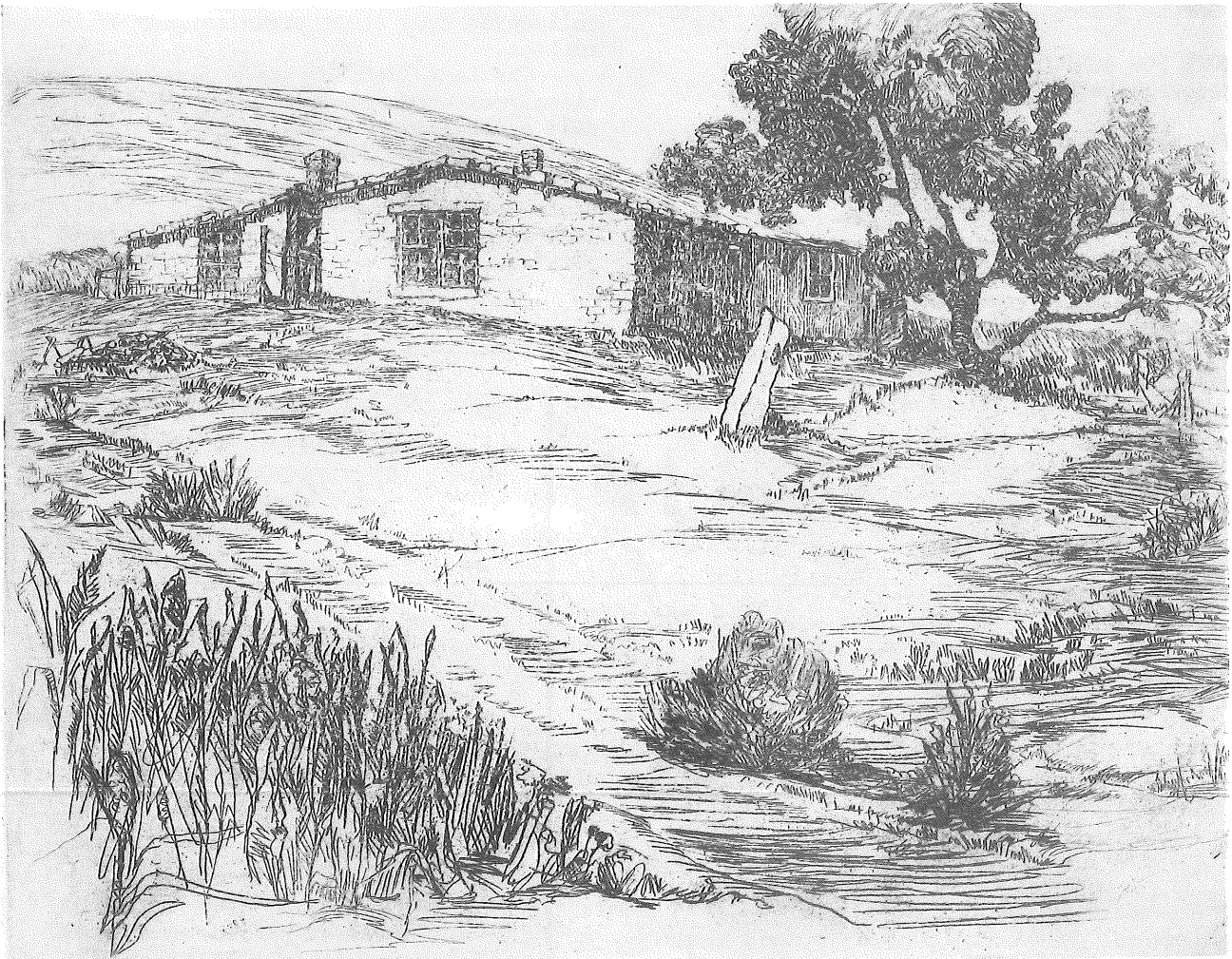

THE LAND REPORT

Spring 1988

Number 32



The Home of an Early Settler

John A. Harte



Getting Acquainted

Dana Jackson

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Number 32

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John Thelander took the large photographs and printed several of the small ones for this issue.

ON THE COVER

The print on the front cover was made from an etching by Clara Hatton. Several other prints by Clara are featured in the Prairie Images section on page 18-19.

In each spring issue of The Land Report, we introduce our new student interns. Since some staff changes inevitably occur, we also list staff members so readers can know who works here. Whether you have subscribed recently or have been on our mailing list for a long time, this issue will help you to become acquainted with the people at The Land in 1988.


We also would like to acquaint readers with the goals of The Land Institute, the work we do to further those goals, and the ideas which emerge to help us refine our goals and work. In this report from The Land, we tell not only what we do here, but what we think about and what ideas we consider and discuss. Most of the articles are written by interns, staff, members of our board of directors, or Friends of The Land. Some are written by former students, or colleagues from other organizations or institutions.

The Land Institute is a non-profit educational/research organization devoted to sustainable agriculture and good stewardship of the earth. This issue of The Land Report and the next two issues will tell readers how that statement of purpose is translated into intellectual and physical work by student interns and staff in 1988.

We hope you are pleased to make our acquaintance!

The Land Report

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THE LAND INSTITUTE IS A NON-PROFIT EDUCATIONAL-RESEARCH ORGANIZATION DEVOTED TO SUSTAINABLE AGRICULTURE AND GOOD STEWARDSHIP OF THE EARTH.

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At The Land

1988 INTERNS

Laura Benson: M.S., agronomy, Univ. of Minnesota, St. Paul.
Tom Clemetson: B.S., agricultural science, Rutgers Univ., New Brunswick, N.J.
Jennifer Delisle: B.A., geography, Univ. of Colorado, Boulder.
Karen Finley: B.A., biology, Colorado College, Colorado Springs.
Caton Gauthier: B.S., general agriculture, Univ. of Illinois, Champaign-Urbana.
Beth Gibans: B.S., natural resources, University of Michigan, Ann Arbor.
Douglas Towne: M.A., geography, Univ. of Arizona, Tucson.
Jake Vail: B.A., political science, Ohio State Univ., Columbus.



Jake, Caton, John, Tom, Jennifer, Karen and Laura enjoy noon volleyball.



Caton Gauthier, Tom Clemetson, Karen Finley and Doug Towne return from experimental plots.

PHOTO ON RIGHT - Jon Piper and Thom Leonard look for early spring plants on Wauhob Prairie.

AGRICULTURAL INTERN PROGRAM

The agricultural intern program runs from mid-February to mid-December. During the Spring and Fall, mornings are spent in the classroom and afternoons are used for physical work related to research, construction or maintenance. Research work dominates the summer session, but occasional field trips and seminars are scheduled.

This program is for college graduates or upper level undergraduates of any race, color, national or ethnic origin. For more information, write The Land or phone (913) 823-5376.

LAND INSTITUTE STAFF

Wes Jackson - - - Co-director
Dana Jackson - - - Co-director
Jon Piper - - - Research Associate (ecology)
Peter Kulakow - - Research Associate (genetics)
Mary Handley - - Research Associate (plant pathology)
John Thelander - - Research Technician
Linda Okeson - - - Administrative Assistant
Sharon Thelander - Secretary/bookkeeper
Gabriel Hegyes - - Director of Development
(beginning June 1, 1988)
Rob Fischer - - - Operations Manager
Randy Kempa - - - Operations (part time)
Paul Rasch - - - Greenhouse Coordinator
Thom Leonard - - - Director of the Grain Exchange,
Manager of The Land Institute Community Garden
Danielle Carré - - Market Gardener
Brad Burritt - - - Market Gardener



Thom Leonard Manages Land's Community Garden

Karen Finley

Thom Leonard, who brought the Grain Exchange to The Land Institute in 1987, extends his contribution this year as manager of the Land's vegetable garden. While the garden work continues to be a project shared by staff and interns, Thom's focused time and attention expands the garden's function as a place of learning.

Thom is a Kansan who, in returning home, brings a wide knowledge of gardening gained while living for years in the Arkansas Ozarks, on both coasts and in Ireland. Thom worked for a season on a forty acre organic produce farm in Washington and seasonally on an Ohio farm specializing in growing and marketing organic specialty grains and beans. In addition to his experience in growing vegetables and grains, Thom has been a miso maker and a professional baker. He has also been involved in the preservation of heirloom varieties of vegetables and field crops, which led him to found The Grain Exchange.

Before coming to Salina, Thom was a senior writer for East West Journal, contributing articles primarily on the subjects of grain production, bread baking, and fermented foods. Immediately prior to his return to Kansas, he was the gardener at Abundant Life Seed Foundation, a small seed company located in Port Townsend, Washington.

Thom is particularly interested in creating a garden system which is self-sustaining in terms of soil fertility. He plans to make use of

green manures and cover crops, effectively "growing fertilizer" in the garden itself. He is also interested in planting windbreaks which would produce food and provide support for climbing vines, as well as shelter plants from the dehydrating effects of the Kansas wind.

Dana Jackson managed the garden as a Land Institute project from 1983-1987. For ten seasons before that it was the Jackson family garden. Dana explained why she decided to turn the management responsibility over to Thom.

"By making the garden manager a half-time position, we have an opportunity to teach and learn in the garden, as well as grow food for everyone here. I did not feel that I had been able to spend enough garden time with interns in the past few years because of my other duties. I would often get students started on a task and then would have to go back to work in the office.

Thom Leonard is the right person here at the right time. He is an avid gardener whose experience fits in well at The Land. Having grown up in Kansas, he combines an understanding of this region's climate and traditional gardens with knowledge about intensive beds, and inter-planting methods practiced more in other regions. I am excited about the gardening potential at The Land Institute under Thom's management."

Dana will not keep her hands completely out of the soil, however. She will be tending the strawberries, asparagus and several flower beds.



Beth Gibans, Jennifer Delisle, Thom Leonard and Karen Finley have lunch in the library.

Former Interns Start Market Garden Project

Two intern alumni, Brad Burritt (1986) and Danielle Carre (1985), returned to The Land Institute this spring with their son Ian Jacob to begin a new project. They are planting several acres of vegetables on the property owned by The Land along Ohio Street to market in the area this summer. This new venture coincides with the start-up of a farmers' market to be held every Saturday morning in the Spilman Plaza just south of the Vogue Theatre on Santa Fe Avenue in Salina. As soon as it becomes feasible (perhaps 1988, but more likely in 1989), The Land Institute will construct a roadside stand along Ohio Street and also market produce directly to customers there.

Paul Rasch, who has been the greenhouse construction coordinator, will work on the market garden project when the greenhouse is completed this spring.

The trio plans to grow a complete variety of vegetables. Major crops in 1988 will include sweet corn, melons, flowers and garlic.

The vegetables will be grown organically. Although there is still no Kansas state certification for organic growers, Brad, Danielle and Paul will work to meet the standards of the Kansas Organic Producers' organization.

It is a goal of The Land Institute to develop the market garden into an income-producing activity after the start-up costs have been recovered. Since this is a new venture, 1988 will be somewhat of a trial and error period as we plant our first crops, gather necessary equipment, find out our labor needs and develop markets. Brad, Danielle and Paul have the energy and vision to initiate the project and discover its possibilities.

Development Director Chosen

The Land Institute has hired Gabriel Hegyes to be the new director of development beginning June 1, 1988.

Gabriel has been working on a master's degree in agronomy, specializing on alternative crops for Nebraska, at the University of Nebraska. He has previously earned a bachelor's and master's degree in education and an M.A. in library science from the University of Missouri, Columbia.

From 1983 to 1986, Gabriel worked as the rural services consultant for the Central Kansas Library System centered in Great Bend, Kansas. He managed the rotation book service and developed the rural issues collection. He was an elementary school teacher in Higginsville, Missouri from 1978 to 1980.

As director of development, Gabriel will work with the co-directors to raise operating and capital funds and develop an endowment for The Land Institute.



Danielle, Brad and Ian Jacob.

Stewardship Seminar Offered

The Land Institute will be the site of a seminar on land stewardship for church leaders sponsored by the American Baptist Campus Ministries at Kansas State University and the University of Kansas on June 2, 1988.

The purpose of the seminar is threefold: 1) to recall and recover the biblical tradition that calls us to honor the land as a gift and a trust, 2) to understand the breadth and depth of the present land crisis and its implications for all existence, and 3) to consider a model for more responsible and holistic land stewardship and how those values may be incorporated into the church's ministry.

After an introduction by Dr. David Stewart, American Baptist campus minister at Kansas State University, Dr. Geoffrey R. Lilburne, professor of theology at the United Theological Seminary in Dayton, Ohio, will speak on "A Theology of Land: A sense of Place."

Wes Jackson will speak on two topics: "Modern Agriculture: Where it Has Led Us," and "Future Agriculture: Where we Need to Go."

To register, send \$10 to Dick Orr, 1629 W. 19th, Lawrence, Ks. 66044 or call (913)841-8001.



Staff families share bi-weekly potluck lunches: Mary Handley and Elliot, Beth Piper and Emily.

New Greenhouse is Dedicated

Tom Clemetson

I stood out on Water Well Road, on March 26, directing traffic, beckoning everyone who drove by to pull into The Land Institute. I got a couple of weird glances from those people who knew nothing of the Greenhouse Dedication nor The Land Institute and were only trying to get to town or to the local fishing hole. But I received many wonderful smiles as our participants rolled around the corner towards the greenhouse.

We interns had spent a substantial portion of our first six weeks here at The Land Institute helping with the construction of this greenhouse. The greenhouse was not completed as of the dedication, but it was functioning as a greenhouse. One of the four rooms was filled with seedlings of Illinois bundleflower and Eastern gamagrass. At the opposite end, on the west side, another room was near completion. The center two rooms were awaiting the installation of the heating and cooling system before they could be pronounced finished.

Because the headhouse had not yet been partitioned into an office and a processing area, the large open space served us well as a place for the dedication program. Co-directors Dana and Wes Jackson and Paul Rasch, the greenhouse coordinator, spoke about the history of the greenhouse and the people who made it possible. Mary Handley, greenhouse manager, described some of the design and management principles which will make the operation of this greenhouse unique. Wendell Berry, a writer and farmer from Kentucky and a member of the Honorary Board of Directors of The Land Institute, gave a talk which appears following this article. Elise Stiefel provided the refreshments, cookies and herb tea.

After the program, Paul and Mary stood in the center section of the greenhouse and explained some of its main features. They discussed the experimental nature of the outer two rooms, which are to be passively heated and cooled. Rock storage in the benches will collect the solar energy of the day and release it at night, and a heat recovery system will pull warm air from the ceiling and blow it through the rock storage. A manually operated vent system that is much larger than conventional vents will help release excess heat during the day without the use of fans.

Paul explained that the two center rooms will be actively heated and cooled. The main furnace will burn wood and be backed up by a propane burning furnace. It will heat water that will be piped through synthetic rubber tubes (EPDM) which run under the pots of plants. These pipes will heat the soil rather than the air, a more efficient method, because plants have been found to tolerate cooler air tempera-

tures as long as their roots are warm. For cooling, the vent system can be either manually or automatically opened, and a fan and evaporative cooling pad (Excelsior) will be installed to actively cool these center two rooms.

The watering system will be an automatic Chapin system which consists of small diameter tubes with lead weights on the end placed in each pot and activated by a timer.

Paul described the glazing, which is double paned acrylic (Exolite) on the side walls and double polyvinyl fluoride film (SERAC) on the roof. These glazings maximize light penetration and minimize heat loss. Other energy efficient features include the superinsulated headhouse and the thermal mass gained by constructing the greenhouse four feet below ground level on the north. The structure is also protected from the wind by the office building on the north and by a shelterbelt of trees on the south.

