
THE LAND REPORT

Spring 1990

Number 37





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On the Cover

The Smoky Hill River runs by The Land Institute and is our "natural connection" to much of Kansas. This aerial photograph of the river by Terry Evans is part of her work for the Water in the West Project.

--About This Issue--

The purpose of this publication is to inform readers about the work of The Land Institute, the people who do that work, and the ideas and values that guide us. The articles reflect our interest in a broad spectrum of issues that relate to the sustainability of agriculture, including natural resources conservation, environmental quality, human health and social justice, and the viability of rural communities. Staff, interns, members of the board of directors and Friends of The Land contribute articles, photographs and drawings.

This issue contains a LETTERS section, which we have only included one other time. We will again publish letters that address the content of articles if readers wish to write to us.

The Land Report's salute to Earth Day can be found in the section, "Natural Connections" (pages 18-26). Earth Day has motivated a 50-things-you-can-do-to-save-the-environment-behavior, but that won't last beyond April 22, 1990 unless we have a better picture of the earth and a sense of our proper place here. Perhaps, outdoor activities we call "recreation," can give us a spiritual relationship with the earth that will make the difference.

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

BOARD OF DIRECTORS: Paula Bramel-Cox, Bruce Colman, Mari Detrixhe, Terry Evans, Wes & Dana Jackson, Ivy Marsh, John Simpson, Alice Waters, Donald Worster

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At The Land

1990 Term Gets Underway

Jake Vail

Every year around the middle of February we get valentines in our mailboxes, and interns at our doorsteps. Although the 1990 term officially began on February 19th, most interns were here on Friday morning, February 16, when Donald and Bev Worster stopped by for a visit. Donald Worster is a member of the board of directors of The Land, a professor at the University of Kansas, and the author of several books. Recently he edited *The Ends of the Earth: Perspectives on Modern Environmental History*.

The interns are now familiar with some of Don's writings as they discussed chapters he wrote in *Meeting the Expectations of the Land*, a book of essays on sustainable agriculture and stewardship, in class this spring. Wes introduced the year with a series of talks on The Land Institute and the concept of using nature as measure for agriculture. Following that we read from Evelyn Fox Keller's *Gender and Science* and discussed a number of articles on energy, limits, and "efficiency vs. sufficiency." Then we covered some introductory prairie ecology and plant breeding, explored the topic "educating the homecomer" and read *Nature's Economy*, Donald Worster's history of the ideas in ecology.

Spring and fall days are organized so that mornings are spent in "warm-up," an unstructured

discussion of topics from liposuction to strong democracy, that is followed by class. After lunch we put our hands to work. The first two weeks, interns, with help from Thom Leonard, planted seeds and transplanted seedlings of eastern gamagrass in the greenhouse, part of a large germplasm study to be planted in the field in May. Included in this is gamagrass germplasm sent by James Henson of the Kerr Center for Sustainable Agriculture, in Poteau, Oklahoma.

After days of meticulous seed work, heads turned skyward, and everyone got busy insulating and sheetrocking the aisleway ceiling in the greenhouse. Nature provided a wonderful illustration of the worth of our efforts when halfway through the insulation job it snowed. Where the aisle was insulated a thick blanket of snow accumulated on the roof. The snow melted right off where we hadn't yet reached.

All the work in the greenhouse must have been quite a sight to two visitors we had in late February. Randy Kempa, back from planting trees in India, was an intern in 1987 and involved with the very beginning of the greenhouse construction. Three days after Randy's visit, 1988 intern Karen Finley surprised us with an extended stay. Karen's been studying raptors (mostly Swainson's hawks) in northern California.

Even as Karen visited, sandhill cranes flew north over The Land, their honks and tootles signal-

Interns listen to presentation by Wes Jackson.

(l. to r.)

Todd Francis

Paul Muto

Kris Schaefer

Tamara Kraus

Doug Romig



1990 Interns

- Kathy Collmer:** B.S., chemistry, Rice University (Texas).
- Holly Ewing:** B.S., geology, Carleton College (Minnesota).
- Todd Francis:** B.S., biology, Grinnell College (Iowa).
- Jean-Luc Jannink:** B.S., biology, Haverford College (Pennsylvania).
- Tamara Kraus:** B.S., biology and society, Cornell University (New York).
- Paul Muto:** B.A., German, Rutgers University (New Jersey).
- Tracy Noel:** B.S., biology, Northland College (Wisconsin).
- Doug Romig:** B.S., range and soil science, New Mexico State University.
- Kris Schaefer:** B.S., environmental studies, Grinnell College (Iowa).

ing spring's imminent arrival. Inspired, several of us put up bluebird boxes, gifts to The Land Institute from the Natural Gardening Company in San Anselmo, California. Throughout much of the country bluebird populations are threatened by starlings who usurp nest holes, and erecting boxes with starling-exclusive holes seems a wonderful way to embrace the wild. When we planted the garden in the third week of March, at least one pair was singing and soaring about.

Early in March, interns and several staff "flew" east to Kansas State University for a day in the library and a visit with Paula Bramel-Cox. Paula is on The Land's board of directors and is working with us on perennial sorghum breeding experiments. We also talked with one of her grad students, Stephanie Green, who's studying drought resistance in sorghum, and two Land alumni, Vern Stiefel and Michel Cavigelli, both interns in 1985. Vern is also a grad student of Paula's, studying genetic resistance in sorghum to spider mites and aphids. Michel, who went from The Land to the Kansas Rural Center, is now pursuing a degree in soils, studying phosphorus cycling.

Back in Salina, we were all treated to a weekend visit by Lou Gold, an ecologist, storyteller, and eloquent voice of the native forests of the Pacific Northwest. Lou spun tales of

spotted owls, the wisdom of the earth, and his walking stick, and as if the visions he brought forth weren't enough, illustrated his stories with a slide show that took us from the prairie right up to the top of Bald Mountain.

A week later Chuck Francis and his family visited. Chuck is professor of agronomy at the University of Nebraska and editor of two books on sustainable agriculture: *Multiple Cropping Systems* and *Sustainable Agriculture in Temperate Zones*. After an informative discussion with the interns on sustainable agriculture programs in land-grant universities and the problems and benefits of agricultural extension, he met with the research staff to brainstorm on our plans for a large-scale perennial polyculture.

In the beautiful week of the vernal equinox, interns and staff accomplished great physical feats: burning the grassland on the 160 acres and the



Photo at right: Todd Francis, Jean-Luc Jannink, Paul Muto and Kris Schaefer install insulation in the greenhouse.

various eastern gamagrass plots, renovating the beds in the garden and planting all the early spring crops, and planting a woodlot east of the greenhouse. On Friday the temperature dropped and it snowed, and we were glad that we had worked hard earlier in the week. We had similar luck early in April when we planted a windbreak at the Ohio St. farm and transplanted forbs and grasses in the herbary.

