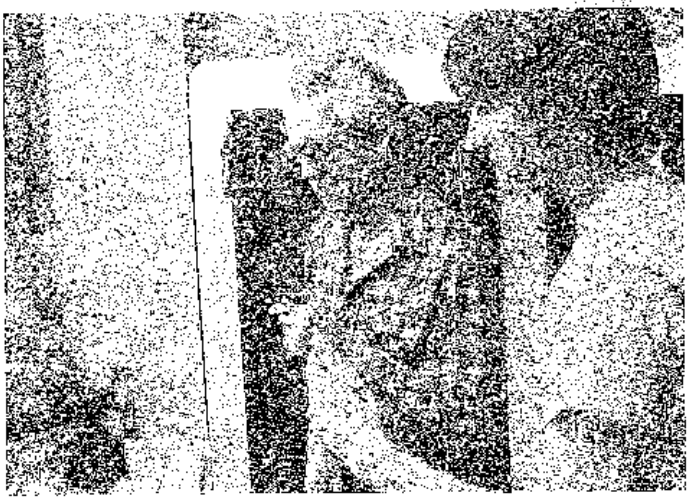
An important part of my experience at The Land has been the time spent as Saturday manager of the Prairieland Food Cooperative located at 707 Bishop Street. The storefront contains more than just good food at reasonable prices; for me, it has also been a warehouse of first-hand information on how people interact cooperatively. My experiences there have put me into close contact with individuals whose belief in the importance of the co-op alternative leads them far beyond the call of duty. Problems such as low cash flow, inadequate refrigeration equipment and the uncertainty of worker availability abound at Prairieland and at co-ops throughout the country, but some people keep working out the answers and make the co-ops possible.

This past year we improved the store by rearranging the stock and installing more efficient refrigeration equipment. We do need a walk-in cooler and are making plans to build one.

Prairieland has tried to be an educational influence in the community through conducting mini-seminars on health and energy alternatives. Members helped organize and run a healthy food booth at the Smoky Hill River Festival also.

The biggest problem at the co-op is getting the work load spread out among more people. Even the most dedicated members grow weary of continually taking most of the responsibility for management, and the danger is that when they decide to quit, no interested persons will be trained to take their places. This past year we revised the discount schedule to provide incentive for people to devote more hours to the co-op. Members who work two hours a month can receive a 15% discount; those working four hours can earn a 25% discount; and those working six hours or more can buy food at a 35% discount. This system hasn't been in operation long enough to adequately evaluate it.

I hope the Prairieland Food Cooperative will continue to exist, not only as an alternative to the supermarket and over-packaged, processed foods, but as an alternate business venture based on cooperation.



Paul Rasch explains herbs and spices to customer.

"Food is becoming more artificial simply because, in order to stay in business, manufacturers feel they must sell more and more complex, more and more inventive, more and more novel food items with a longer and longer shelf life, at greater and greater profits. It's the American way." (Joan Gussow, The Feeding Web, p. 124)

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 classroom/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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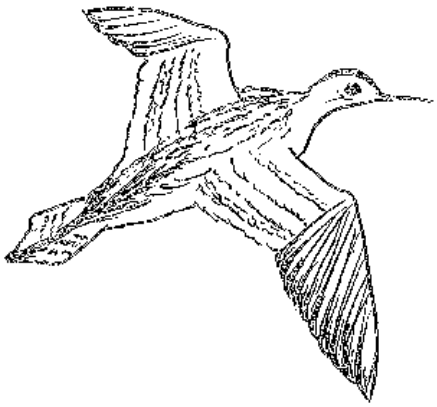
Fall Events

September 3	- First day for students
September 19	- Kansas Association of Biology Teachers meet at The Land
September 29	- Discussion Evening I - 7:30 P.M.
October 18	- Annual Visitors' Day Program 1:30 P.M.
October 27	- Discussion Evening II - 7:30 P.M.
November 21	- Environmental Political Action Workshop at The Land
November 24	- Discussion Evening III- 7:30 P.M.
December 18	- End of first semester for students

Three special discussion evenings have been scheduled for the fall semester. Each discussion will be based on a provocative paper or article relating to the ethics of certain environmental, energy, or agricultural issues. The specific papers have not been chosen, but they will be announced early in September.

The Land will mail an announcement of each discussion evening with a registration form to everyone on our Kansas mailing list. Persons who register and send the $5.00 fee will receive a copy of the paper to be discussed by return mail.

Anyone living outside of Kansas who would like to receive notices about the discussion evenings and other informal programs at The Land should write to Dana Jackson to be placed on the mailing list for that purpose.



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