It was inspiring to see the interest expressed in this greenhouse, which so many people at The Land have worked on, and to witness the enthusiasm of over a hundred people gathered in one place to celebrate the long range goals of The Land Institute.

The Farmer, Speaking of Greenhouses

Dedication Speech by Wendell Berry

I want to begin by thanking Dana and Wes Jackson for asking me to take part in this occasion -- and, indeed, for allowing me to be one of the students of The Land Institute. That I am one of the least qualified of its students doesn't diminish at all the fact that I am its student, and that I have enormously enjoyed and benefited by its lessons. Great things have been accomplished here, and greater things are going to be accomplished here. I'm glad to have this occasion to say that my association with this work, as guest and friend and student, has been one of the finest privileges of my life.

In 1913, seventy-five years ago, Liberty Hyde Bailey retired from his post at Cornell after a quarter century during which he had been, first, Professor of Horticulture, and then Director and Dean of the New York State College of Agriculture and Director of the Experiment Station. Two years later he published a little book with the remarkable title, *The Holy Earth*. In it he wrote, "Most of our difficulty with the earth lies in the effort to do what perhaps ought not to be done... A good part of agriculture is to learn how to adapt one's work to nature... To live in right relation with his



John TheLander

Paul Rasch and Mary Handley (third from right) explain features of greenhouse.



Wendell Berry

natural conditions is one of the first lessons that a wise farmer or any other wise man learns."

Was that perhaps the exhalation of a restless soul, having cast off at last its academic bonds? No, it was not. For in 1905, the second year of his deanship, he had published a book entitled *The Outlook to Nature*, in which he spoke of nature as "the norm." "If nature is the norm," he wrote, "then the necessity for correcting and amending the abuses of civilization become baldly apparent by very contrast." And he added, "The return to nature affords the very means of acquiring the incentive and energy for ambitious and constructive work of a high order..."

Dean Bailey was not, of course, against the necessary pursuits of the human economy. He was merely for bringing those pursuits into harmony with nature, which he understood as their source and pattern. I mention him here, not only because he is one of the inevitable measures of the subsequent history of the Land Grant system, but because, as an officer of that system, he spoke for a view of things that, however threatened in his time and since, goes back to the roots of our experience as human beings.

This view of things can be stated very simply: it holds that we can live only in and from nature, and that we have, therefore, an inescapable obligation to be Nature's students and stewards, and to live in harmony with her. This is a theme of both the classical and the Biblical traditions. It is not so prominent a theme as we could wish, perhaps because until

lately it was taken for granted, but it is a constant theme, and it is more prominent than modern education prepares us to expect. Virgil, for example, states it boldly at the beginning of *The Georgics*, written between 36 and 29 B.C.:

...before we plow an unfamiliar patch
It is well to be informed about the winds,
About the variations in the sky,
The native traits and habits of the place,
What each locale permits, and what denies.

And several hundred years before that Job, the man of Uz, had said to his visitors:

...ask now the beasts, and they shall teach thee;
and the fowls of the air, and they shall tell thee:

Or speak to the earth, and it shall teach thee;
and the fishes of the sea shall declare unto thee.

In the English poetic tradition this theme is restated by voice after voice. Edmund Spenser, toward the end of the sixteenth century, described Nature as "the equall mother" of all creatures, who "knittest each to each, as brother unto brother." For that reason, perhaps, he sees her also as the instructor of creatures, and the ultimate earthly judge of their behavior. (So much for the alleged "anthropocentrism" of western culture.)

The theme was stated again by Shakespeare in *As You Like It*, in which the forest performs the role of teacher and judge, a role that is explicitly acknowledged by Touchstone: "You have said; but whether wisely or no, let the forest judge." And Milton stated the theme, again forthrightly, in *Comus*, when the Lady says of nature:

she, good cateress,
Means her provision only to the good
That live according to her sober laws
And holy dictate of spare Temperence...

And Alexander Pope stated it, as plainly as the others, in his *Epistle to Burlington*, in which he counseled gardeners to "let Nature never be forgot" and to "Consult the Genius of the Place in all."

After Pope, so far as I know, this theme departs from English poetry. The later poets were inclined to see nature and humankind as radically divided, and were no longer much interested in the issues of a practical harmony between the land and its human inhabitants. The romantic poets, who subscribed to the modern doctrine of the preeminence of the human mind, tended to look upon nature, not as anything they might ever have practical dealings with, but as a reservoir of symbols.

The theme of nature as instructor and judge seems next to have been taken up by a series of agricultural writers in our own century. I have said "series" rather than "succession" because I

The goal is a harmony between the human economy and nature that will preserve both nature and humanity, and this is a traditional goal.

don't know to what extent these people have worked consciously under the influence of predecessors. I suspect that the succession, in both poetry and agriculture, may lie in the familial and communal handing down of the agrarian common culture, rather than in any succession of teachers and students in the literary culture or in the schools. I do not, for example, know the ancestry of the mind of Liberty Hyde Bailey, though I would guess with some confidence that he is one of the heirs of Thomas Jefferson. Jefferson's preoccupation with what he called "horizontal plowing" and other issues of proper husbandry was certainly an attempt of a "wise farmer" to farm "in right relation to his natural conditions." But such a coincidence of thought does not establish succession. There remains the possibility -- and I think it is a strong one -- that, though Bailey undoubtedly knew the example of Jefferson, both men worked out of predisposing ideas and assumptions handed down to them as children.

One of Liberty Hyde Bailey's contemporaries was J. Russell Smith, whose interests and loyalties as an academician will seem as improbably to us as those of Dean Bailey. In 1929, when he was professor of economic geography at Columbia University, J. Russell Smith published a book entitled *Tree Crops*, the aims of which were at once ecological and patriotic. The book, he said, was "written to persons of imagination who love trees and love their country." His concern was the destruction of the hill lands by agriculture: "Man has carried to the hills the agriculture of the flat plain." Smith's answer to this problem was "that farming should fit the land." "Trees," he wrote, "are the natural crop plants for all such places." The great virtue of trees is that they are perennials; a hillside planted in trees would be "a permanent institution." Tree crops, he believed, could restore both the ecological and the human health of the hilly land. His vision was this:

I see a million hills green with crop-yielding trees and a million neat farm homes snuggled in the hills. These beautiful tree farms hold the hills from Boston to Austin, from Atlanta to Des Moines. The hills of my vision have farming that fits them and replaces the poor pasture, the gullies, and the abandoned lands that characterize today so large a part of these hills.

That J. Russell Smith was aware of the early work of Albert Howard we know from a footnote in *Tree Crops*. Whether or not Howard

knew Smith's work, I do not know. Nevertheless, when Sir Albert Howard (as he came to be) published *An Agricultural Testament* in 1940, his message was essentially the same as Smith's (and essentially the same as that of the Book of Job, Virgil, Spenser, Shakespeare, Milton, Pope and Liberty Hyde Bailey). Nature, he said, is "the supreme farmer." If one wants to know how to farm well, one must study the forest. In a paragraph as allegorical as *The Fairie Queene*, he wrote:

The main characteristic of Nature's farming can therefore be summed up in a few words. Mother earth never attempts to farm without live stock; she always raises mixed crops; great pains are taken to preserve the soil and to prevent erosion; the mixed vegetable and animal wastes are converted into humus; there is no waste; the processes of growth and the processes of decay balance one another; ample provision is made to maintain large reserves of fertility; the greatest care is taken to store the rainfall; both plants and animals are left to protect themselves against disease.

Sir Albert Howard mentioned the prairie on the same page with the passage I just quoted, but he was native to country that was by nature forest land. It remained for Wes and Dana Jackson and their fellow workers at The Land Institute to take the logical next step to the proposition that if one lives on the prairie, one must learn to farm by studying the prairie. The difference between the native prairie and the modern grain field is a critical difference, and it provides the only feasible basis for criticism and correction of the grain field. The principle is stated by Wes in Chapter 8 of *New Roots for Agriculture*: "the agricultural human's pull historically has been toward the monoculture of annuals.. Nature's pull is toward a polyculture of perennials."

By now, I hope my purpose is evident. I wanted to show that, if the work of The Land Institute is innovative, it is so partly in response to a long tradition and an old hope; the work of The Land Institute is not merely another episode in our time's random pursuit of novelty. When Wes Jackson and Marty Bender set forth the Institute's purpose in their article, "Investigations into Perennial Polyculture," it is at once new and recognizably ancient: "We believe that the best agriculture for any region is the one that best mimics the region's natural ecosystems...our goal is...to create prairielike grain fields..."

It is our present principled and elaborately rationalized rape and plunder of the natural world that is a new thing under the sun.

...if the work of The Land Institute is innovative, it is so partly in response to a long tradition and an old hope; the work of The Land Institute is not merely another episode in our time's random pursuit of novelty.

The goal is a harmony between the human economy and nature that will preserve both nature and humanity, and this is a traditional goal. The world is now divided between those who adhere to this ancient purpose and those who by intention do not, and this division is of far more portent for the future of the world than any of the presently recognized national or political or economic divisions.

The remarkable thing about this division is its relative newness. The idea that we should obey nature's laws and live harmoniously with her as good husbanders and stewards of her gifts is old, as I have shown. And I believe that until fairly recently our destructions of nature

were more or less unwitting - the by-products, so to speak, of our ignorance or weakness or depravity. It is our present principled and elaborately rationalized rape and plunder of the natural world that is a new thing under the sun.

But we have come here today to celebrate the addition of strength and capability to the old cause. And we have further reason to celebrate in that this addition is not unique. The signs are now everywhere that the traditional side is gaining strength. Though we should beware of optimism, I think we may be permitted to see great hope in our gains. We are slowly acquiring a capacity to know where we are and what we are doing and what we ought to do, such as humans may never have had before. We are learning to return to nature from farther away than we have ever been, and this, in the words of that good dean of our cause, gives us "the incentive and energy for ambitious and constructive work of a high order..." -- such as this most impressive new building that has gathered us here today.



John TheLander

Jake Vail and Karen Finley plant seeds in flats.



Prairie Festival 1988

"Health, Beauty and Permanence" is the theme for the tenth annual Prairie Festival to be held at The Land May 28-29. The Festival

is a celebration of the prairie ecosystem and prairie folk, but programs relate to a special theme, which this year is a phrase from "The Proper Use of Land" in Small is Beautiful by E.F. Schumacher.

J. Stan Rowe, professor emeritus in plant ecology and crop science at the University of Saskatchewan, Canada, will make the opening presentation on Saturday afternoon on "Land and People- an Ecological Perspective." He will be followed by Conn Nugent, director of the Five Colleges Inc., speaking about "E. F. Schumacher: Idealism and Realism."

Gardening will get special attention this year. Wendy Johnson, head gardener at Green Gulch Farm, Sausalito, California will do a two hour gardening workshop on Saturday morning, and also make garden presentations on Saturday afternoon and Sunday morning. Thom Leonard, Land Institute gardener, will do a Sunday morning workshop on "Gardening in One Raised Bed."

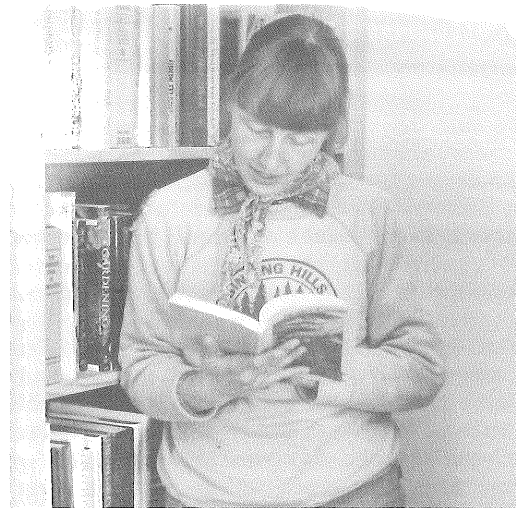
Liese Ricketts, Illinois artist, will introduce her unique exhibit, "New American Landscapes" twice on Saturday afternoon. Lora and Frank Gilbert will also repeat their workshop, "The Landscape of Human Health." Thirteen other programs will be options in the afternoon.

The music of Ann Zimmerman will again be a highlight of the Festival, and toe-tappers will also enjoy the concert on Saturday evening by the Alferd Packer Memorial String Band from Lawrence, Kansas. The band will play later in the evening from 10:00 to 12:00 for the square dance to be called by Mike Rundle.

Between the concert and dance, Dona Freeman will present the one-act play by Nancy Paddock, "Planting in the Dust." A Wichita actress hired by The Land Institute after auditions last summer, Dona has performed the role of Annie 22 times in Kansas communities this past year.

An introduction to The Land Institute research program and a tour of the experimental plots is scheduled for Sunday morning, rather than Saturday afternoon as in previous years. Another change is the potluck, which will be on Saturday evening, instead of Sunday noon. On Sunday the Prairieland Food Co-op will cater a buffet lunch; reservations are required.

The final session on Sunday afternoon will feature Conn Nugent, executive director of the International Physicians for the Prevention of Nuclear War when the organization won the Nobel Peace Prize, speaking about the prevention of nuclear war, and David Orr, Director of the Meadowcreek Project in Fox, Arkansas, whose topic is "The Continuation of Life on Earth."



Laura Benson browses in regenerated garden and farming section of library.

Rodale Publishing Donates Books

There are 64 new books in the library, donated to The Land Institute by Rodale Publishing Company.

A storm last July resulted in wet and ruined books along the north wall of the classroom where the roof blew off. Many of the damaged books were farming and gardening books which we had purchased over the years from Rodale Publishing Co. We wrote Robert Rodale about the loss and inquired if Rodale Publishing might make us a gift of replacement books. To our delight, they sent us two boxes of books.

The additions to our library include 37 books about gardening, 8 about agriculture-related subjects, 7 about health, 5 cookbooks, and 7 related to building or crafts.

We are grateful to Robert Rodale and the Rodale Publishing Company for helping "regenerate" our gardening and farming library.

Writer-in-Residence

One member of The Land community this spring, Adam Rome, cannot be listed as an intern or a staff member. As our first writer-in-residence (not employed by The Land), Adam attends class and works sometimes with the interns in order to gather material for a book about The Land Institute.

A native of the state of Connecticut, a graduate of Yale University and a Rhodes scholar, Adam has been in Kansas for five years. He is known in Kansas for his articles in the Wichita Eagle Beacon and for a special series of columns called "Hidden Places." These were written under a grant from the Kansas Committee for the Humanities and published in sixty Kansas newspapers in 1983-84.

Kansans Talk to Annie

Dona Freeman

While performing the play *Planting in the Dust* by Nancy Paddock for The Land Institute, I've traveled to Kansas towns I had never even heard of. I've had the opportunity to meet many different people, including farmers (male and female), teachers, writers, and feminists, and I've even shared a midnight supper with Dominican sisters. I've performed on stages under conditions that we sometimes thought would be impossible. And I've enjoyed every minute. Oh sure, there've been times when I've lost my concentration, wondered what the next line was, and only once wished someone else could come on stage for just a minute so that I'd have time to collect my thoughts.

Live performance-- a new show each time it's presented! Each performance becomes alive because of the stage setting, the kind of audience watching the play, and how people respond to the lines. After the play, when the people in the audience feel they know Annie, they want to tell their stories to her-- not to Dona, the city actress-- but to Annie, the woman who understands and experiences the same everyday problems, the woman who shares the same love of the land. They especially want to tell her their dust bowl stories.