Angus Wright, professor of environmental studies at California State University, and his parents, Thelma and Howard Wright, spent Saturday morning, March 24, at The Land. Angus talked about his new book, *The Death of Ramon Gonzalez: the Modern Agricultural Dilemma*, to be published next fall by the University of Texas Press.

As we started the month of April, our interns, like greenhouse plants that have been "hardened off," were oriented to The Land's philosophy of sustainable agriculture, conditioned to physical work, and ready to take over their experiments and start the growing season.

Tree Planting Begins

Berni Jilka

We welcomed the spring equinox by planting tree seedlings on a blustery March day. It was encouraging to see earthworms as we overturned shovels of soil to plant an acre woodlot east of the shop, near the greenhouse. Due to the large amounts of firewood needed to fuel "Igor," the greenhouse stove, we felt it necessary to begin woodlot plantings in appropriate areas. Green ash, hackberry, honeylocust, and black locust are included in this woodlot. These species were chosen due to their ability to grow fast, create a source of dense fuel, and resprout after being cut. We planted black walnut seedlings in the lower, moist areas.

We are also planting the first phase of a windbreak along our property bordered by Ohio Street and Water Well Road. The shelterbelt will serve many purposes, primarily to subdue the strong winds, to reduce the evapotranspiration of the soil and plants, and decrease soil movement. We have chosen many different species of trees, with an emphasis on edible plants such as walnuts, hickories, crabapples, and apricots. The fruits and nuts will not only provide food for humans, but food and cover for wildlife such as birds, which may help reduce large insect populations. The dense planting will also provide a habitat for beneficial insects. By planting a diversity of species in a random pattern we are hoping to keep insect and disease infestations to a minimum.



Staff birthday party and pizza lunch is enjoyed by Mary Handley, John Craft, Karen Finley (1988 intern back for a visit) and Jake Yail.

Staff News

John Jilka, a native Salinan who farmed just south of us for some twenty years, has been hired as The Land Institute's farm operator. He'll be watching over the 72 acres on South Ohio Street, helping operations manager John Craft with a little bit of everything, and working with the interns and research staff in laying out this year's experiments. Lately in warm-up we've talked about information, knowledge, and wisdom. We're happy to have John as the newest member of the Land community, for he brings all three, as well as the sense of place so important to each.

Beth Gibans, intern in '88 and intern coordinator in '89, is now The Land's Development Assistant. She is helping Tom Mulhern with outreach and fundraising, and is involved in compiling a new intern directory.

Berni Jilka, the intern coordinator this year, has recently joined the Board of Directors of the Kansas Organic Producers.

Wes Jackson will appear in an NBC-TV special called "The Earth is the Lord's: Ecology as a Religious Concern" on April 29 with David Ehrenfeld. David, professor of biology at Rutgers, is editor of *Conservation Biology* and a member of The Land's Honorary Board of Directors.

Book by Thom Leonard to be Published

Thom Leonard has been director of the Grain Exchange for four years now, and the Land Institute community has benefited greatly from his experiences in genetic preservation of cereal crops. Members of the local food co-op enjoy his energy every time they bake a loaf of bread with flour milled in his basement on a pedal-powered grinder. Thom has written *The*

Bread Book: A Natural, Whole-Grain, Seed-to-Loaf Guide to Making Real Bread, to be published by East West Health Books. The following is from the introduction.

I question whether what we make when we use baker's yeast instead of natural leavening can be called bread at all. Many naturally leavened breads have survived well into this century. Some of these — San Francisco sourdough, European sour rye, and "Parisian barm" (oddly, natural leavening widely used in Scotland around the turn of the century) have been carefully studied. They each exhibit, in addition to one or more yeasts, at least one and often several species of lactic acid bacteria. The different organisms cooperate in creating a favorable environment for one another. Together they create conditions that suppress the development of populations of organisms that would weaken the culture. And they help to create food ideal for nourishing humans and human culture.

Traditional bread leavening is, like virtually all traditional fermented foods, in effect, a living ecosystem, multi-specied, complex, more like a forest or the native prairie than like a pulpwood plantation or an Iowa cornfield. No one even suggests that a field of corn is a tallgrass prairie ecosystem. If a cornfield is not a prairie, can there be such a thing as yeasted bread?

The breads you'll make from this book are all naturally leavened, made without baker's yeast or chemical rising agents. And what other bread book tells you of old mills in Ireland, helps you choose a home mill, walks you through the process of building your own wood-fired brick oven, and growing your own wheat?

The Bread Book

by Thom Leonard will be available in April, by mail, from the Grain Exchange at the Land Institute. \$8.95 plus \$1.50 shipping and 5% sales tax for Kansas residents.

Terry Evans Speaks for the Arts

As Land Institute Arts Associate, Terry Evans has provided her own photographs or found works of other artists for Prairie Festival and Land Report covers. She has been responsible for art exhibits at The Land and special performances and lectures in the arts sponsored by The Land. Her encouragement of the arts in an organization that focuses on agriculture and the environment has enriched our program and extended our ability to communicate The Land's mission. The cover article about The Land Institute in the November 1989 issue of *The Atlantic* featured photographs by Terry Evans.

On March 5, Terry appeared as a witness for a hearing held by the U.S. House of Representatives Subcommittee on Post-secondary Education regarding the reauthorization of the National Endowment for the Arts (NEA). The hearing took place in the J. Paul Getty Museum, Malibu, California, on March 5, 1990. Terry was one of ten artists and educators from Montana, Arkansas, New Mexico, Kansas and California who testified in support of federal funding for the arts through the National Endowment.

In her testimony, Terry described how NEA fellowships had fostered and promoted creativity in her own life and stimulated larger art projects that involved many other Kansas artists. Terry referred to her prairie photography in the testimony.

My experience has shown me that the National Endowment for the Arts is willing to risk giving us support for learning through art who we are as individuals and as a society. I learned while photographing the prairie that the natural prairie ecosystem depends on a rich variety and diversity of plants in order to survive in wholeness and health. Like the natural ecosystem of the prairie, our culture's health and wholeness depends on rich variety and diversity of life. May unrestricted funding of the NEA continue to nourish us.

Terry Evans is the author of *Prairie: Images of Ground and Sky* (University of Kansas Press, 1987). She is also a photography instructor at Bethany College, Lindsborg, Kansas, and a member of the board of directors of The Land Institute.

Land's Harvest Cooperative

Last year Brad Burritt and Danielle Carre, stewards of The Land's Harvest market garden, planted nearly two acres of perennial crops on our 72 acre field near the corner of S. Ohio Street and Water Well Road. After Danielle and Brad moved to Colorado last December, The Land Institute decided to privatize the organic vegetable operation. We looked for someone to lease the land and continue growing and selling organic vegetables at the local farmers' market, but were unsuccessful. This spring a number of Salinans banded together to establish a workers' cooperative to keep the perennials thriving. The Land's Harvest Cooperative has a steering committee of four: Jean-Luc Jannink, an intern at The Land; Ted Zerger, a Salina math professor and ardent gardener; Jake Vail, research and education assistant at The Land; and Helen Sullivan, a Salinan who exceeds the whole group in energy and enthusiasm.