People all across the state have shared memories of the black clouds rolling in, or red clouds depending on where they lived at the time. Wet towels and sheets hanging from windows and stuffed under the doorways to keep the blowing dust out were common recollections. One couple told me of the birth of their first child the very day the storm hit. They were afraid the child would suffocate from the fine dust creeping in around the wet sheets at the windows. Fortunately they lived close to town, and the man went in for blocks of ice. They set a block of ice in front of an electric fan, and the gentle moist breeze that was created kept the dust from covering the baby. The man didn't tell me about the difficulty of driving into town. Modest about his efforts, he just said, "Well, it took awhile." Nor did the woman convey how difficult the delivery was, or if she were ever frightened of the storm or of being there alone during such a crucial time of her life.

Cold chills raced over my body at this vision recreated by one farmer.

"It was a beautiful spring day. The sun was shining brightly that morning when I went to school. I was seven years old. Our farm was within a couple of miles of the school house, and I usually walked. Suddenly in the afternoon the sunlight went away. Our teacher looked out the window, and when she looked back to us her face was white, and we could tell she was scared. We thought a bad storm was coming-- you



Dona Freeman

know, a thunderstorm. She said, "Run home as fast as you can! Run and don't tarry. The end of the world is coming!" I raced out of that room and my feet hardly touched the ground. I looked over my shoulder and the whole sky was black. It was rolling right toward me! I ran as fast as I could all the way home, thinking I was never going to see my mom or dad before the end of the world came!"

Imagine being seven years old and faced with the end of the world!

Another favorite story is about love, love that has lasted for fifty-two years.

After some of the performances, the sponsors arranged a small reception with refreshments. Usually everyone stayed pretty close to one another, within earshot anyway, to share stories. This particular evening my eye caught the beckoning motion of a lady standing apart from everyone else. She had a story to tell me, but she just didn't feel like she could tell it in front of everybody else from this small town. Her story went like this.

"I was a young girl when that dust storm hit, and I had just started seeing this nice young man. I lived about twenty miles out from town, and my young man drove out on this beautiful Sunday morning after church. We shared a picnic and had a wonderful afternoon. About the time he was supposed to leave, the sky turned black and that dust just rolled in! Well, he couldn't leave." And with a twinkle in her eye and a remembering smile on her lips, she said: "We've been married ever since!" Where was her husband? Right by her side, his eyes squinted

with a smile and memories of his own. I'll never forget them, and their unusual happy dust bowl story.

The people across Kansas are indeed friendly, warm, and ready to talk about their love of the Kansas soil. Sometimes it's very painful, and my attempts to express understanding are so inappropriate. There is one farmer (I would say in his seventies) who has seen the play three times. Each time he expresses to me his thankfulness for the way the play recognizes the connection some people have to the land and the love they feel for it. The last time I talked to him after a show, he appeared weary. Some spark was missing that I had caught before. He came close and looked into my face. His eyes were moist and it was hard for him to talk. "I've farmed the same land my father and grandfather farmed. I love that piece of land and have struggled to keep it good and rich so I could pass it on to my children. They're all grown up, left the farm and got children of their own. None of them want it. No one wants the farm. Not a one of them is interested in coming back to the land. I've no one to leave it to, no one."

After one performance I spoke to a woman close to my age and words, the "tools of my trade," failed me. A theatre group sponsored the play, and they invited me to join them for a late night supper at a local restaurant. As usual after a performance, I was "hyper" and talked incessantly. We shared stories of our theatre experiences and laughed loudly. A small-framed woman sat at the end of the table, very quiet. I moved over one seat to sit next to her and asked if she enjoyed the play and if she could identify with any of the characters in any way. She cast her eyes downward toward her hands in her lap, and in a very low voice replied, "I had to leave. I couldn't watch the play. I'm sorry. You see, we just lost our farm."

I realized that I was holding my breath. My brain kept telling me that I should say something-- to respond would be the polite thing to do-- but my heart stopped any of those polite, useless words from gushing out.

She laced the fingers of her hands together, held them firmly in her lap and looked up at me. "But I got a job in town and a nice house for my children, and we are settling in."

"Good," I said. "It must not be an easy adjustment in your life. How's your husband accepting the change?"

"Well," she said, sighing and returning her gaze to her firmly clasped hands, "He's gone. The land had been in his family for many years, and when it was gone he couldn't face the feeling of failure. Even though his parents here in town are very understanding, he left, and we haven't heard from him."

A single tear slipped down her cheek. I laid my hand on her arm. My brain and my heart agreed that there wasn't one word I could say to this woman that would ease her pain or give her

the strength to go on. She had heard it all, I was sure. All I could do was let her know in my own way that at that very moment another person cared.

I think about her often and of the abundance of courage and strength inside that small-framed body. In the play *Great Grandma Clara* says: "We toil for a future we know not of."

At the performances I've given at district soil conservation meetings this winter, I've been impressed by how many children were involved in the poster and limerick contests and how aware they are of the problems facing today's farmers. In *Neodesha* I was particularly touched by a young girl named Marisa. Marisa visited with me after the play and we had our picture taken together. When I started to leave we hugged each other, and she said she would pray for me. At first I was a little startled-- I'm not sure why except maybe I haven't had anyone praying for me for quite awhile, not that I was aware of anyway. But in all of Marisa's innocence and childlike honesty, she didn't allow my reaction to faze her. She said, "I will write to you and I'll be praying for you and what you are doing for the land." Sure enough I have a letter from her, and sure enough she's been praying for me.

There are so many other stories of people's problems and struggles I could share, just as they have been shared with me, and the thread that runs through every one of them is their undeniable love of the land, the deep connection they have with the soil. In the play, Annie reminds us that "we borrow our lives from it." She tells us that "this soil is made up of all the bodies of all the beings that have ever lived and died in this place over millions of years. And it's the whole life of all the years to come, too." Performances of *Planting in the Dust* reinforce the respect for soil that many rural people have, and it teaches others who have not thought much about it that soil is not to be taken for granted. Through Annie's emotional description of life on the farm that has been in her family for four generations, and her poetic expression of our dependence upon soil, The Land Institute takes a powerful message about land stewardship to Kansas communities. I'm thankful for the opportunity to help present that message.

Other Kansas performances by Dona Freeman of *Planting in the Dust* can be arranged for a minimal fee plus travel expenses. The one-act play takes 30 minutes and is usually followed by a 20 to 30 minute discussion. It can be effectively staged in a variety of settings and requires only a performing space of approximately 12' X 18' and three props: a kitchen table, a chair and an old rocking chair. For more information, or to book the play, write or call Dana Jackson (913-823-5376) at The Land Institute.

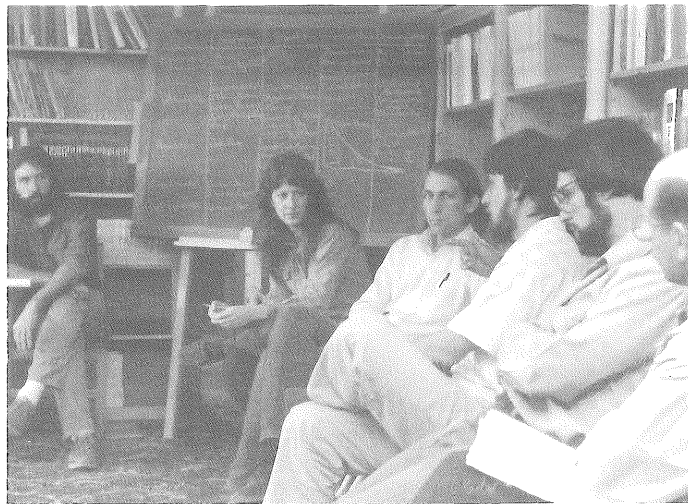
Energy Caucus Held at The Land

Participants at the energy caucus held at The Land Institute on January 30, 1988 agreed that public apathy about energy issues is a serious obstacle to the development of sustainable energy policies. Low gas and oil prices give a perception of plenty, even though recoverable reserves are steadily diminishing. The Reagan administration has systematically dismantled the federal governmental infrastructure promoting renewable energy and turned the Department of Energy into a major nuclear weapons unit. With an overbuilt electrical capacity and oil profits down in the state, Kansas has backpedaled on efforts to promote conservation.

The caucus was called to revive the discussion among Kansas environmentalists about renewable energy sources and public policies which encourage efficiency and solar technologies. The 25 participants suggested topics for discussion, and the moderator, Mari Peterson, former executive director of the Kansas Natural Resources Council, developed the agenda by organizing the topics in a matrix on the blackboard.

The state of Kansas has no energy policy. Construction of the Wolf Creek nuclear plant and the coal-burning Sunflower plant gave Kansas a surplus of electricity and high consumer prices in the areas served by those plants. With religious fervor the legislature has discussed "economic development" the past two years, and "economic development rates" are in vogue to encourage consumption of our excess capacity of electricity. For example, over the Ogallala Aquifer, irrigators are offered cut rates to promote electricity consumption-- and consequently, groundwater depletion. (Our other electric utility, Kansas Power and Light, on the other hand, is promoting customer adoption of devices to cut off air conditioning for short periods during peak loads in order to avoid building additional peak load generating capacity.) Participants in the caucus were generally pessimistic about the chances of re-introducing conservation and renewable energy into the thinking of those who make policy affecting energy use in Kansas.

One topic of discussion at the caucus has been acted on since January. Kansas Corporation Commission (KCC) chairman Keith Henley appointed five charter members of the Citizens' Utility Ratepayers Board (CURB) on April 5. Their responsibility is to represent residential and small commercial ratepayers in utility proceedings before the KCC through one full-time KCC attorney working for the Board. Margaret Miller of Wichita, co-chair for a Residential Utility Consumers Office (RUCO), attended the energy caucus and recommended a more independent, autonomous office to represent the consumer which would be established through action by the state legislature, rather than the regulatory agency. Though the less desirable consumer advocate structure was established, energy activists have



Bruce Snead, Mari Peterson, Paul Johnson, John Craft and Paul Burmeister listen to Paul Rasch (3rd from right) make a point at the energy caucus.

been generally pleased with the persons selected for the Board and encourage the public to provide input and encouragement to the CURB.

Participants at the energy caucus agreed to keep the information flow going within the sustainable energy network and to have similar informal meetings in the future. Though there have been relatively few areas for action on the state level this past year, they agreed that opportunities for public education about sustainable energy are still available and must be developed.

Energy Efficiency — Beyond Kansas

Dana Jackson

As a member of the board of directors of Rocky Mountain Institute, I try to keep up on the work of Amory and Hunter Lovins and their approximately thirty staff members. The non-profit, resource policy center in Colorado has five program areas now, but work on energy efficiency technologies and policy still receives the greatest attention.

Even though I get discouraged about Kansas' backwardness when it comes to energy efficiency, one can get excited about the interest other states and private companies are showing in this least-cost method of energy production. The latest venture of Rocky Mountain Institute has been to establish COMPETITEK, a technical information service on advanced techniques for electric end-use efficiency. COMPETITEK'S quarterly reports and annual forum provide complete, useful and up-to-date information on how to save electricity. The service has a substantial subscription fee and is designed to serve utilities and their regulators, intervenors, custo-

mers, suppliers, financiers, and public policy agencies. The thirty-five charter members include the Bonneville Power Administration of Portland, Oregon, Boston Edison Company, Central Maine Power, New York State Energy Office, Wisconsin Power and Light Company and Chicago Department of Planning.

COMPETITEK's first 348 page technical report, *The State of the Art: Lighting*, was published in March 1988 and will be continually updated for subscribers. The executive summary states the importance of lighting efficiency.

"Lighting directly uses about a fifth of all electricity used in the United States. Adding lighting's associated space-conditioning loads raises its share to a fourth or more. More than half that usage is in commercial buildings. Lighting, directly and indirectly, can use a third of a typical city's electricity."

COMPETITEK asserts that in the past few years, advances have occurred in new technologies and in the refinement and integration of lighting systems which could, in full practical use, provide U.S. electrical savings equaling the output of about 120 one-thousand megawatt power plants, costing several hundred billion dollars to build. Five large cities are now interested in targeted commercial retro-fitting to save kilowatts and dollars.

Recently the U.S.S.R., which is the least efficient major industrial country, has been particularly interested in the work of Rocky Mountain Institute. When I last saw Amory

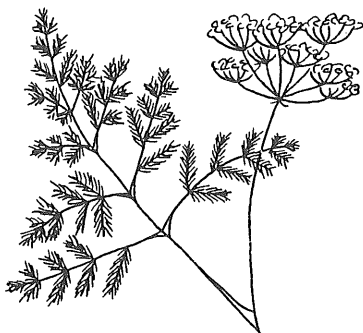
Lovins, he was on his way to Russia carrying a special suitcase of energy efficient electric light bulbs. In his first visit to Russia, Amory captured the attention of Yevgeny Velikhov, vice president of the Soviet Academy of Sciences and an advisor to General Secretary Gorbachev. Reducing the need for additional nuclear power plants is an appealing prospect to many Russians after the Chernobyl experience, and energy efficiency has the potential to do that.

COMPETITEK publications are not written for the general public. However, anyone can request the long list of not-so-technical publications which are available by writing to Rocky Mountain Institute, 1739 Snowmass Creek Rd., Snowmass, Colorado 81654-9199.

Rocky Mountain Institute is now starting to examine the analogous potential to substitute modern efficiency-raising technologies for oil. Some preliminary findings indicate tremendous opportunities for savings. For example: improving the car fleet by one mile per gallon from the 1986 level (18.3 mpg) would eliminate the equivalent of 1985 imports of oil from the Persian Gulf. Or—spending one year's U.S. military costs in the Persian Gulf to make buildings more heat-tight and burn less fuel oil would more than eliminate imports of oil from the Persian Gulf.

An excellent update on the whole topic of energy efficiency is available in Worldwatch Paper 82: *Building on Success: The Age of Energy Efficiency* by Christopher Flavin and Alan B. Durning. This can be ordered from the Worldwatch Institute, 1776 Massachusetts Ave., Washington D.C. 20036.

Early Spring Blooms



What is it? Some early prairie plants are harder to find and identify than those on this page. Puccoon (*Lithospermum incisum*) (lower r.) grows on the edge of our driveway beside a prairie grass area. Its pale-yellow blossoms are a bit ruffled along the edges. The Indians used Puccoon both for medicine and dye. They boiled the long, red tap roots to produce orange dye with a red tinge. *Lomatium daucifolium* (lower l.) was found blooming in abundance on the Wauhob Prairie in April. Indians ground the roots of this wild carrot/par-sley-like plant into meal and made "Cous" cakes from it. Though called blue-eyed grass, *Sisyrinchium campestre* (upper r.) is a member of the iris family. Clusters of the light blue to white blossoms were quite showy in early May in the pasture.

Iralee Barnard drew these plants for *Favorite Prairie Wild Flowers*, an 80 page booklet written by Mary Louise Johnson in 1979. A second edition was published this spring by Smoky Hills Audubon, Box 173, Salina, Ks. 67402.



New Roots for Agriculture

1988 Research Season Underway

Jon Piper

The ongoing research at The Land Institute is providing information necessary for developing a successful polyculture of perennial seed crops. This new agriculture will reflect many beneficial attributes of North American grassland ecosystems. Some of these attributes are a) reduced soil erosion, b) biological management of pests and weeds, c) internal provision of fertility, and d) plant species that complement one another in space and time.

During meetings in January, the research staff set a goal of establishing a large-scale perennial polyculture by 1991. Consequently, each of our projects this year, ranging from ecological studies of native prairies and plant-soil dynamics to germplasm collections and new crop development, is addressing a different aspect of this goal. The experiments for 1988 are listed below.