This is the second year for the strawberries, asparagus, and raspberries, which means that asparagus and raspberry yields will be modest, but there should be a good harvest of strawberries.

The Land Co-Sponsors Earth Day Kick-off

Kathy Collmer

Try to imagine what your world would be like if there had been no Earth Day in 1970. Imagine no Environmental Protection Agency, no Clean Air Act, no Water Pollution Control Act, no OSHA. A whole host of policies and programs such as these were inspired by the attention Earth Day focused on environmental protection. With an estimated 20 million people in the U.S. participating, Earth Day was the largest environmental event in history.

The mission of the first Earth Day, however, is far from being fulfilled. In the years since, Three Mile Island, Bhopal, Chernobyl, and the Alaskan oil spill have demonstrated the destructiveness of human technology and the vulnerability of the earth. The planet we celebrate on April 22, Earth Day 1990, is in many ways a very different place from what it was in 1970. While the environment has become a popular issue, the problems we face are more serious than ever. Earth Day 1990 challenges us to convince people all over the world of their ability — and responsibility — to contribute to the solutions.

From the crowded streets of Tokyo to the rolling grasslands of the Great Plains, groups are organizing to respond to this challenge. Here in Salina, Kansas, The Land Institute joined forces with the grassroots group Citizens for a Healthy Environment and Project DOMINION of Salina's First United Methodist Church to co-sponsor a March 2 planning meeting that brought together representatives of many community groups. The purpose of the meeting was to generate ideas for local Earth Day activities involving all sectors of the community —

schools, businesses, churches, environmental and civic organizations.

Staff members and interns from The Land made colorful posters for the meeting hall, set up a literature table, and warmed up the crowd with sing-along music celebrating the earth. Marge Streckfus, facilitator for the meeting, introduced representatives of the sponsoring groups: John Marietta, CHE steering committee chair, Troy Bowers of the First Methodist Church, and Dana Jackson of The Land Institute. They described the activities of their organizations. Wes Jackson addressed the audience of over 100 Salinans, stressing that our future depends on knowing, loving, and defending our own local communities. What's needed to save the planet is "an intense love of the place," he said. "The public is an abstraction. No one can find 'the public,' but we can find Salina. A community is tangible, but 'the public' just evaporates, and that's why it accommodates power... There ought to be a clear definition of public interest in contrast to community interest, placing community first."

On that note, the crowd split up into small groups to brainstorm ideas for Earth Day activities in the Salina community. One group proposed a march from a nearly-defunct Salina shopping mall to the municipal landfill, while another group suggested an Earth Day worship service in which each family would bring a week's worth of garbage into church as "offerings."

Others proposed longer-range actions, such as composting the city's grass clippings and leaves for Salina's 115 community garden plots, and passing a "clean industry ordinance" to limit the kinds of industry that would be allowed to move into Saline County. These ideas, in extending beyond April 22 itself, offered evidence that the real purpose of Earth Day—to mobilize people to work for long-term environmental protection— was being fulfilled.



Land Institute to Participate in Earth Day Programs

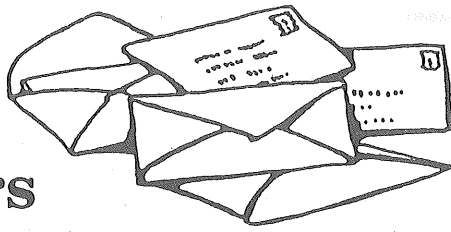
The Land Institute staff and interns will celebrate the 20th anniversary of Earth Day on April 22 by setting up displays about The Land Institute and giving short talks at Earth Day Fairs in several Kansas towns. They also are helping plan an Earth Day Fair in Salina's Oakdale Park. Everyone will participate in Salina not only as Land people, but as members of the Citizens for a Healthy Environment, the Prairieland Food Co-op, and the Smoky Hills Audubon Society.

The Land Institute will present "*Planting in*

the Dust," a one-woman, one-act play about land stewardship, at Salina's First United Methodist Church at 7:30 in the evening on Earth Day. The Land's actress, Dona Freeman, will perform the play as the final Earth Week activity of the Lawrence, Kansas community on Friday evening, April 27.

Wes Jackson will travel far and wide during Earth Week making speeches at Kansas State and at the universities of Iowa, Ohio and Maine. He will speak in Chicago's Lincoln Park on April 22, and at Bethel College, Newton, Kansas, on April 23.

Letters



Chez Panisse not for Peasants

Please spare us articles like Bruce Colman's idolatrous piece on "not high-falutin" Chez Panisse (# 36, page 32). I'd hate to think that the Bay Area's food fetishism is reaching Salina. As Colman himself states, a list of restaurateurs spawned by Chez Panisse would be inappropriate to *The Land Report*. Why, then, is this entire article about one restaurateur more appropriate?

For six years I grew organic fruits and vegetables for a restaurant in the East Bay (over the hills from Chez Panisse and its offshoots, away from the inbred circle of high-profile, media-powered eating places, those churches of enlightened consumerism). The restaurant's windows overlooked the garden and while the doctors, lawyers and developers nibbled at their flowery organic salads and sipped California wine, they could watch the gardeners work and sweat on their behalf. A supreme gustatory experience! Food as entertainment for people in a hurry to catch the next trend—in this case, getting close to the soil.

Restaurants like Chez Panisse didn't evolve from the sidewalk food stands of ancient times, but from the aristocratic traditions of Europe where royalty and its followers kept highly trained cooks to tickle their thoroughly jaded palates with an absurd variety of elaborately prepared foods. In a fit of reverse snobbism, restaurants today are promoting simplicity as the latest sensation to massage their customers' aristocratic tendencies.

I doubt that taking peasant (those quaint "people of the soil") food and serving it up in lush settings at aristocratic prices that a peasant could never afford (even for that "special occasion") is a socially redeeming act, even if it were sensually awakening, leading to clear thought about "events and issues of the day."

The notion that occurs to me is that we need to think clearly about what and whom we work for and about what we do with our money. That fifty dollars spent on peasant food at Chez Panisse would be better spent on any of the organizations promoting social justice for farmworkers (the modern American analogue of landless peasants), on any organization fighting starvation anywhere in the world, for land preservation in the tropics, for bicycles in the Third World, even for your own gardening tools or to put a week's food on your own family's table, or—need I say it?—on The Land Institute.

Food is not entertainment. The growing and eating and sharing of food is closer to being a sacrament which can sometimes lead to conviviality in a deep sense. Institutions like Chez Panisse trivialize the agricultural process and deserve hardly a passing nod from The Land Institute. Leave the restaurant reviews to *Gourmet Magazine*.

Joseph Queirolo
San Ramon, California

Chez Panisse IS Special

A Land Institute staff person solicited my article on Chez Panisse by way of introducing a new Land Institute board member—the proprietress, Alice Waters. I thought it a good opportunity for suggesting to The Land community some ways, usually not covered in *The Land Report*, in which issues The Land is working on are being dealt with in other, perhaps distant, sectors of our society.

In the Bay Area context, Chez Panisse is quite reasonably priced. In a lot of other places around San Francisco, Berkeley, Silicon Valley, Marin County, the northern California wine country, etc., where carefully prepared meals are presented in lovely environments, you can pay a great deal more than \$55 per person (before wine) for five courses. I believe, too, that Chez Panisse is reasonably priced in terms of its costs in putting meals on the table. (I overstated the probable costs for eating in Chez Panisse's a la carte cafe, however. You'd have to be on a real eating rampage to spend \$50 per person, before beverages.) And the fact is that there are plenty of people who happily pay that much for dinners. Better, I should think, for the earth and for all we care about for them to eat at restaurants that take the care that Chez Panisse does with ingredients, and that turn parts of their profits to the kinds of political and social ends identified by Mr. Queirolo in his penultimate paragraph, as in fact Chez Panisse does with donations and fundraisers. Better that, than some alternative we could identify in this area or any area.

Neither Alice Waters nor any of her staff would disagree with Mr. Queirolo's remark that food should be a sacrament; I certainly agree with him. The convivial atmosphere they aim to achieve need not prevent it being a sacrament. But if some of her customers are too cloddish to get this point, is this her (or the restaurant's) fault? Surely not. Surely many fans of Picasso or Stravinsky or Joyce miss most of what they have tried to communicate, yet we hardly blame those artists.

So, unless Mr. Queirolo will argue that Ms. Waters or Chez Panisse falsify their claims (rather modest claims, I might add; the Chez Panisse menu for February 27-March 3, 1990, says only that "Most"—my emphasis—"of our produce and meat comes from local farms and ranches that practice ecologically sound agriculture") for how their produce is grown, or that they are hypocritical in their backing of good works, or that their support for organic growers is somehow detrimental to those growers or the countryside or the growers' neighborhoods, I would say that Mr. Queirolo's quarrel is with people who dine out, period. But that's a quarrel he'd best pick with anyone who spends any of his or her disposable income on anything other than good works (i.e., not on restaurant meals, not on movies or music or the theater, not on an extra pair of shoes).

I contend that Chez Panisse and restaurants like it—including Mr. Queirolo's restaurant, which I would have mentioned had I known about it—are helping educate people to want healthier food. More educated people means larger markets, which mean larger production, which means more affordable good food. Luxury restaurants aren't the whole answer; it'd be foolish to suggest they are. This education is going forward on many fronts,

from, let us say, Jane Brody's food-and-health columns to the NSF report. But Chez Panisse and the trend it leads are helping. Already, in California, we're seeing an effect wherein supermarket chains are placing restrictions on how produce is grown that head in an organic farming direction, and one major chain, Safeway, has set aside parts of its produce sections specifically for certified-organic produce. In Salina, we saw this effect, too, when the Holiday Inn became a major customer for The Land's organic produce.

It's worth pointing out that at Chez Panisse, Mr. Queirolo's "doctors, lawyers and developers" are joined by academics, grad students, artists, undergrads, and Berkeley political types—that is, political progressives, who I'd guess largely share his political agenda.

I'll cop to my piece being idolatrous—and I made a poor phrase choice in "high-falutin"—but I've been eating at Chez Panisse for fifteen or more years, and every occasion there has seemed special.

Bruce Colman
San Francisco, California

Difficult Questions

Mr. Queirolo brought up several points in his critique of the article about Chez Panisse by Bruce Colman in Land Report # 36 that lead to difficult questions that we should struggle over.

First, there is the troubling question: "Why should only wealthy people be able to afford healthy food?" I have talked to organic growers who need to sell their produce for higher prices than large-scale conventional producers in order to survive. These organic growers feel guilty that ordinary people like themselves cannot afford organic food. We have rationalized together that the purchase of organic produce by exclusive restaurants will increase the demand for it, and more will be produced. Then prices will go down and more people can afford it. We have also discussed the importance of keeping organic farms economically viable and organic methods alive in the culture by taking advantage of the "fashionable" standing of healthy food and the good prices it brings. All over the country, not just in California, growers are urged to become entrepreneurs and peddle specialty vegetables (baby lettuces) to high-paying restaurants in larger cities. Then they can afford to grow potatoes and onions to sell to their neighbors.

The produce shipped to Kansas from large corporate farms in California is too cheap. In a strange twist, we can say that as long as food is cheap, only wealthy people can afford healthy food. The true costs of irrigation, pesticide contamination of soil, health problems of workers, groundwater contamination, and fossil-fueled transportation are not being paid by the producers. The same can be said for grainfed, feedlot beef—grown, slaughtered and packaged in western Kansas. But as long as Americans consume these products at fast-food restaurants, the investors in cheap-food industries make money and can afford to buy expensive, healthy food.

One way for more people to have fresh, organic produce is to grow it themselves. One or two raised beds or containers in the backyard can produce a tremendous

amount of salad. At an earlier time in this country, almost all people grew some of their own food. It wasn't a big deal. But cheap food has destroyed that as a cultural norm and trivialized agriculture.

A second tough question: "What is food for?" Mr. Queirolo says: "Food is not entertainment. The growing and eating and sharing of food is closer to being a sacrament which can sometimes lead to conviviality." That is too serious for me. I would agree that food fights for entertainment are intolerable. And food is more than fuel. Malcolm in Anne Tyler's *Accidental Tourist* made food preparation and consumption efficient by eating only popcorn. How sad! But most of us find food to be part of entertainment and know from experience that beautiful and delicious meals can lead to conviviality among diners.

Can the creation of recipes and menus and the preparation and presentation of food be an art? Some people do have a special touch. In the film *Babette's Feast*, the French chef could be viewed as Mr. Queirolo described: a "highly trained cook" kept by aristocrats "to tickle their thoroughly jaded palates with an absurd variety of elaborately prepared foods." But one can also view Babette as an artist who needed to create, to "do her best work." She didn't even ask the diners if they liked her feast! Should our society not allow ballet dancers, singers, and great chefs to do their art and be rewarded?

How do we change the food system in this country which trivializes the farmer? Should we quit buying supermarket produce and use only that which is seasonally produced by us or growers within our community or region? Should we encourage people to boycott those affordable salad bars where iceberg lettuce is decorated with numerous condiments and long shelf-life vegetable combinations soaked in oil and spices or smothered in pasta and mayo-cream preservatives? People won't drink soured milk or eat burned hamburger buns. What if we could educate Americans to refuse bland produce grown for firmness and shelf life rather than taste and nutrition?

A syndicated column in our newspaper by Mary MacVean describing the Smithsonian TV program "A Moveable Feast" began: "The Pilgrims ate what they could grow because they had to. Centuries later, the restaurant that is the mecca of California cuisine demands what the Pilgrims were stuck with: locally grown ingredients."