1. productivity and vegetation structure of native prairie
2. plant-soil interactions
3. long-term seed yields of four herbaceous perennials
4. investigations into perennial polyculture
5. variability in eastern gama grass (*Tripsacum dactyloides*) populations segregating for normal and pistillate sex ratio variants
6. germplasm development of perennial seed crops
7. perennial sorghum breeding and genetics



John, Peter, Karen and Tom divide gama grass for relocation while Beth tags plants.



Jennifer, Beth and Tom clip weed biomass in triculture. (Burned gama grass in background.)

Many of these projects build upon the work of previous years. For example, Caton Gauthier will continue to study growth and change in vegetation of the prairie. Her work will represent the third year in which we have documented the seasonal productivity of specific types of prairie plants (e.g. legumes, grasses) on The Land Institute's ninety acre prairie and the Wauhob Prairie. Information from this study may provide insights into how agronomic counterparts might behave in a perennial polyculture. A study last year indicated how some of our crop species deplete moisture and nutrients of the soils they occupy. Karen Finley is expanding that work and studying specifically how plots of gama grass, leymus, and Illinois bundleflower change the soils on which they grow.

Doug Towne will be measuring seed production in leymus, gama grass, Illinois bundleflower, and maximilian sunflower. This is the third (in some cases fourth) year in a five-year study of seed yields in plots of these plants grown without fertilizer or irrigation. In another experiment last year we observed that plants in a triculture of Eastern gama grass, Illinois bundleflower and leymus behaved differently in different growing combinations. For example, gama grass behaved one way when grown by another gama grass plant and a different way when grown by an Illinois bundleflower plant. Beth Gibans will repeat these observations on interactions between species this year and observe which combinations of species best control weeds.

Peter Kulakow has developed an active breeding program with three species: eastern gama grass, hybrid sorghum, and Illinois bundleflower. Last year we identified some gama grass

crosses resistant to various diseases. Tom Clemetson will continue this work, which is important to developing gama grass into a useful grain crop. Laura Benson and Jake Vail are establishing a large scale planting of gama grass and Illinois bundleflower for crop improvement within both monoculture and bicul-ture planting designs. In the process of devel-oping a winter-hardy grain sorghum, we have assessed the variation in rhizome production and agronomic quality of seed heads in *Sorghum bicolor* x *Sorghum halepense* hybrids. Jennifer Delisle will assist Peter in backcrossing our sorghum hybrids to milo (*S. bicolor*) parents to increase agronomic qualities of the perennial hybrids.

We have two new resources assisting the research this year: a 4500 square feet green-house and a level 72 acre field with good soil and a plentiful source of groundwater for irri-gation. The greenhouse will extend our breeding program into cooler seasons and will allow an extra sorghum generation. During March we planted pots of Illinois bundleflower, eastern gama grass, and sorghum hybrids for the germ-plasm and plant breeding experiments in the greenhouse. We also planted seeds of several prairie plants for transplanting into restored areas. The new field is made up of uniform Horde and Eudora silt loam soils which will enable us to make meaningful comparisons among plots within extensive experiments. Karen Finley is establishing the experiment on plant-soil interactions there. The property is located on south Ohio Street, about one and three-fourths miles from The Land.

Another asset this spring is John Thelan-der, our new research technician. John prepared the fields for planting and performed a wide range of jobs to help get the experiments successfully underway.

Since early spring interns and staff have been busy threshing last year's sorghum hybrids, planting and watering in the greenhouse, and burning gama grass plots and prairie areas. The 1988 field season began in earnest as the red-buds, wild plums and greening of the burned prairie beckoned us outdoors.



Peter and John Thelander discuss how to divide Eastern gama grass.



Peter and Doug set stakes for new plot.

POST DOCTORATE POSITION

The Land Institute has an opening for a post doctorate in soil science. This two year appointment could lead to a permanent position. We are looking for someone with expertise in soil fertility and plant nutrition and soil microbiology to work with our perennial polycul-ture research program. Send applications to Wes Jackson, director of research. For further information, call 913-623-5376 and talk to Wes, Peter Kulakow or Jon Piper.

THE LAND INSTITUTE RESEARCH REPORT

The results of experiments carried out in 1987 are now available in *The Land Institute Research Report*, number 4. Papers in this pub-lication were written by the research staff and 1987 interns and edited by Jon Piper. The 1986 report (number 3) is also still available. Copies can be purchased by mail for \$2.75 each postpaid. Address orders to *RESEARCH REPORT*, The Land Institute, 2440 E. Water Well Rd., Salina, KS 67401.

Prairie Images

Terry Evans

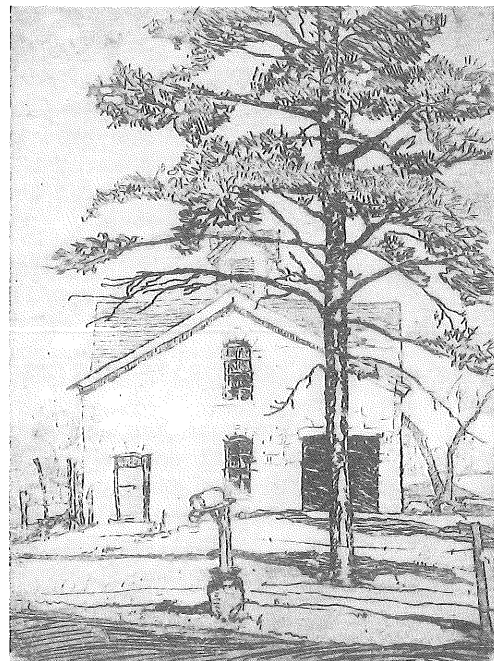
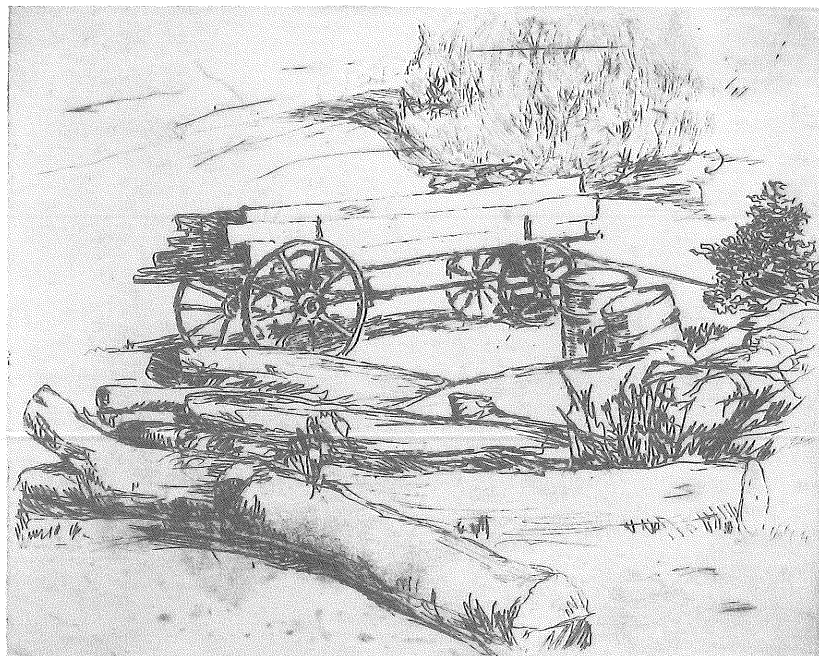
Although Clara Hatton's artistic curiosity has led her away several times, she has always returned home to Kansas to continue her work. The examples shown here are etchings and all are of Kansas in the 1920's and 30's. Clara renders artistic expressions of the environment wherever she is and she loves Kansas landscape as a subject.

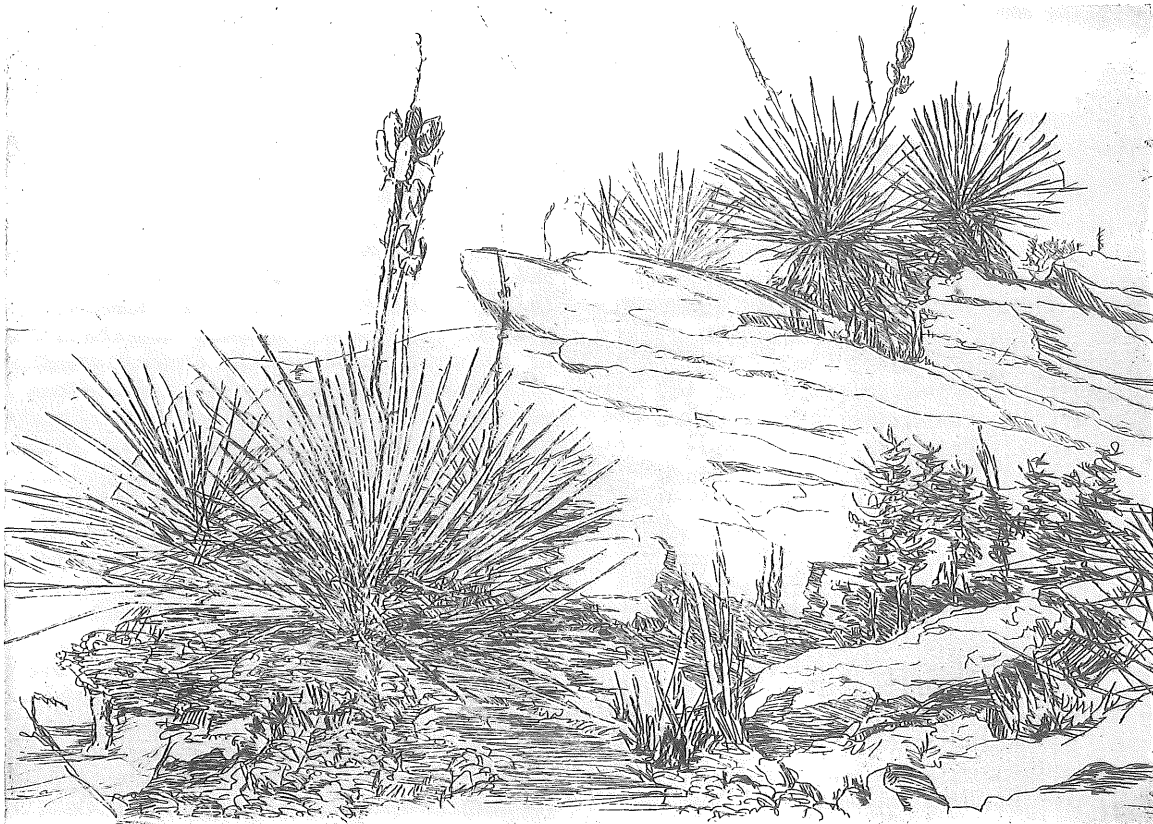
Clara Hatton's life in art has been long and full. Born in 1901 on a Kansas farm, now inundated by Wilson Reservoir, Clara's first art course was in Hays, Kansas in 1919. After earning her teaching certificate and teaching elementary school there for three years, she entered the University of Kansas (K.U.) as a design student in 1922. In addition to getting her degree in design from the University of Kansas in 1926, Clara studied calligraphy at the Chicago Art Institute and began teaching calligraphy at K.U. in 1925. After teaching at K.U. for nine years and getting a BFA in drawing and painting there in 1933, Clara went to London in 1935 to study printmaking at The Royal College and at the Central School of Arts and Crafts.

Back at K.U. in the summer of 1936, she heard of a position open at Colorado State University and went to Fort Collins to start the art department and an occupational therapy program. Clara remained at Colorado State until she retired in 1966.

At age 86, she continues her lively interest in art here in Salina. Her arms still show the sturdy shape formed by years of hand shaping bookbinding tools, pushing and pulling printing presses, lifting lithography stones, and carving wood block images. These arms and hands are skilled in wielding water-color brushes, oil paint brushes and printmaking tools of many kinds.

Prints by Clara Hatton will be on display at the 1988 Prairie Festival.



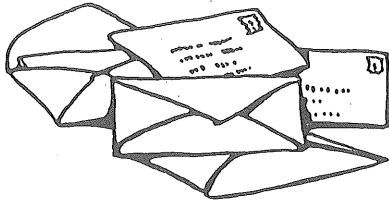


Spring Burning

Jay Bremyer

The farmers, maybe a couple brothers
and their sons, the wife coming over at noon,
maybe as late as two, with dinner;
then they'll work on into the night,
tending, as good stewards, visiting easily
in the heat of an early spring day,
just before the wild things turn green,
coaxing the slow fire, the lazy fire
dying off into sunset, black clean
fertile rolling pasture ground stretching
far as the eye can see, leaving trees,
saplings and old cotton giants along
the dry creek, not quite dead,
challenged again into life, reminded by fire
of fire thing sleeping inside; tending
the burn-off just as they would sheep,
that at ease with the prairie cycles.

Letters



Editor's note: The following letter was written on the back of a membership solicitation which the writer had received from the Professional Farmers of America, Cedar Falls, Iowa. The letter said that rural Argentina is a vast sea of incredibly fertile grasslands, with topsoil averaging close to 12 feet deep and covering over 350 million acres. The land can produce 60 pounds of corn per acre without chemical fertilizers and using inferior hybrids and can be bought for as little as \$29 an acre. But, the letter declares, even with the enormous competitive advantage of these low production costs, American wheat farmers can compete successfully. (Join Professional Farmers and find out how.)

Dear Editor:

The mail ad I've copied (over) suggests that Jess Ennis' statement (see "In Farming, Bigger is Better, or Is It?" in Land Report # 31), "The wise thing to do would be for all wheat farmers at once to cut back their wheat production" (p. 27) may be wishful thinking. Even if farmers could band together ("strike") and cut production to raise prices, it would only make it more profitable for farmers overseas to produce the grain. Grain floats both ways (towards money?), and if millers in the U.S. don't want to pay the price at home, they'll import cheaper stuff. Won't they? Aren't we farmers damned, do or don't?

The ad for "Pro Farmer" magazine goes on to remind us that American farmers have advantages of stable politics and economy, which make us good suppliers. They also laud themselves for predicting flooding in Argentine croplands in 1987, run-off from deforested Brazilian jungles.

Consider that if American farmers could retire more land, which would be a boon for all sorts of wildlife in this country, or even if they were to begin restoring the prairies, we would just be condemning the native Argentine prairies to the plow. As conservationists, as farmers, apparently the thing for us to do is to buy up that \$29/acre grassland and set up prairie national parks in Argentina.

Warm regards,

Michael M. Melius

Dear Wes, and Thom Leonard and Doug Dittman,

Hey, that piece about Albert Arens is pretty good (Land Report # 31)...

Some comments on your good interview. When you ask, "What are we going to do with all those oats?" I have to get my oar in. One of the points of my book to come out next year is that oats was (is) a whole lot better deal than we think, and it is not without reason that the decline of farming roughly parallels the decline of oats, at least in the midwest (and the increase in that damn oriental soybean). If you read your Morrison (Feeds and Feeding, the Bible of the livestock feeder for decades), you will find a wonderful statement, which I have quoted often: "Oats may be fully worth as much as corn per hundred pounds of feed if they form a relatively small part of the ration." Think about that. Farmers now shun oats because it is (usually) only about half the price of corn. BUT in a ration of 70 lbs. of corn and 30 lbs oats, the mix will provide the fat and energy of 100 lbs. of corn, and of course supply more protein than a hundred pounds of corn. So the livestock farmer who has 30 acres of oats and 70 of corn is much better off than the farmer with 100 acres of corn. The value as feed is greater.

One might argue that the value of the oats is even greater than soybeans because in addition to not having to use so much (or any) soybean meal in the feed for protein, the oats allow a better rotation. Oats, intelligently grown, act as a natural herbicide to competing weeds and a nurse crop of alfalfa or clover, coming on reduces erosion, along with the oats themselves. Corn and soybeans of course exacerbate erosion. When the value of the straw for bedding is added in, and a cutting of the nurse legume crop (or harvest of clover seed or fall pasture) after oats harvest, oats will be seen to be a good crop for a well-rounded grain-livestock farm, as valuable as corn and arguably as valuable as soybeans. And when things get so pathetic as last year when oats was worth at market as much as corn for awhile, it can be sold for a nice profit. Did you know we imported oats last year? Nothing could be more ridiculous. The reason was that the idiotic farm program in some way mysterious to me allowed farmers to treat oat acreage like corn in the corn program.

Oats alone will fatten lambs. I've done it many times (although it is good to put a little shelled corn in because the stupid sheep choke when they gobble pure oats sometimes). Oats will fatten hogs and are perfect for pregnant sows.

Keep up the good work.

Gene Logsdon
Upper Sandusky, Ohio

Dear Friend,

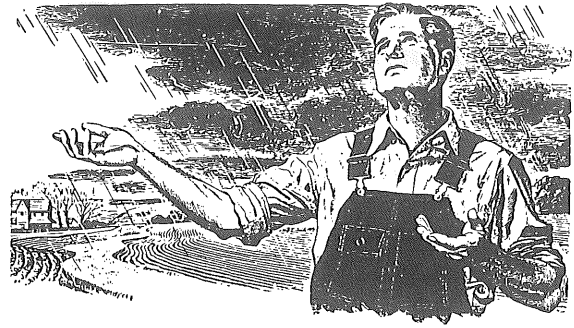
Being impromptu, some of the statements, (in "Albert Arens, Corn Breeder," Land Report #31) while correct, were misleading; i.e. the production and bulk of sales was within a 50 mile radius, but breeding and research, while related is a distinct, necessary and monumental task. While we have done some inbreeding in South Dakota and surrounding areas, the bulk of it is done here. We also had leased a block in a greenhouse at Norfolk for six years, but discontinued this phase. It wasn't realistic - we needed to subject our cultures to existing environments. We have intermittently entered in Nebraska, Iowa and South Dakota state yield trials and were competitive. We also had John Lonquist report that in the year we tested there (Madison, Wisconsin), our entry was high in one plot. Dr. Jones also planted a number of our crosses at New Haven, Connecticut. I later saw this corn and was very pleased. Trial plantings at various Indiana friends did well. Illinois tests were average.

...The reason for dwelling on this was that I got the impression (from The Land Report interview) that there was a feeling that these various cultures would have a rather limited adaptability. Corn over the years has adapted itself to a wide variation of environments. In fact, this is true with all of nature, which makes it so interesting and satisfying to be part of it.

...As to breeding for a particular area--it's not that easy, and as one scholar put it, "You have a thousand times better chance of getting struck by lightning than producing a superior inbred."

... We've always tried to get as near perfection and still be practical, and in the late thirties we exhibited and raised the champion Duroc sow at the Nebraska State Fair. I later sold this animal to a young aspiring breeder who was spending his father's savings by adding champion boars, etc. with the assumption that he was going to produce a lot of champions. He didn't realize that the champion was the peak, and he'd have to start over again.

That is one thing I like about corn. In livestock one doesn't realize the contribution of a particular blood line till it's gone. In corn you can maintain such lines. We've all heard the old



saying that the best looking cow won't necessarily produce the best calf--it's usually a common looking individual. The reason for detailing the above is the that the same holds true with cereals.

In comparing notes with dedicated breeders, we've all experienced the following. We would be planting an isolation plot of our pets (we sometimes referred to them as magazine covers) and there would still be some odd rows left. To fill this space, we would grab some mediocre stuff, and on many occasions such crosses would outperform those that we had high hopes for. Such phenomena makes it interesting and it's something money can't buy.

As to genetics, John (Lonquist) and I had always maintained that a line was never truly homozygous. I had come to this conclusion in crossing with various calicos, steriles, and restorers. We didn't have too many that agreed with us until McNichols discovered the mobile nucleus. One major thing most of us did agree on was "maternal influence." We found this also to be true in livestock.

While this may be premature, based on our past experience we have a lot of confidence in the potential of synthetics.* I feel that in a 5, 10 or 50 year span, these wide genetic cultures will be elastic enough to be an excellent source of material to fall back on.

...The term "synthetic" has almost become an old record. I feel it's perhaps the only challenge to a conglomerate takeover...The major interest of farmers in this is no yearly cash outlay for seed as it appears at this time that this material can be maintained indefinitely. This would especially appeal to farmers in areas of limited rainfall, or with average to below fertility, drouthy soil, or just plain "hard up."

While it will not be as attractive in the field, have moisture variations and may not be the highest yielder, it should be fairly competitive. In fact, under adversity such as a new blight or insect outbreak or something new, it could easily be the best corn, and sooner or later this is going to happen.

Best personal regards,

Albert Arens
Green Acres
Hartington, Nebraska



Traditional Roots for Agriculture



Grain Exchange Board of Advisors Meets

Thom Leonard

The Grain Exchange Board of Advisors met at The Land Institute the evening of March 29. Gary Nabhan was in Kansas to attend the American Association for the Advancement of Science meetings in Wichita on the 31st and at The Land for our "Elegant Solutions" seminar on the 30th. Kelly Kindscher made the trip from Lawrence, Kansas, Peter Kulakow is always here, and Kent Whealy was unable to attend. Steve Gliessman, in Kansas for the same two reasons as Gary, sat in on the meeting, as did Dianna Rogers, president of the Central Prairie Seed Exchange.

The major topics addressed during the discussion were funding for the Exchange, development of descriptor lists for the various grains, and the direction and focus of the work. Shortly before the meeting began, Lorenzo Mitchell of Penobscott, Maine, pledged continuing support of the Grain Exchange in the form of substantial annual personal gifts. While this relieves some of the pressure, considerably more money will be needed for us to do the necessary work of grassroots genetic conservation. In addition to seeking foundation grants for general support and specific projects, we discussed the possibility of recruiting more subscribers and of mailing a fund-raising letter.

Gary was particularly concerned about the need to accurately describe cultivars that exist within the Grain Exchange network, not just so we know what we have, but also to give us protection should a seed company "discover" a particularly valuable variety and seek protection under Plant Breeders' Rights. As an example of how we might do this, Gary had brought a copy of the form used by the International Maize and Wheat Improvement Center to record reference data for their Maze Germplasm Bank. Stan Cox, U.S. Department of Agriculture research geneticist at Kansas State University, has agreed to help develop a concise descriptor list for wheat.

The Board of Advisors agreed that the Grain Exchange can be an important element in non-governmental conservation, but also questioned what we could do that would be unique to the Exchange. While the most recent seed list included nearly one thousand entries, most members offering seed also list in the Seed Savers' Exchange Yearbook. At least a quarter of the listings were duplicated, and two major contributors to the Grain Exchange listings also list large collections with Seed Savers' Exchange (SSE). Kent Whealy,

Director of SSE, recognizes the problem and has suggested that the SSE could drop cereal listings, saving work and paper for SSE, and eliminating the problem of duplication for both organizations.

Gary and Steve emphasized the importance of "collecting" cultural information as well as seeds, so that we understand how varieties were important to the people who have grown them, and what they might offer to us. Gary suggested that the Grain Exchange could become a clearing house of information on old grain varieties, how they were grown and used, and serve in a consulting role to living history farms and museums.

For the current year, as we consider the possible directions for the future of the Exchange, we are concentrating our horticultural efforts on a few rare varieties of maize adapted to this area and to older varieties of winter wheat. Last summer we grew thirty-five varieties of corn, all but three in small plantings requiring hand pollination. This summer we are growing only a third as many varieties. In June and July we will harvest grain from thirty-odd winter and spring small grains, mostly sown in 36" x 60" plots in the Land Institute garden. We have a larger planting, totaling one-half acre, of three winter wheat and two rye varieties. The Exchange will continue to publish a newsletter with articles on genetic resources, growing and harvesting techniques and technologies, and historical and biological background of various crops. For more information on the Grain Exchange, please send a large self-addressed, stamped envelope.

"Elegant Solutions Predicated on Place"

The Land Institute sponsored a seminar on March 30 and borrowed a phrase from John Todd (Ocean Arks International) for the title. The thirty participants in the session included three special guests: Gary Nabhan of the Desert Botanical Garden in Phoenix, Arizona; Steve Gliessman from the University of California, Santa Cruz; and Stan Cox from Kansas State University. Joining Stan in the trip from Manhattan were Land Institute Board member and KSU professor emeritus Orville Bidwell, Lee Ann Harrell, USDA research technician, and David Margolies, Entomology Department. Other invited guests were Kelly Kindscher, former Land student now doing graduate work in ecology at the University of Kansas, Dianna Rogers of the Central Prairie Seed Exchange, Doug Hemken, a graduate student at the University of Kentucky working on a National Science Foundation Project evaluating plant germplasm programs, Mark Slater, a 1986 agricultural intern now working

with Gary Nabhan in Phoenix Arizona, and the visiting parents of current intern, Karen Finley.

The morning session began with a talk and slide presentation on agroecology among the traditional people of the Sonoran region by Gary Nabhan. Gary talked about the causes of genetic erosion of germplasm. He pointed out that crops were abandoned due to the dying of tradition, economic change and outmigration, destruction of farm habitats, the takeover of land or water by newcomers, replacement of indigenous multi-cropped plantings by monoculture, and land race replacement by improved hybrid cultivars of the same crop species. Gary believes that plant genetic erosion has been triggered by impacts on indigenous cultures far more pervasive than the recent green revolution consequences. Preserving native cultures is essential to preserving germplasm.

Steve Gliessman spoke about agroecology in Costa Rica and Mexico. His slides showed agricultural systems which focused on the processes of production rather than only what one could get out of the system through harvest. Gary had just explained the importance of short season corn varieties to take advantage of the short rainy season of the desert bioregion. Steve showed one Mexican lowland system where 60 day corn was necessary to take advantage of the short dry season. Standing water on the ground made it impossible to grow crops for the rest of the year. Other wetland agroecosystems Steve had visited used a network of canals to drain fields during the wet season and to hold water during the dry season. Fertility in the fields was maintained through planting nitrogen-fixing trees along the canal banks, spreading the muck from the bottom of the canals on the fields, returning animal manure to the fields, and practicing crop rotation. Gary and Steve each showed convincing examples of complex, elegant solutions developed by indigenous farmers of the Americas.

After a lunch prepared by Land Institute students and staff, the seminar continued with a talk by Stan Cox, USDA Research Geneticist at Kansas State University working in germplasm



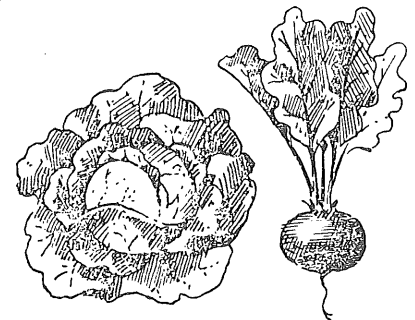
Thom reads Albert Arens' letter to Gary Nabhan, Kelly Kindscher, Steve Gliessman, Doug Hemken, Orville Bidwell (chairs) and Karen Finley (floor).

enhancement of wheat. Stan talked about using land races and wild species to broaden the genetic base of winter wheat. In contrast to the genetic erosion occurring among traditional peoples in the less-developed world, in Kansas, the winter wheat crop has become increasingly more diverse through this century (though the genetic base is still quite narrow). Stan's work involves the evaluation of land races and various wild wheat relatives for traits useful in developing resistance and for general enhancement of winter wheat. His presentation showed the techniques used in making inter-specific crosses necessary to incorporate wild germplasm into his breeding material.

The afternoon concluded with a discussion directed by Thom Leonard. Nebraska corn breeder and seedsman, Albert Arens was invited to the seminar, but could not attend, so Thom read parts of a letter from Albert describing aspects of his breeding work. The group then discussed the importance of including more than yield and profit in establishing criteria for breeding programs and for evaluating agroecosystems. Sustainability and human values are inherent in elegant solutions, and indeed, elegance may be a prerequisite for any real solution.

Central Prairie

Seed Exchange



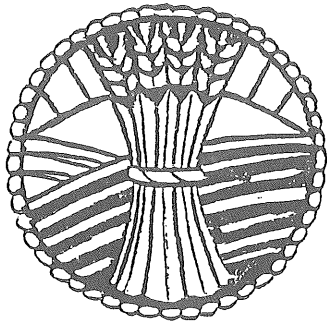
A handful of persons from Kansas, Nebraska and Oklahoma formed the Central Prairie Seed Exchange in the summer of 1986. Interest in such an organization was sparked at The Land Institute Prairie Festival by a workshop about regional organizations presented by Gary Nabhan and Karen Reichardt, founders of Native Seed Search, and Kent Whealy founder of Seed Savers Exchange. The objectives of Central Prairie Seed Exchange are

- to seek out, save, and distribute locally adapted plant varieties;
- to preserve the great central prairie's plant diversity;
- to develop opportunities for personal and community education in this endeavor.

The annual dues of \$10 provide members a quarterly newsletter, seed exchange and annual meeting in November, localized spring scion exchanges, and local summer garden tours. New members should send dues to the treasurer Curt Jensen, R.t 1, Box 59, Superior, Nebraska 68978.

To contribute to the newsletter, send information or articles to the editor Cathy Love, 321 Lake Rd., Guthrie, Oklahoma 73044.

Dianna Rogers, 7949 W. 21st St., Topeka, Kansas 66604, is president of the organization.



Kansas Organic Producers Meet

Jennifer Delisle and Beth Gibans

On Saturday March 12, organic producers from all across Kansas participated in the annual meeting of the Kansas Organic Producers (KOP). Over eighty growers and supporters gathered in Salina from all parts of Kansas for a day of business, speeches, workshops, and, of course, food and festivities. Kay Johnston of Wichita, who organized the morning registration as well as the noon and evening potlucks, recruited several Land interns to help register people as they arrived. Practically every kind of organic grower was represented, from the household gardener to the small-scale diversified farm to the large scale commercial grain and livestock farmer. The members shared a common goal -- to build a strong future for organic farmers.

KOP has grown out of the developing realization of the need for interdependence among organic farmers. The organization began in 1975 as a small group of organic growers concerned about their health and that of the environment. It has expanded to include a wider farming community.

Organic farmers, generally small and often ineligible for government subsidy programs, are left alone to deal with the challenges of operating a profitable small scale farm. In Kansas, marketing of organic crops has not been well organized. Many organic grain farmers have no option other than to sell to the local grain elevator for the same price as their neighbors farming conventionally. In addition, organic farmers have little access to information and technical assistance. USDA and university researchers have not studied organic practices, and the extension service has not served the organic farmer.

These factors would seem to indicate that organic farmers are struggling on their own, that they are perhaps more independent and self-reliant than their conventional counterparts. To some extent this has been true. However, many organic producers have come to realize that independence isn't enough and in the long run isn't desirable. Farmers have discovered that they need a formal community for markets, information and support. KOP is working to develop and strengthen this community.

Of particular concern to KOP members is the need for better marketing organization and appropriate research from the land grant colleges and the U.S. Dept. of Agriculture.