After describing how transportation and refrigeration have changed the American diet, the TV program focuses on Alice Waters's Chez Panisse restaurant. MacVean comments: "...at Chez Panisse, the farmer has become as important as the chef in determining what is served. The salad greens are picked that day, the tomatoes used depend on what is flown up from the Chino family farm in Southern California."

That seems right to me. Now if we can just figure out how to make it affordable for all of us.

Thanks to Bruce Colman and Joseph Queirolo for stimulating this discussion in *The Land Report*.



Dana Jackson, Editor
The Land Report

Letters -- contd.

Dishonest about Homeopathy

In the issue # 36 which I received recently, there is an article "Homeopathy: an Ecology of Human Health" by Danielle Carre' (pages 29-32).

The article starts out describing a remedy which has the active ingredient "diluted one to a hundred, thirty times!" This results in a concentration of 10^{-300} of the original. Six paragraphs later it is mentioned, without relating it to this specific dilution, that Hahnemann obtained results from doses diluted to "such a degree that possibly no molecule of the original remedy was present in a typical dose."

At the end of that paragraph, it is mentioned that Hahnemann had a theory that "the curative property of the substance might reside in the energy it imparted to the diluted sample" rather than in the actual substance. I consider it intellectually dishonest to write this and not mention that this theory goes against all of the current knowledge of chemistry and physics. I am not claiming that modern science knows everything or is correct in every respect, but when someone advances a claim that is contradictory to all of modern science, it would be more honest to mention it.

The sentences beginning "It seems difficult to believe that such minute doses of substance could have any effect," and "It is, however, a common occurrence in the biological world" clearly say that this example is comparable to the homeopathic dilutions discussed previously. The example is a "concentration of just one part to 10,000 million parts." This concentration is 10^{-10} . How close is this to the homeopathic concentration of 10^{-300} which opened the article? The difference is NOT 30-fold. The difference occurs in the exponents, and the hormone is more concentrated by a factor of 10^{290} .

Claiming that such concentrations that differ by this factor are comparable is intellectually dishonest.

*Henry Schaffer
Raleigh, North Carolina*

Article an Overview

The purpose of my article was neither to prove nor disprove the effectiveness or even the validity of homeopathic remedies, but rather to provide the readers with an overview of this interesting form of alternative medicine. Due to limited time and space, my treatment of the subject was brief.

I did not, nor was it my intention to, directly compare the concentrations of free thyroid hormone (10^{-10}) to the dilution I initially described in my introduction (which, according to my calculations is not 10^{-300} , but 10^{-60}). I wished to alert the reader to the fact that extremely dilute concentrations of some substances can retain their biological activity. I should have been more explicit by comparing the thyroid hormone concentration with the lower homeopathic dilutions (lower potencies) mentioned in the previous paragraph.

I did not write either that "Hahnemann had a theory" or "advanced a claim." My sentence reads: "He theorized that the curative property of the substance might reside in the energy it imparted to the diluted sample." The third definition of "theorize" in The American Heritage Dictionary of the English Language is: to speculate. I don't think it is "intellectually dishonest" to write about a person's speculations or even to make a few speculations of my own without referring to the current theories of modern science. I did note in the article's conclusion that medical doctors and researchers are skeptical of homeopathy.

The Land Institute has always encouraged its staff and students to think beyond the conventional wisdom of science and society. The unique research program at The Land is the result of this kind of courageous thinking that questions the status quo. *The Land Report* has often provided an avenue of expression for some of these investigations. I am no longer associated with The Land Institute, but I would encourage it to continue providing thought-provoking material to the readers of *The Land Report*.

*Danielle Carre'
Hotchkiss, Colorado*

Questionable Statements about Homeopathy

I support a concept of holistic health and agree that humans work on more than the physical level, and that we also work on the spiritual/mental and emotional levels. However, there are several questionable statements made in the article to substantiate homeopathic doctor practices.

"The medicines used in homeopathy are usually derived from plants, animals, and minerals." How is this different than non-homeopathic medicines? I hesitate to accept as a basis for medical practice the statements in the remainder of that paragraph on page 31 of the Fall 1989 *Land Report*, i.e. "Their toxic and therapeutic properties are tested in 'provings' which involve giving healthy individuals... These provings provide the experimental basis for determining what symptoms a substance elicits, and thus according to the Law of Similars, what it cures..."

What assurance do we have that the medicines are made under controlled conditions? Certainly not all government regulations are of equal value, but there are many safeguards to protect our health. Is the homeopathic doctor the person who mixes and dispenses the medicine? This could be a potential avenue of profit.

"After each dilution the medicine is mixed vigorously by striking it against a firm surface." How hard? If this is done manually — do all people have the same strength?

Each of us has our own reasons for deciding what we want to believe. One of us believes printed material; others of us accept anything that sounds scientific. I believe further study needs to be conducted into the field of homeopathic medicine before it is given the sanction of your journal.

*Shirley Kasper, R.D.
Tonganoxie, KS*

Embrace Biodynamics

Why hasn't The Land openly espoused or shown more overt interest in biodynamic agriculture? Almost every article in the current issue (#36) flirts with but never quite embraces the key point. The point is that there must be a recognition that there is a spiritual principle operative behind visible nature (and therefore within man!). Once this is recognized, practical steps based on this insight can be taken that will lead to a meaningful solution of our agricultural question. It is my belief that we must seek out these operative spiritual principles. The dialogue that Wendell Berry proposes we carry out with nature would be greatly deepened and carried to more fruitful ends, and more practical means towards healing the land and ourselves would be found.

Airy, isn't it? Perhaps. But it is no airy vision if one looks carefully at the hundreds, perhaps thousands of biodynamic farms over the globe that have successfully applied the biodynamic approach, in some cases for over half a century. An objective, awake appraisal of biodynamics will only be positively impressed by what it will find. In biodynamic agriculture, the fundamental starting point is that a wise, guiding spiritual principle is constantly active in nature, and that it requires our cooperation and support if wholesome agriculture is to be achieved.

When the indications that led to the biodynamic approach were first given over sixty years ago, the door was opened for the ego-conscious "modern" individual (whom Donald Worster suspects the culprit) to once again participate in agriculture in a truly understanding manner. An understanding is now in our reach that can figure out not only how to produce so many pounds of crop, but how the individual farm is connected to its surroundings. Reading over the words of these first biodynamic indications one

cannot help but marvel that from the point of view of biodynamics, the wedding between agriculture and ecology took place long ago. Perhaps there was never even a conscious divorce, only a shift in human awareness.

I am heartened by recent articles in *The Land Report* on homeopathy and the Fred Kirschenmann visit. Worthy of mention is a fine piece on biodynamics in your Summer '88 issue. The question remains, where does The Land stand on biodynamics?