The issue of whether or not KOP should join the National Farmers Organization (NFO) generated considerable discussion at the annual meeting. The NFO is a non-profit organization which was established to meet the marketing needs of family-owned grain and livestock operations. Farmers attempting individually to market their products lack the time and resources necessary to find reputable buyers and consistent markets. The NFO conducts credit checks on potential buyers and seeks out those with favorable payment histories. If a buyer then fails to meet the terms of his contract, the NFO will pay the grower the price agreed upon. This insurance is covered by annual member dues.

The NFO gains its strength through collective bargaining. Members marketing through the organization act as a single unit, working with, rather than competing against, one another. The NFO representative negotiates with the buyer, bargaining for a fair price and arranging the details of a sale. Growers may stipulate their own terms, although since this limits NFO's bargaining power it is not encouraged. A grower who is an NFO member is not obligated to sell through the organization and is always free to market as an individual if it is in his or her best interest to do so. The NFO, however, will not market for non-members.

The NFO has only recently begun to market organic products. Buyers for organic goods tend to be small and dispersed, making marketing complex and expensive. Also, there is currently no state government certification process for organic products in Kansas; therefore the definition of organic is not consistent among growers.

In order for growers to receive a premium price, an accepted definition of "organic" is necessary. Currently it is up to the grower's discretion to decide if he or she can market as organic. But buyers usually will pay a premium only for certified organic products. KOP is now considering adopting the certification standards of the Organic Crop Improvement Association (OCIA). If these standards are adopted, all KOP members will be required to meet them if they wish to market as organic. Through the OCIA, farm inspections are conducted to assure compliance. Terms include no pesticide use for three years and no synthetic fertilizer use for two years. Local chapters are set up to handle these inspections. Farmers must keep a record

of their field history, detailing moisture content, pest control and other factors. They must also institute a crop improvement plan which will insure uniformity of product.

To address the possibilities for further research on organic practices in Kansas, KOP invited Dr. Rhonda Janke, Director of Agronomy at Rodale Research Institute, to give the keynote speech. She briefly outlined the research being conducted at Rodale within each of the several project areas, such as the garden, new crops, perennial grains, cropping systems, and weed management.

Of particular interest was her description of the on-farm research project Rodale is conducting with 10 Midwest organic farmers. Farmers interested in doing research on their own fields with no monetary compensation have been selected to participate. Each farmer must focus on a single question. The research design consists of six replications of a single experiment, with two treatments on each replication plot. Results from such an experiment can be fairly conclusive, and the research can then be fine tuned the following year to address the same or a different question. Little equipment is needed (weigh wagon, moisture tester and combine record monitor), and the farmer can easily implement and monitor the project.

Dr. Janke's example demonstrates a simple model for an on-farm research program that could be replicated in Kansas; it is relatively easy

to undertake, requires few overhead costs, and very directly addresses farmers' interests and needs. Presently, no strong research program, on-farm or off, exists at Kansas State University (KSU), Kansas' land grant university, that investigates sustainable agricultural techniques. Dr. George Ham, chair of KSU's Agronomy department, spoke very generally about current research initiatives attempting to address some issues related to sustainability.

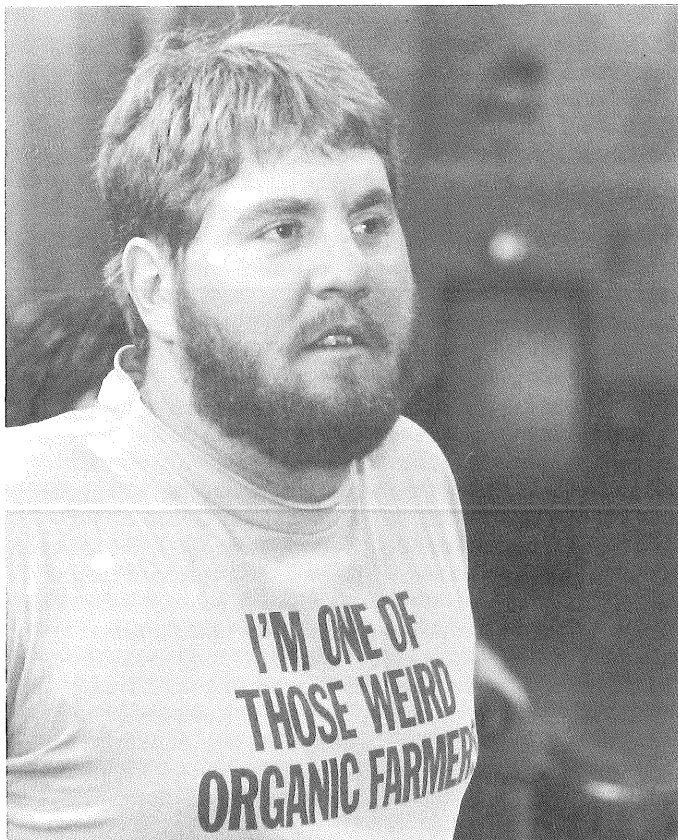
More specifically, Dr. Warren Sahs of the University of Nebraska's Agronomy Department discussed a sustainable agriculture research project that they are conducting in Mead, Nebraska. Initiated in 1975, this project involves a four year sequence of rotating crops between oats/clover, corn, soybeans, and corn. Feedlot manure is used on the trial plot as fertilizer and no herbicides or pesticides are applied. The results so far have been positive, indicating that in most years yields from organic fields are close to those in conventional fields, and in drought years the organic plot fares better. Dr. Sahs also expressed an interest in setting up an on-farm research project in Nebraska.

This was all received very positively (the audience being who it was). Many organic farmers are eager to participate in research to improve the information available to them. The challenge will be to get an actual program in place.

Other interests were discussed throughout the day in the various workshops. Thom Leonard, director of The Grain Exchange, with Dianna Rodgers of the Central Prairie Seed Exchange led a workshop on the importance of preserving native seed. Kelly Kindscher presented some uses of native prairie plants. Jim Cooley talked about the art of tofu making. These and several other workshops provided an opportunity for members to share information and ideas in small, informal groups.

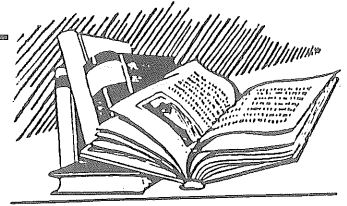
The day's agenda was full and varied. Judy Nickelson, the new KOP secretary, did an especially good job of arranging the details of the program. For those who didn't need to rush home, there was square dancing in the evening with music provided by members of the Jayhawker Old Time Dance Band featuring caller Mike Rundle. KOP president Joe Vogelsberg seemed to especially appreciate the chance to put on his dancing shoes after a long day's work.

Throughout the day a rallying call was made for increased cooperation among the organic farming community. In order to develop stable markets, encourage local research and share ideas and information, a close networking of farmers is necessary. Through these interactions, growers can reap the benefits of community while maintaining the integrity of individually owned farms.



Joe Vogelsberg





Feeding a Billion: Frontiers of Chinese Agriculture

by Sylvan Wittwer, Yu Youtai, Sun Han, and
Wang Lianzheng.
Michigan State Univ. Press, E. Lansing, 1987.
cloth: 500 pages, 45 color photos, \$30.00.

Reviewed by *Orville Bidwell*

"The impacts of Chinese agriculture on the world food market by the 21st century may well compare with that of Japanese industry on world business in the 1980's," warns Sylvan Wittwer, senior author of *Feeding a Billion*.

This is the first authoritative work on China by an American in conjunction with knowledgeable Chinese agricultural scientists and one of the most comprehensive works in English on Chinese agriculture since F.H. King's 1911 classic, *Farmers of Forty Centuries*. *Feeding a Billion* presents an impressive array of up-to-date commodity and resource data reflecting trends of the past decade in agricultural production technology that have enabled China with 7% of the earth's arable land to essentially eliminate hunger for 22% of the world's population.

Its 37 chapters aptly describe efficient food-producing systems and sideline industries that have developed during the transitional period from a state-controlled economy to a market-driven one. In this "responsibility production system" (Zhe Renzhi), the state land owner returns the land to families and small groups to farm.

Sylvan Wittwer, Director Emeritus of the Agricultural Experiment Station at Michigan State University, effectively used five trips to the People's Republic of China from 1980 to 1987 to arrange with Chinese agricultural scientists to produce this remarkable volume. Nine chapters, including the Introduction and the last two, are Wittwer's; the others are those of his Chinese collaborators. There are chapters entirely devoted to particular crops, such as grains as corn, soybeans and barley, and vegetables such as the sweet potato and Chinese cabbage. Overall the book describes the goals, achievements and problems of the contract responsibility system of agricultural production that successfully has improved China's food-producing capabilities from 1978 to 1986.

The success of Chinese agriculture is corroborated in the preface by Nyle Brady, Senior Assistant Administrator, Science and Technology, U. S. Agency for International Development, and in dust jacket laudatory comments by respected American authorities, Norman Borlaug of the International Maize and Wheat Improvement Center and John Hannah, Executive Director of the United Nations World Food Council.

The dramatic surge in food production began in December 1978 when the 11th Congress of the Central Committee of the Chinese Communist Party, recognizing the disadvantages of overcentralized management in running the peoples' communes, replaced the old inefficient practices with an output-related system that placed individual households in charge of production.

Under the new production responsibility contract, economic incentives have been substituted for bureaucratic control. Farmers are contracted to deliver a quota of farm products at a fixed price and to make payments to a common accumulation fund of a collective economic organization. With the payment of the obligation, they're allowed to grow anything they want and sell competitively for whatever price they can get on the so-called "free market." Now they can work to meet the demands of the market; before 1978 they only worked to meet the quota. What to plant and when become issues of profit and loss, and only the most profitable crops are grown. Working to become rich is not just legitimate, it is encouraged.

Gone are communes and state farms with their brigades of workers. Now much of the planting, tilling and harvesting is done by individual farm families early in the morning and late afternoon, before and after working in the factories. Wittwer claims that today's China is the hallmark of success in food production and agricultural reform. Based on the accomplishments of the past decade, he predicts that Chinese agricultural production likely will grow at least twice as fast as the population and continue to make the positive advances responsible for his startling prediction in the first paragraph.

WALKING ON TWO LEGS

With no additional land on which to expand, food increases have had to come from an across-the-board increase in crop yields and improved natural resource management, using a curious mixture of ancient traditional experience and ultra-modern technology, a combination known to the Chinese as "walking on two legs."

Traditional methods, meticulously described by King in his *Farmers of Forty Centuries* seventy-five years ago, include crop rotations with a legume and recycling of organic manures and compost. Farmers use time to compensate for space limitations by transplanting and employing multiple-, and relay-cropping systems to obtain as many as two, three, or sometimes four crops a year from the same tract of land.

Intensive cropping systems and programs of water management that included irrigation and

drainage long were used to cope with the shortage of arable land, as well as the floods in the south and frequent droughts in the north that led to the old farming proverb: "A good or bad harvest depends upon fertilizer, but water determines whether you get any harvest at all."

Today, with 116 million acres under irrigation compared to 34 million in 1949, water conservation holds top priority, for although first in population, China is sixth of the world's nations in water resources. Sun states that water for crop irrigation is the most important factor in achieving dependability and increasing the magnitude of food production because rainfall is undependable, varying from season to season and from year to year.

Rice and sugarcane, two of China's important crops, are notoriously high water consumers. Also, the high-plant-density designs which efficiently use the five and one-half hours of sunshine that two-thirds of China averages daily, require large amounts of water. In no other systems are crops so demanding of moisture as the layered vegetation plantings, relay cropping systems or companion plantings.

Additional modern methods are being used to extend the margins of food production in many directions, including the most feared environmental impositions: damages by weather, insects and disease. Plastics are revolutionizing crop production by increasing yields and extending the growing season. They help solve the weather and climate problems by achieving higher and more constant temperatures, conserving water by reducing evapotranspiration, protecting plants against cold and freezing temperatures and hot drying winds, and protecting the seed-root bed against excessive downpours of rain and hail that cause soil erosion and compaction. In addition plastics improve fertilizer availability and increase vegetative growth, as well as provide effective weed control.

Although inorganic chemical fertilizer use in China tripled from 1975 to 1983 (the fastest rate of growth of any country using large amounts) and is expected to double between now and the year 2000, the ancient practice of incorporating up to 30 tons of long-lasting organic manures per acre per year as a basal fertilizer is still popular. By top-dressing with the more soluble inorganic chemical fertilizers, they can also provide instantly available plant nutrients.

The Chinese have no peers in their ingenious recycling and efficient use of human and animal wastes, peats and humic manures, green manures, and domestic and industrial wastes. Well-decomposed wastes are used for early maturing, short-season crops; less decomposed wastes, for late-maturing crops. Yu states that pigs, 90% of which are privately owned, are fed mostly wastes, and are raised primarily for the manure they produce.

A major factor in China's ability to feed its billion has been the emphasis on crop improvement through the use of tissue culture in

plant breeding and selection and the use of its vast germplasm resources in the rice, soybean, and vegetable breeding programs. China leads all nations in hybrid rice research and had released ten dwarf rice cultivars by 1966 when the International Rice Research Institute released IR-8, its first of a series of "miracle rices." Likewise, breeding high-yielding, superior tillering, semi-dwarf and dwarf wheat cultivars that are insect and disease resistant made China the world's leader in wheat production in 1984. Similar improvements have been accomplished in the germplasm of corn, millet, sorghum, sugarcane, sweet potatoes, Irish potatoes, rape, peanuts, and countless fruits and vegetables.

Another across-the-board technology contributing to the burgeoning productivity of many crops has been the integrating of the traditional biological insect and disease controls with limited use of commercial pesticides. Anyone interested in minimal use of toxic chemicals in farming should study the Chinese pest management system that uses improved varieties, cultural practices, and natural enemies to control insects and diseases.

Pork production has been increased without a sizable increase in the number of sows by increasing the number of litters per sow per year, the number of weaned piglets, the number of fattened pigs for sale, the carcass weight of each pig and the percentage of lean meat.

Fish production has been increased by penning pigs near fish ponds so that pig manure can nourish both the pond's vegetation and the fish. Mulberry trees grow in the dikes so that silk-worm feces and pupae fall into the ponds to benefit both vegetation and fish. Unlike in the United States, pond eutrofication is considered beneficial and the products periodically are removed to fertilize field crops.

By "walking on two legs," the Chinese now export rice, wheat, corn and soybeans and lead in the production of wheat, rice, sweet potatoes, rape seed, sesame, pears, chickens, ducks, geese, rabbits and products of aquaculture.



The reviewer, Orville Bidwell (right), professor emeritus in soils at K.S.U. and member of Land Institute board of directors, talks to Steve Gliessman at Land Institute germplasm seminar.

They are second in corn and peanuts, third in soybeans, and fourth in sugar and sunflowers.

CURRENT AND POTENTIAL PROBLEMS

With all of the accomplishments, however, the new Chinese system is not free of problems, and the future holds many questions according to Wittwer.

In handling such a vast production, how can they maintain quality through post-harvest handling, packaging, storing, transporting, processing, distributing and marketing, especially of the perishable produce?

What and how much mechanization can be introduced to the countryside without a wholesale replacement of farm workers so that they leave the soil but not the village, and enter the factories but not the city?

Will the individual households continue the laudable integrated pest management system previously conducted by the collectives?

Can the current annual 5% agricultural growth be maintained and the goal of quadrupling the 1980 production be achieved by the year 2,000?

Will the current recognition by academia, the press, and the central government of the environmental problems of air pollution, soil erosion, water pollution due to the precipitous rise in nitrogen-fertilizer usage and acid rain be sufficiently strong to support a permanent campaign to solve these formidable problems?