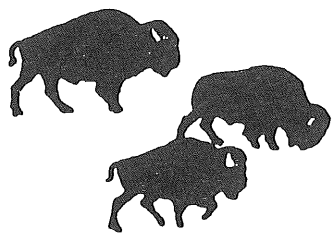
*Nicolas Franceschelli
Woolwine, Virginia*

Editor's Two Bits:

Homeopathy and biodynamic agriculture interest people at The Land, and we have published an article on each subject. The authors were not proponents of these practices but were interested in learning more about them. Practitioners of homeopathy and biodynamic agriculture, like modern physicists or geneticists, do operate with a set of beliefs. In *The Land Report* articles we tried to describe those beliefs and explain how they are applied in homeopathic and biodynamic practices. In both articles the writers suggested that the topics needed more research.

The fact that we published the articles does not mean that The Land Institute endorses either homeopathy or biodynamic agriculture. But as we look at the side effects and expense of modern medicine and industrial agriculture, we are motivated to explore alternatives.

*Dana Jackson, Editor
The Land Report*



12th Annual Prairie Festival June 2-3

The introduction to *Half a Glass of Water*, a new study by Marty Strange and others at the Center for Rural Affairs in Walthill, Nebraska, begins:

Two Rutgers University geographers caused quite a stir when they suggested that the Great Plains will inevitably become largely depopulated and that "the wisest thing the federal government can do is start buying back great chunks of the Plains, replant the grass, reintroduce the bison — and turn out the lights." (Farney 1989)

The idea was immediately ridiculed and denounced by public officials, editorial writers, and scholars from the region. But we couldn't help but wonder whether their protests reflected their embarrassment at the lack of a better idea?

Frank and Deborah Epstein Popper who caused the stir about the fate of the plains will lead off the Saturday afternoon program at The Land Institute's twelfth annual Prairie Festival on June 2. Marty Strange, who analyzed economic development policies in six states of the "Middle Border" to learn if there are any "better ideas" will be the opening speaker for the Sunday morning, June 3 program. Between and after these talks there will be programs addressing the festival theme, **The Future of Prairie Communities.**

Saturday morning activities will feature prairie walks and talks about prairie ecology.

In addition to a workshop on Saturday morning and a concert by guitarist/singer Jim Scott on Saturday evening, a number of regional musicians will perform throughout the festival, and the Saturday Night Land Band will provide music for dancing.

Louise Anderson, a professional storyteller from Jacksonville, North Carolina, is a special feature of this year's festival.

The annual tour of The Land Institute's research plots led by interns and staff will take place on Saturday afternoon.

New Roots for Agriculture

Using Nature as a Model

Jake Vail

The Land Institute is doing nothing new. As is pointed out below, our work just seems new when contrasted with modern industrial agriculture. Nor are we "going back," however, except in the sense of going back to the source. The source—the patterns and processes of nature—holds answers to the problems *in* and the problem *of* agriculture. For thousands of years this belief has been shared by poets, scientists, and those who would call themselves neither. "Nature," said soil scientist Albert Howard, "is the supreme farmer." "The pathless world of wild nature is a surpassing school," says poet Gary Snyder.

What is new is that we take these thoughts seriously. The research we do each year uses nature — the prairie ecosystem of the Great Plains — as measure and model for a more sustainable agriculture. Designed by the research staff, each experiment is thus a marriage of ecology and agriculture. An intern will oversee each.

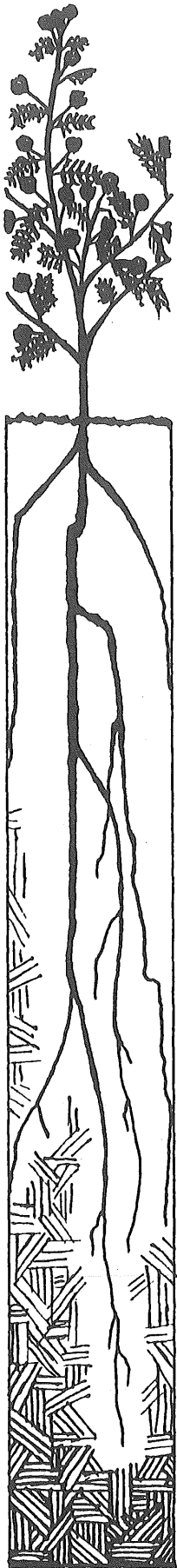
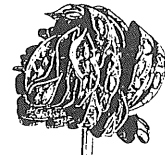
To introduce this year's research at The Land Institute, we quote from "The Ecological Impact of Modern Agriculture," a chapter written for a new book entitled *Agroecology* (C. Ronald Carroll, et. al. eds, 1990, McGraw Hill). This examination of the increasingly familiar agricultural problems of soil erosion, irrigation, the loss of genetic diversity, chemical contamination, surface and groundwater pollution, residues on food, and pesticide resistance is authored by Judy Soule, Danielle Carre, and Wes Jackson. Judy was The Land's staff ecologist from 1984 to 1985, and is writing a book with our present ecologist, Jon Piper, to be entitled *Farming In Nature's Image: An Ecological Approach to Agriculture*, contracted for 1990 publication by Island Press. She now lives with her family in East Lansing, Michigan. Danielle was an intern at The Land in 1985, stayed on as Research Associate, and with her family managed The Land's Harvest organic truck farm for

the past two years. She and her husband Brad Burritt, an '86 intern, now live on a small farm in western Colorado. Wes is co-founder and president of The Land Institute.

"The 'problem of agriculture' is as old as agriculture itself, and although the core of the problem has always been soil erosion, new problems have been added...

It is only in the last fifty years, with the expansion of industry and the chemicalization of agriculture, that the inherently extractive economy has acted as though the renewable resources that support agriculture are fair targets for exploitation in industrial terms. That is what makes the modern era different. That is what makes the current agricultural economy more brittle than almost any agricultural economy in history. It is hard for us to see this, perhaps, because it is hard for us to imagine our energy and aquifer mines lying hollow. It is hard for us to believe that our well water and air, our pleasingly packaged food, and our perfect produce could contain invisible poisons. It is hard for us to grasp the value of genetic diversity or to foresee the consequences of rampant extinctions. It is hard for us to believe that we may one day come to the end of our magical ability to produce ever-higher-yielding crops. It is hard for us to comprehend the total loss of our vast tropical forests or to anticipate the climatic changes when the earth's belly is belted in barren, sterile soils rather than the green, moist vegetation. It is hard for us to imagine a world where ancient salts sterilize the land and young chemical pesticides and fertilizers lie below our agricultural surfaces like demons in quiet prisons of degraded soil.

The outlook is not entirely bleak, for solutions to all these problems lie in lessons we have learned and can still learn from nature. If we turn our attention away from the extractive industrial model and begin to focus on nature's models of productive ecosystems as our guide for agricultural systems, we may yet see truly sustainable agriculture emerging. It isn't that nature learns faster than humans. It is just that she has been at it longer."



The 1990 Experiments

1. **Patterns and dynamics of native prairie.** The purpose of this ongoing study is to examine vegetative patterns typical of the prairie for insights into designing successful perennial polycultures.
2. **Evaluation of genetic variability in *Leymus racemosus*.** This study will describe genetic variability in leymus for characteristics needed to develop it as a perennial grain crop.
3. **Eastern gamagrass germplasm evaluation.** With domestication of eastern gamagrass as our goal, we will describe genetic variation of natural populations and estimate the heritabilities of traits such as seed yield.
4. **Illinois bundleflower breeding program.** The objective is to domesticate Illinois bundleflower as a perennial grain legume for inclusion in perennial polycultures.
5. **Foliar disease on eastern gamagrass in native and cultivated populations.** To model an agroecosystem on the prairie we need to study patterns of interaction present on the prairie and how these patterns change when transferred to a cultivated

field. This experiment will study patterns of pathogen interactions with eastern gamagrass in both settings.

6. **Breeding Illinois bundleflower and eastern gamagrass in monocultures and bicultures.** The purpose of this experiment is to assess which characteristics of these two species can be evaluated in monoculture and which will have to be evaluated in a simple polyculture to breed perennial crops adapted for use in polycultures.

7. **Perennial sorghum breeding.** The long-term goal of this project is to convert grain sorghum to a winter-hardy perennial seed crop by crossing it with its weedy relative. This year we will continue crosses and backcrosses, and begin to study the amount of rhizomes a plant needs to overwinter in our region.

8. **Preparation for the 1991 polycultures.** To get ready for a large scale planting next year we will establish field sites and conduct several preliminary studies of above-ground growth, establishment procedures, and soil erosion.

LISA-Funded Legume Research

Jake Vail

We've suspected since before Virgil's time that planting legumes makes for healthier grain crops, and over the years have learned how and why. Legumes, such as alfalfa, hairy vetch, and Illinois bundleflower biologically "fix" nitrogen, pulling it out of the air through microbial symbionts living on the legume's roots.

Because of this biological process, large amounts of otherwise unusable atmospheric nitrogen become available to grasses such as wheat, sorghum, and eastern gamagrass when they are planted in rotation (or in polycultures) with legumes, through processes of mineralization and nitrification when a legume is plowed under and decomposes. As it does, microbes release ammonium into the soil, a form of nitrogen usable to some crops, or bacteria may convert the ammonium to nitrate, which is usable by others. (See Land Report #34, p.16, for a nitrogen cycle primer).

Studies suggest, however, that rates of nitrogen mineralization differ with soil type, temperature, rainfall, cultivation practices, and the grass and legume species within a given rotation. Last fall we started a two-year experiment at The Land Institute designed to examine rates of mineralization and uptake in conventional crops, as well as in several

potential perennial crops we're investigating. The experiment is funded by the U.S. Department of Agriculture's Low-Input Sustainable Agriculture program (LISA), and carried out in cooperation with a team from Kansas State University and The Kansas Rural Center. John Havlin, a soil microbiologist at KSU, is the project coordinator.

"Synchrony and Contribution of Legume Nitrogen for Grain Production Under Different Tillage Systems" is the experiment's title. Successful low-input sustainable agriculture will depend on biologi-



University of Nebraska professor Chuck Francis talks with the research staff.

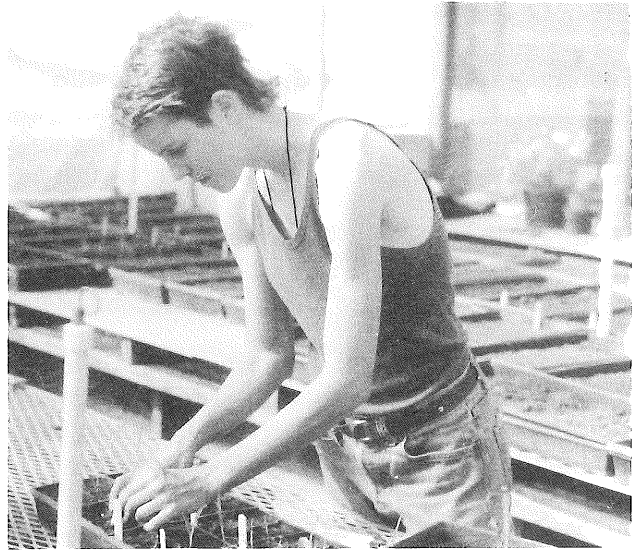
cal nitrogen since fewer chemical fertilizers will be used. But a legume is not a legume, and a grass not a grass. Amounts of nitrogen fixed and rates of uptake differ from species to species. For example, a study in Kentucky showed nitrogen mineralization from cover crop legumes occurring after the demand for it in subsequently planted corn had decreased. (Huntington et al., 1985. Release and recovery of nitrogen from winter annual cover crops in no-till corn production. *Comm. Soil Sci. Plant Anal.* 16:193-211). Ideally, the period of maximum mineralization would overlap or coincide with the period of maximum uptake by a non-legume crop. By looking at several species we hope to get a better feeling for how much nitrogen is fixed by different legumes, and when that nitrogen is available to various grasses planted following them.

Conventional agronomic research such as this is an important part of developing a sustainable agriculture which uses nature as a model, when that research is placed within a broad framework of ecological studies. We've chosen eastern gamagrass, Illinois bundleflower, and leymus (wild rye) as components of a large-scale perennial polyculture to be established next year. By this first-time formal collaboration with Kansas State University and the Kansas Rural Center we hope to gain new information on our three perennials to help us design the polyculture. Illinois bundleflower we see as the fertilizer of the polyculture, providing biological nitrogen, but we've yet to quantify its nitrogen-fixing potential, especially on a field scale. Knowledge of nitrogen use by eastern gamagrass and leymus will also further our work. In addition, the experiment will contribute base-line information on crop rotations and tillage systems in Kansas, information presently lacking and certain to be needed as we move toward more sustainable systems.

We planted hairy vetch and alfalfa last fall. This spring we'll sow sweet clover, Illinois bundleflower, and soybeans. After a season's growth we'll turn under the five legumes and follow them with plantings of four grasses — two annuals and two perennials: wheat, sorghum, eastern gamagrass, and leymus. Replicated research plots, soil samples, and nitrogen assays of plant biomass will help us follow the cycling nitrogen from air to legume to soil to grass. As the experiment's title indicates, we'll study this under different tillage systems, as cultivation practices affect the nitrogen cycle. This aspect of the experiment will not be done at The Land Institute, but by KSU and on-farm plots under the supervision of KSU and the Kansas Rural Center.

The Land Institute is devoted to sustainable agriculture and good stewardship of the earth. In the words of Wendell Berry, "a sustainable agriculture does not deplete soils or people." Indeed, both are

renewed. Experiments such as "Synchrony and Contribution of Legume Nitrogen for Grain Production Under Different Tillage Systems" help renew the soil through biological processes of fertilization rather than through fossil-fuel-based external inputs, as well as by increasing soil organic matter. In turn, as we lessen environmental degradation and become more aware of natural processes, we are renewed.