Can the ever-present problems of nitrogen loss and disease pathogenic organisms associated with recycling of organic wastes be permanently resolved?

How long can the Chinese continue intense farming practices that destroy soil organic matter and soil structure and contribute to accelerated soil erosion, especially on the problem soils comprising one-third of their cultivated land?

Even with all these uncertainties, Wittwer says that China is a model to be emulated by the developing nations, for it is a country that has essentially eliminated hunger. He says that China has developed a self-sufficient sustainable agricultural system that may interest advocacy groups looking for alternative food-producing technologies such as organic farming or regenerative systems of agriculture.

Can today's successful family planning program in China be continued through this century? Much is left unsaid in the book about the number one problem, population, and the difficulties of providing so many people a satisfactory quality of life (adequate transportation, communications, etc.) This may be the pivotal question which determines whether China can continue successfully to feed its population.

Feeding a Billion, in this reviewer's opinion, should interest anyone contemplating living in the 21st century, because the combination of the Chinese socialistic regime's land policy and its citizens' strong work ethic is bound to have a significant influence on life in the U.S. as well as in China.

Breaking the Pesticide Habit:

Alternatives to 12 Hazardous Pesticides

by Terry Gips

International Alliance for Sustainable Agriculture, St. Paul, Minnesota, 1987.

Reviewed by *Terry Shistar*

Breaking the Pesticide Habit is a report from the International Alliance for Sustainable Agriculture with a threefold purpose. First, it is written as a basic text on pesticide alternatives for a popular audience. Second, it is designed to provide information about twelve of the most hazardous pesticides as identified by the Pesticide Action Network (PAN). PAN'S "dirty dozen" are chlordane/heptachlor, chlordimeform, DBCP (dibromochloropropane), DDT, the "drins" (aldrin, dieldrin and endrin), EDB (ethylene dibromide), lindane/hexachlorohexane, paraquat, parathion, pentachlorophenol, toxaphene, and 2-4-5-T. Finally, the report is intended to help meet the needs of policy makers, farmers, extension agents and households for a useful compendium of alternatives to hazardous pesticides. In this regard, it is meant not as a quick source for chemical replacements, but as a basis for sustainable agriculture policy.

The first three chapters of *Breaking the Pesticide Habit* provide background on pest control and sustainable agriculture. These chapters discuss the evolution of pest control, success with Integrated Pest Management in cotton, and the usefulness of the sustainable agriculture perspective in developing agriculture policy.

The bulk of the book consists of twelve chapters on the dirty dozen--their uses, their dangers, and alternatives to them.

The last chapter gives recommendations, based on the study of these pesticides, for policies that would promote sustainable agriculture.

Finally, there are several appendices, which should not be neglected because they are isolated at the end. They contain, for example, valuable discussions of pesticide development, marketing, and regulation, as well as a comprehensive list of resources.

The principal conclusion is inescapable. In reading chapter after chapter, there is mounting support for the conclusion that less hazardous alternatives exist for all of the the dirty dozen, and often the most effective control measures do not involve biocides at all. I use the term "biocide" for a chemical that is dangerous to living things in general. There are some biologically-based pesticides that are not biocides. Some such pesticides (for example, *Bacillus thuringiensis*, known as BT) do share some of the other problems of biocides--

such as negative impacts on non-target organisms and the development of resistance to them by the pests they target.

I found the first three chapters most valuable as material for a text or as a reference for those making public policy. Chapter 1 tracks the evolution of pest control from the first pests, through the development of different classes of pesticides, to the maturing of Integrated Pest Management. The history highlights key issues, to which the author returns in later chapters: secondary pests, resistance, and ecological and human health impacts.

Chapter 2, a case study of insect pest management in cotton, plays a central role in the report. The history reveals to what extent pesticide use has created more problems than it has solved. It shows how much of the "need" for "pest control" is really a desire to avoid certain types of labor and, especially, planning.

Chapter 3 develops the concept of sustainable agriculture and its relationship to other concepts. It gives a convincing argument for the central role of sustainable agriculture (defined as agriculture that is ecologically sound, economically viable, socially just, and humane) as a unifying concept.

The chapters on the dirty dozen contain much evidence about how pesticide use and development violates the ethic of sustainability. For example, the chapter on chlordimeform relates how Ciba Geigy hired children to stand in a field and be sprayed with chlordimeform. Ciba Geigy's response to critics was, "The tests were conducted under normal working conditions."

Breaking the Pesticide Habit provides abundant documentation for alternatives to the dirty dozen. Many of these are also alternatives to the use of other chemical pesticides, showing that there are pest control measures which can substitute for the major uses of most pesticides. The sources for the documentation include an extensive search of the literature, a survey of 2,000 scientists, farmers, government officials and organizations, and research conducted by the author for a forthcoming book on sustainable agriculture worldwide.

The chemical-by-chemical format creates a juxtaposition of problems and solutions that is easy to read. It should also prove to be extremely valuable in efforts to ban these particular chemicals. However, the format has some shortcomings. First, the author must choose between repeating the whole story of a particular pest for each pesticide used to control it and introducing something new each time. In fact, Gips does some of each, which means that the reader has to search to get the whole story on rice stem borers, for example. Second, the format may reduce the report's impact on genuine pesticide reform measures.

In some sections, there is a lengthy description of all the alternatives for various pests in a given crop. It would be helpful to have a brief summary at the end of each section such as, "In short, there are no uses of DDT in

THE DIRTY DOZEN

(established by the international Pesticide Action Network)

the "Drins" (Aldrin, Dieldrin, Endrin)	DDT
EDB (Ethylene Dibromide)	2,4,5.T
Chlordane/Heptachlor	Parathion
Chlordimeform	Paraquat
DBCP (Dibromochloropropane)	HCH/Lindane
PCP (Pentachlorophenol)	Toxaphene

cotton for which a safer alternative does not exist and only rarely should insecticides be needed at all."

As Gips points out in his book, current regulation of pesticides in this country under the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) leaves much to be desired. Although pesticides pose greater risks to public health and the environment than toxics used in other ways, FIFRA sets a much weaker standard of safety than statutes regulating other toxics. Apparently our nation is willing to tolerate the intentional dispersal of toxins into the environment because we have been convinced that we need them in order to produce food, protect our homes, and reduce nuisances. Therefore, a critical part of pesticide reform will be documenting the existence of alternative methods of pest management.

In this report, Terry Gips has gathered much of the documentation that is needed to bring our message to Congress. However, it is not arranged in a format that will easily get the message across. What a citizen activist needs in order to convince a Congressional representative of the minor, limited role pesticides should play in pest management is information that is crop- or site- specific showing where alternative strategies are documented and where they are not. Chapter 2 does this (and more) for cotton. In the realm of legislative strategy, the most useful documentation would be that which shows the faults and falsehoods in the "need" arguments for pesticides.

Terry Gips has certainly succeeded in two of his goals for this report. First of all, he has produced a very good and readable basic text on pesticide alternatives and an introduction to sustainable agriculture. Second, he has succeeded in providing documentation showing the need to ban each of the "dirty dozen."

Copies of *Breaking the Pesticide Habit* are available for \$24.95 (institutions), \$14.95 (individuals), or \$12.95 (IASA) members, plus \$2.00 for postage from The International Alliance for Sustainable Agriculture, Univ. of Minnesota Newman Center, 1701 Univ. Ave, S.E., Room 202, Minneapolis, Minnesota 55414.

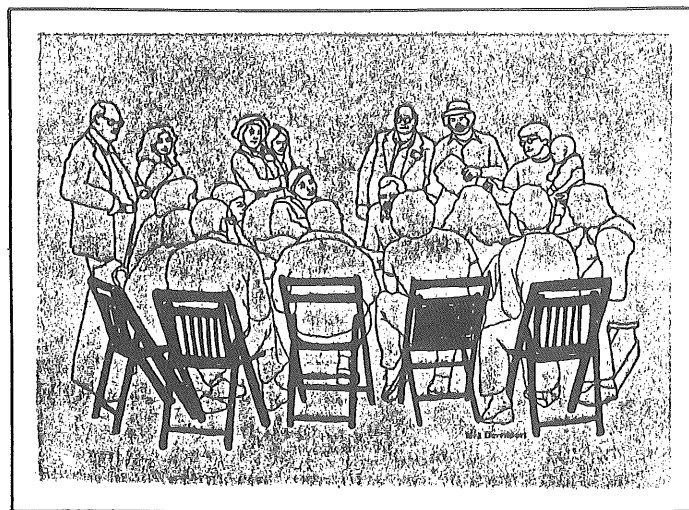
Terry Shistar, reviewer of this book, is a member of the board of directors of the National Coalition Against the Misuse of Pesticides and co-author of the Sierra Club's pest management policy. She wrote "The Future of Pesticide Reform" for Land Report # 30.

Sustainability and Strong Democracy

David Orr

If environmental issues are inherently political, as I think they are, building a sustainable and durable society will require civil renewal leading to what political theorist Benjamin Barber calls "Strong Democracy." (See *Strong Democracy*, Univ. of California Press, Berkeley, 1984). It is roughly equivalent to rebuilding the crumbling foundation before trying to remodel the house. Despite our rhetoric about democracy, real democratic participation is in decline. Whether from apathy or disgust, half of the eligible population does not vote. Opportunities for participation have declined with the rise of the mega-corporation and public bureaucracies. People are losing control over the basic conditions of their lives. What de Tocqueville regarded as the seedbed of democracy (the civil association in the small town, the neighborhood, the workplace) is in disarray. Where they are intact, public interests are in a continual David and Goliath struggle against huge blocks of power and money. From the perspective of Goliath, ideas that Iowa topsoil ought to stay in Iowa, or that poisons don't belong in the environment are dismissed as idealistic or worse.

The process of civic renewal is grounded in the recognition that politics is the process by which we define the terms of our collective existence. That that existence is now in real jeopardy would inform the minimally alert that something is gravely wrong with those political processes. In such a world no one can be apolitical. To avoid political matters is only to leave them to others. Democratic politics is grounded in the faith that everyone is entitled to a voice in political matters, and that no one, whether by circumstances of wealth or birth, is entitled to more. Representative democracy is an uneasy compromise between democracy and demography with a touch of fear about mob rule. "Strong democracy," on the other hand, is premised on the belief that people can and do act responsibly, given the opportunity, and that those opportunities can be nurtured in a mass society. Barber proposes twelve steps to this end including the following: 1) a national system of neighborhood assemblies, 2) a civic communications cooperative, 3) a national initiative and referendum process, 4) electronic balloting, 5) a lottery for local offices, 6) universal citizens service, 7) workplace democracy, 8) a new architecture of civic space.



Barber argues that strong democracy is the "only legitimate form of politics (and) constitutes the condition for the survival of all that is most dear to us." To this I would add that strong democracy or some comparable program of civic renewal is a prerequisite for sustainability as well. The connection is often missed or ignored.

Significant mischief in human affairs most often begins behind closed doors. And it is concentrated power that enables a few to close the doors to the many. The usual arguments for oligarchy of any kind rest finally on the premise that the public is incompetent to decide matters of public concern. Behind Oliver North's efforts to create democracy in Nicaragua is the belief that it doesn't work here and so must be subverted by whatever means necessary. The case for technocracy is similar. Technological issues, we are told, are so complex that only experts can make intelligent choices. In the full light of day, such arguments can be seen for what they mostly are, which is self-serving bamboozlement by people who have little or no sense of the public interest and little understanding of the democratic process, and a great deal to gain by remaining aloof from both.

We might dismiss the issue here except that the steady erosion of democratic participation also effects the prospects for sustainability and, I think, for peace. The centralization of power has removed many resource decisions from the public arena. Disposition of large tracts of land and resources including the use of common properties like air and waters are made as if they were private decisions with wholly private consequences. The concentration of power deflected the development of technics away from tools and toward the kind of machinery necessary for large scale resource manipulation and extraction, the machines necessary to level mountains, divert rivers, split atoms, and alter genes.

The crisis of sustainability is, to a great extent, about the consequences of these processes of centralization and scale operating unfettered by effective public constraints or private morality. These constraints were eroded as the independent shopkeeper, farmer, and small businessman became employees in enterprises over which they exerted no control. If dependence begets venality, as Jefferson once said, it also leads to demoralization, confusion, and passivity in the face of wrongs. But not infrequently those wrongs occurred incrementally as a quiet crisis, or in remote areas where few could see what was happening. In either case the institutions, attitudes, and independence necessary to resist were weakened at the source. The soft nightmare of Brave New World is no longer an idle fantasy in a world of genetic engineering, computers, fusion reactors, star wars technologies, television and total convenience. And can anyone seriously believe that sustainability will be taken seriously by persons so single-mindedly captivated by Faustian ideas of progress?

Civic renewal begins with the dispersal of power and the extension of the range of things decided by those effected. Participation is both a way to acknowledge those effects and to elevate public discourse. It is also a recognition, in Jefferson's words that there is:

no safe depository of the ultimate powers of the society but the people themselves; and if we think them not enlightened enough to exercise their control with a wholesome discretion, the remedy is not to take it from them, but to inform their discretion.

Informed public involvement is also a way to develop more prudent policy choices. Where an active citizenry is involved, we may expect greater equity in the distribution of costs and benefits. We might also expect their vigilance to exert a countervailing power to elites with purely private interests. As de Tocqueville, Dewey and others have noted, civic education can only occur through participation in neighborhood, community, and workplace decisions. Civic education for the sustainable management of food, energy, water, materials, and waste can only occur if people have a part in these decisions and understand their consequences.

The success of any program of civic renewal also depends on the reversal of two centuries of social atomization. Citizenship implies the priority of interdependence over self-interest. For people whose heroes are lonely cowboys or egotistical rock stars, this may be a difficult lesson, one made all the more difficult if it must be learned under duress of scarcity. The requirements of sustainability will also lead us to recognize that we are citizens of a larger

community whose individual and collective well-being is tied to that of the larger fabric of life.

Having argued that Barber's case for strong democracy and civic renewal is a necessary condition for sustainability, I must still acknowledge a large gap of the "then-a-miracle-occurs" size. That gap can only be filled by the emergence of leaders at all levels whose loyalties go beyond party or nation to humanity and the planet. They will not be the dividers and hate mongers who can only appeal to fear and greed. They will be persons of a different sort, possessed of vision, spiritual depth, intellectual breadth and courage. The self-described "realists" have had their time. They are the makers and perpetuators of our nightmares, able to offer no realistic blueprint or even reason for human survival. It is now time for visionaries - those able to dream as Gandhi and Martin Luther King did - of men living in harmony and justice. Humans are creatures of symbols, and one of the tasks for a new generation of leaders is to change the symbols for which we struggle, fight and die. Consider the power of a new tradition in American political life of a President-elect making a pilgrimage to ground zero at Hiroshima to take an eloquently drafted "never again" oath on bended knee. Better yet to issue an invitation to the heads of all nuclear armed states to join in the oath. Or the power of empathetic identification with the suffering of others: that same President standing head bowed at a Russian cemetery outside Volgograd. We will not build the constituency for sustainable futures on mere logic. We must fire the imagination which alone will ignite the actions necessary to build that future. If sustainability implies, as I believe that it does, doing with less and accepting limits, these constraints must be placed within a compelling moral vision. "Humans," in the words of Erazim Kohak, a philosopher at Boston University, "can bear an incredible degree of meaningful deprivation, but only very little meaningless affluence" (*The Embers and the Stars*, Univ. of Chicago Press, 1984).

FURTHER READING ON STRONG DEMOCRACY

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Society as a Maturing Ecosystem

Jake Vail

In a groundbreaking article written nearly twenty years ago, Eugene P. Odum outlined "The Strategy of Ecosystem Development."¹ Central to his thinking was a perception of ecosystems as measurable units of biological organization. In so treating systems, Odum was able to plot stages of their development just as one might follow the stages of an organism's development. Reading the article recently, I was struck by the similarities in the successional stages of ecosystems and some of the properties exhibited by human society as cultures have increased in numbers, mixed, and dispersed around the globe.

At The Land Institute our curriculum is divided into two complementary foci: investigations into sustainable agriculture and considerations for a sustainable society. We've long maintained that we can't have one without the other, and I think a new look at society can contribute to the discussion of both. A sustainable agriculture must necessarily use nature as a model, and solutions are therefore predicated on place. In central Kansas our model is the climax ecosystem of the prairie, thus understanding how the prairie evolved will aid in establishing working regional agro-ecosystems. Perhaps the lessons learned can also serve as guidelines in a succession toward a sustainable society.

The study of ecosystems as units of organization is relatively new. Naturalists of the nineteenth century largely looked at nature descriptively, viewing the whole as the sum of its many parts. Darwin, for example, went on his voyage aboard the *Beagle* primarily to collect and inventory "new" species. Sigmund Freud similarly explored the uncharted territory of the human psyche by dividing it and labeling its parts. Society, too, was viewed as an aggregate, its form the result of interacting individuals. We now realize that such ways of describing systems are at best incomplete. Ecology has overshadowed taxonomy and the short comings of Freud's descriptions are generally acknowledged. Likewise, we are beginning to view human society in a new light.

Ecosystems are defined as "all the organisms in a given area interacting with the physical environment."² Looking at human society as an ecosystem, rather than within an ecosystem, is thus somewhat counter-intuitive, for the "environment" must be included within society. Society must be seen as more than a dynamic assemblage of communities or populations. I've found it helpful here to refer to Gregory Bateson, who said, after all, "The big enlightenment comes when you suddenly realize that all this stuff is description."³ The environment in which we live and which we shape, even as it shapes us, is that of Mind, which Bateson sees as being "immanent where there are a number of

parts, moving and mutually constrained."⁴ As such, Mind is different from intellect or knowledge or cleverness or wisdom, all of which, however, are included within human culture as organism.

In his article, "The Strategy of Ecosystem Development," Odum listed three parameters of ecological succession. 1) It is an orderly process of community development that is reasonably directional, and, therefore, predictable. 2) It is community controlled even though the physical environment determines the pattern, rate of change, and often sets limits as to how far development can go. 3) It culminates in a stabilized ecosystem in which maximum biomass (or high information content) and symbiotic function between organisms are maintained.⁵

Already some parallels can be drawn between maturing natural ecosystems and human society. Few would argue that we haven't matured from a prehistoric "pioneer stage." The second parameter might be viewed as our accumulating knowledge determining our direction as we work within "the pattern that connects,"⁶ (Bateson's Mind). We're obviously not yet a stabilized system, but taking Odum's "biomass as information content" a step further, cultural information may be seen to increase just as biological information does, and as it does we find symbiosis - cooperation - easier, and, indeed, necessary.

Odum lists many attributes of ecosystem development in both developmental and mature stages, dividing the discussion into categories such as Community Energetics, Community Structure, Nutrient Cycling, Selection Pressure, and Overall Homeostasis.⁷ Many of these attributes have obvious parallels in societal development. By studying some of the similarities we can perhaps get a sense of where human society lay in its evolution, and what we may expect in the future.

Odum shows that in a maturing ecosystem the amount of biomass supported by available energy flow increases to a maximum in the climax stage. As a consequence, net community production decreases from high in a young system to small or zero.⁸ Again looking at biomass as information content, we might then say that cultural information content ever increases, and as it does we move from a production mode to one of system/societal maintenance. Community structure also changes over time. In a young system, stratification and spatial heterogeneity, or what Odum terms pattern diversity, is seen to be poorly organized. As the system matures, pattern diversity becomes well organized. This is not a shift from more to less diversity (or vice-versa), but an arrangement of system components, as niches are filled and nutrient cycles tighten up. A look at society

shows parallels as it moves from isolated cultures to an interconnected global society. Complementarity becomes as important as diversity.

Parallels in nutrient cycling are also interesting. In maturing nature, mineral cycles close, the exchange rate between organisms and environment slows down, and the role of detritus in nutrient regeneration becomes increasingly important. Here some changes in society as an organism within earth's ecosystem can be readily seen, though we are yet young. As we approach carrying capacity we recognize the necessity of restraint in extraction, recycling, and intelligent use of resources. Viewing society as an ecosystem is a bit more abstract. We might say that increased knowledge increases wisdom, if "wisdom I take to be the knowledge of the larger interactive system -- that which, if disturbed, is likely to generate exponential curves of change."⁹ Knowledge as a nutrient, feeding the society of Mind (a fascinating concept), is more compatible than the image of knowledge as power, for the former is process-oriented. Mature systems have a greater capacity to entrap and hold on to nutrients/knowledge; internal quality and feedback control are also trademarks of a mature system.¹⁰

We should, however, keep in mind that "the community extends only so far as there extends an effectual transmission of information," in place and over time.¹¹ Interesting, too, is Wes Jackson's point that "for (biological) information to be used in an optimum manner... boundaries have to be established because, at some point, a restriction of information is more necessary for stability than a free flow of information."¹² This seems to be true of human knowledge; perhaps only the boundaries we've established have prevented a nuclear holocaust.

Attributes of overall homeostasis in mature ecosystems may thus help point us in the right direction. In a climax, Odum argues, "there is little doubt that the net result... is a symbiosis, nutrient conservation, stability, a decrease in entropy, and an increase in information."¹³ Society would similarly be working toward cooperation, knowledge conservation (for that is not a given), resistance to perturbations, a decrease in disorder and unpredictability, and an increase in cultural information. Odum concluded, "A balance between youth and maturity in the socio-environmental system is, therefore, the really basic goal that must be achieved if man as a species is to successfully pass through the present rapid-growth stage, to which he is clearly well adapted, to the equilibrium-density stage, of which he as yet shows little understanding and to which he now shows little tendency to adapt."¹⁴ Since the time that was written, our understanding of nature's ecosystems has increased substantially. It remains to be seen how well we can apply this understanding to our society.



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The Jessie Smith Noyes Foundation celebrated its fortieth anniversary in 1987. Several grant recipients were asked to write 350 word essays to be printed in a special edition of the foundation's annual report. The Noyes Foundation asked them to respond to the question: "What does society need to do now, in the last years of the 1980's, in order to reasonably ensure that the world will be a better place to live forty years from now?" The essay which follows was the response of The Land Institute.

What We Should Do

Dana and Wes Jackson

The complexity and interconnectedness of world problems will increase, not diminish in the next forty years. In the last decade, U.S. society has been led astray through political and religious leadership which recommends simple solutions, based on rigid ideology, to the complex problems. In the last years of the 1980's we must develop better methods of problem solving and different patterns of behavior, which permeate the culture from the bottom up, not filter down from the top through legislation or regulations. This will require a different way of looking at the world, which should redirect educational goals and methods from preschool through the university and influence social behavior and politics.

First, we must redefine humanity's relationship to the earth. Human cleverness expressed in the invention of technology has led us to believe that we can exist almost independently of earth's natural systems. To use the earth's non-renewable resources prudently and its renewable

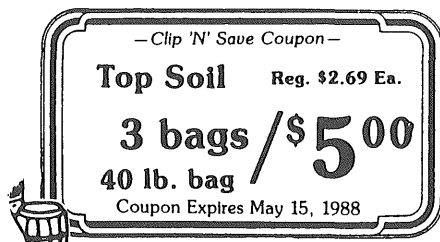
systems sustainably, we must understand and acknowledge our dependence upon them. Since the scientific revolution began, we have worked to separate ourselves from nature and substitute human invention for what could be done by natural systems. The astronaut Edgar Mitchell has told people who asked him what it was like to experience the moon that he did not know, for he was "too busy being operational" to experience the moon. Future generations may be too busy being operational (overcoming ozone loss, purifying polluted groundwater, coping with acid rain, etc.) to experience the earth. But if we look for the wisdom in nature and pattern our life support systems and our society upon ecological principles, a rich experience awaits us.

But all of this sounds like a generality that would promote the "common good," and William Blake warned us about working for the "common good" while avoiding the "minute particulars." We like to think that our work at The Land has been characterized by attention to those "minute particulars." Every experimental design, every pollination, every weed hoed, every seed harvested, every sentence in The Land Report, and every attempt to reply to a student question is

the consequence of our acknowledgement that all of this must eventually lead to that common good—to sustainable farms and a sustainable rural life in a healthy and productive biosphere.

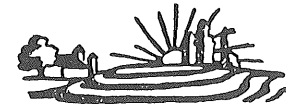
A limit in the earth's available resources and the entropy law impel us to change humanity's relationship with the earth. The "use-it-up, throw-it-away and go-get-more" pattern of behavior must end. Rather than teach patriotism for an economic system based upon greed and self aggrandizement, our educational system should encourage creative minds to develop new economic systems that are just and more compatible with the earth's limits and opportunities.

For the world to be a better place to live in 40 years— for the world to even survive for forty years— we will need a public philosophy which reflects the above understandings and results in responsible citizenship. We will need to mentally juggle a diversity of problems and seek solutions from various paths, while acting in specific instances on those minute particulars. We must begin to develop the reservoir of intellectual, psychological and spiritual resources which will make this possible.



The Value Of Soil

Dana Jackson



BANKING ON SOIL

Five tons of soil lost per acre per year is considered acceptable. If that 10,000 pounds of soil were put in 40 pound bags selling for three for \$5 at the garden store, the acceptable soil loss would be worth \$415 an acre.

Banks in rural communities have sponsored awards each year for farmers practicing good soil conservation. Often the community bank has paid for the banquet preceding the annual meeting of the soil conservation district. Evidently, banks have considered soil to have value. But have they put a price on it?

An assistant professor in economics at Iowa State University, Dr. Greg Hertzler, has put a price on it. Below we quote from an executive summary of his research on "Valuing the Long-term Productivity of Soils."

...Because soil is neither bought nor sold, it has no market price and must be valued indirectly through the decreased revenue of declining yields and the additional costs of fertilizer as soil becomes scarce over time. In a dynamic decision problem, the cost per unit of soil in any year is the "shadow price" on the soil scarcity constraint. Previous

studies could not provide values for soil, but we have done so using MINOS (Modular In-Core Nonlinear Optimization System) by Murtagh and Saunders.

The total cost of erosion per year is the price per unit multiplied by the rate of erosion resulting from the farmer's best choice of management practices. For fertile soils in Iowa we calculate the total cost of soil to farmers as \$1.60 - \$2.00 acre/year. These are quite low and it has been argued that society must consider the well-being of future generations more than do individuals. We solved the model again with a very low rate of discount and found costs of erosion around \$4.00/acre/year.

Tentatively, we conclude that the irreplaceable loss of soils is not a major cost to society. The loss of replaceable nutrients eroded with the soil is much more expensive. It is also probably that pollution damages from erosion are the most significant cost.

Now we know. Don't we?

Resources

Two organizations promoting sustainable agriculture, the Center for Rural Affairs in Nebraska and the Land Stewardship Project in Minnesota, have published practical guides for farmers wanting to make the transition to sustainable agriculture. These two publications provide the kind of information which the USDA and the land grant agricultural colleges have not made available to farmers. We recommend these resources to farmers, vocational agricultural teachers, USDA extension offices and everyone interested in sustainable agriculture.

Resourceful Farming: A Primer for Family Farmers

The *Resourceful Farming* primer is based on the work of the Center's Small Farm Resources Project, located in Hartington, Nebraska, with 23 cooperating farm families over the last four years. The focus of this work has been to find technologies and farming practices, as well as approaches to farm management, that are more appropriate for small to medium sized farms and family farm agriculture in general. The emphasis has been to find practical, low cost ways to help farms become more viable economically and environmentally, which in turn benefits the local rural communities.

The 118 page primer is meant to be a guidebook for family farmers who are concerned about such problems as water pollution, soil erosion, soil compaction, having to use heavy amounts of chemical fertilizers and pesticides, the ill effects of monocropping or simply the high cost of farming these days. It offers farmers an approach to farm management along with alternative farming practices, that can help farmers address these concerns right on their own farms.

The primer's Sustainable Farming Practices papers report the results of actual onfarm research conducted by the SFRP Cooperators on specific practices and technologies such as narrow stripcropping, terraces and field windbreaks and overseeding rye into soybeans. Sustainable Farming Concept papers such as "Soil Building" and "Alternative Legumes" give some of the rationale for the different categories of practices and technologies tried by the cooperators. Papers by SFRP staff such as "Appropriate Alternatives for Farm Management" and "Building Economic Viability" are meant to convey why the cooperating families believe in and want to practice a more sustainable way of farming.

To accompany the *Resourceful Farming* primer, the SFRP staff have also put together an alternative farm management workbook entitled the *Resource Audit and Planning Guide for Integrated Farm Management*. The objective of the *RAP Guide* is to help farmers optimize the use of all

their farm's resources and to look at how the whole farm is doing, not just its different enterprises. The advantage of the 32 page guide, with 24 pages of forms and worksheets over conventional farm management tools is that it is a planning tool.

The primer is \$7.00 a copy and the guide is \$5.00 a copy, plus \$1.50 for postage and handling. Order from the Small Farm Resources Project, P.O. Box 736, Hartington, Ne. 68739.

Reshaping the Bottom Line: Onfarm Strategies for a Sustainable Agriculture

"How are farmers responding to the glaring problems of contemporary agriculture in the midwest?" This question was the original motivation for developing this new publication.

David Granatstein and the staff of the Stewardship Farming Program, working with farmers in southern Minnesota, produced this 63 page booklet. Developed as a summary of sustainable farming practices currently in use by local farmers, it contains numerous examples of farmers' responses to the economic and environmental problems facing the region's agriculture and describes the biological principles on which these practices are based. There is no precise definition of sustainable agriculture, but the underlying ethical commitment to the land is the essential element in its meaning.

Information was gathered from interviews with area farmers, researchers, and extension workers, as well as from publications on sustainable agriculture. The contents include management strategies that are suitable to the farms of the region: using nitrogen effectively, building organic matter, handling and applying manure, controlling weeds and insects, improving pastures, and growing alternative crops. A list of references is included at the end.

Most of the ideas represent "off-the-shelf" technologies that can be used by farmers now with currently available information. Farmers are encouraged to try new ideas on a small scale and adapt them to their individual operations through on-farm experimentation.

The Stewardship Farming Program staff intended the booklet to be a resource for farmers throughout the upper midwest. It aims to build confidence in the viability of new ideas which are being successfully used by farmers. Through the examples in the booklet, the Land Stewardship Project hopes to encourage public agricultural institutions and agencies to take interest and action in the process of developing more sustainable farming practices and to stimulate more on farm research with farmer cooperators.

Reshaping the Bottom Line is \$9.00 a copy postage paid. Order from the Land Stewardship Project, P.O. Box 412, Lewiston, MN 55952.



John Thelander

SPRING IS PLANTING TIME AT THE LAND.
 Tom Clemetson (photo on left) shakes seeds out of packet.

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The Land Institute is a private, education-research organization financed by personal contributions and grants from foundations. The broad-based support of individuals making annual contributions helps The Land in applying for financial support from foundations.

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