Holly Ewing transplants eastern gamagrass

Foliar Disease on Eastern Gamagrass -- An Ecological Approach

Berni Jilka

Using nature as a standard is the basis for our research at The Land Institute. The diversity and resilience of the midgrass prairie has much to teach us. In an agriculture modeled on the prairie, we envision mixtures, or polycultures, of perennial seed crops being planted, which could include domesticated native plants. This concept of incorporating nature's wisdom into a scientific study is an unconventional avenue of research. Several university researchers are using "nature as a standard" in their investigations with plants, insects, and pathogens (disease-causing organisms). Alison Powers, a professor of Ecology and Systematics at Cornell University, is investigating ecological interactions among plants, pathogens, and insects, and applying these studies towards designing an environmentally sound agriculture. Helen Alexander's work has been of particular interest to our research. A professor at the University of Kansas in Ecology and Systematics, Helen has researched plant diseases in natural populations, exploring basic ecological and evolutionary factors

and their interactions between species.

In our research at The Land Institute one of the questions we are asking is: How can we minimize plant disease and avoid epidemics in developing a perennial polyculture? Since 1986, Mary Handley, the plant pathologist at The Land, has been monitoring leaf diseases on eastern gamagrass, *Tripsacum dactyloides*. With the help of interns, disease levels have been evaluated yearly on plants in our research plots. The eastern gamagrass plants in the plots were collected from various populations found in Kansas, Missouri, and Oklahoma. In 1989, Mary expanded the disease studies to include a pilot study which, like Helen Alexander's, investigated disease in natural plant communities. This study was my research project in 1989 and involved observing and comparing disease infestations on eastern gamagrass in agricultural plantings and in natural populations.

There are major differences between agricultural plantings and natural plant communities. Agricultural fields are usually planted to one species of plant while natural communities are composed of multiple species. The size and age of plants in an agricultural community are similar, and development is synchronous. Random spacings and variances in growth and maturity are characteristics of natural plant populations. Humans control agricultural fields by tilling, irrigating, and fertilizing, affecting the biology of the crops. In nature, plant populations develop as a result of interactions of diverse organisms and various environmental factors.

It is often assumed that disease epidemics are rare or nonexistent in nature. This is not necessarily true. Severity of disease is the main difference between agricultural and natural communities. By observing nature, we can begin to understand what moderates and minimizes disease in natural populations. Evaluating disease is an effective way to incorporate the study of natural communities into our agricultural research. It is important to observe the dynamic interaction of organisms within a natural community and to understand how the plants and pathogens coexist in an ecological balance.

To study leaf diseases on eastern gamagrass in natural populations and agricultural plantings, we used several approaches. We traveled to the natural populations where we had collected eastern gamagrass in previous years and compared observations and disease evaluations with the corresponding plants in our research plots. We also transplanted plants from natural populations to field plots and from field plots to the prairie at The Land Institute.¹

Disease infestations vary among different eastern gamagrass populations. Environmental factors, such as wind and rainfall, may determine disease development. Because 1989 was a dry year, which inhibited the growth of fungi, most of the

disease ratings were low in both natural plant communities and agricultural plantings, although the natural populations had lower disease ratings overall. We noticed that populations of eastern gamagrass growing in protected sites seemed to have less disease than those growing in open, exposed sites. The most interesting results showed a significant difference between the disease ratings of plants in the research plots compared to the same plants that we had transplanted to the prairie. The prairie transplants, selected because of their susceptibility to disease, had fewer disease symptoms than the same plants in a monoculture of eastern gamagrass.

Population influences, such as planting arrangements and plant density, may also affect disease progression. In nature, eastern gamagrass grows in dense populations of various sizes and ages. Disease may help to maintain a natural population's size and density.² Diversity of species may also play an important role in disease development. In natural plant communities of multiple species, there is less of a chance for epidemics to occur. Not only is there a diversity of plants within a population, but there is also genetic diversity within a species. Due to the genetic makeup of a plant, some plants are more resistant to disease than others. By observing where a disease is present and how it progresses within a population, we may be able to plan a cropping pattern of polycultures to minimize disease epidemics.

Gathering information and examining plant populations for this research study has taught me to develop a keener sense of observation and to ask questions of nature. As ecologist Paul Sears said, "Science in some ways is very complicated, but in other ways it's a very simple matter. It's a matter of learning to use your five senses and any other source



Berni Jilka among young gamagrass plants at last year's Prairie Festival.

of information that you can lay your hands on to make simple observations of what's going on around you."

This experiment has also been interesting to me in that it interacts with other experiments at The Land Institute. What we are learning by studying the prairie ecosystem, the genetic diversity of eastern gamagrass, and the cropping patterns of eastern gamagrass has contributed to the knowledge of factors affecting disease-plant interactions. By analyzing interactions between organisms in natural communities we can further understand how to maintain an ecological balance among organisms in an agroecosystem. This type of research is needed to bridge the gap between agriculture and ecology.

References:

1. Jilka, B. 1989. Foliar disease levels on eastern gamagrass in cultivation and natural populations. *The Land Institute Research Report 6*.
2. Alexander, H.M. 1988. Spatial heterogeneity and disease in natural populations. M.J. Jeger, ed. *Spatial Components of Epidemics*, pp 44-64. Prentice Hall.



Kathy Collmer counts gamagrass seedling emergence, the start of a large experiment designed to observe genetic variation within the species.

Immediately preceding the 1990 Ecological Farming Conference held at Asilomar, California, in January, leaders in the field of sustainable agriculture met in a retreat at Esalen to define the issues of sustainable agriculture for the 1990's. They drafted the first consensus definition of sustainable agriculture and outlined the challenges that must be met to implement it.

Attendees at the retreat, which included Wes Jackson of The Land Institute, unanimously approved the document. The 800 individuals attending the Ecological Farming Conference then approved it by acclamation later in the week.

The entire Asilomar Declaration is reprinted in this Land Report to broaden the understanding and discussion of sustainable agriculture.

The Asilomar Declaration for Sustainable Agriculture

"Let us hope that by the best cultivation of the physical world, beneath and around us, and the intellectual and moral world within us, we shall secure an individual, social, and political prosperity and happiness, whose course shall be onward and upward, and which, while the earth endures, shall not pass away." — Abraham Lincoln, on agriculture, Milwaukee 1859

The present system of American agriculture cannot long endure. Our farms have succeeded in producing abundant food and fiber. But the costs and fragility of success become more evident each day.

Sustainable alternatives already prove their value. Not only are they more efficient in their use of energy, biological sources of fertility and pest management, they also enhance rural communities and encourage families to remain on the land. We commit ourselves to hastening the broad adoption of an agriculture that is environmentally sound, economically viable, fair, and humane.

A sustainable agriculture will require and support a sustainable society. Our challenge is to meet human needs without denying our descendants'

birthright to the natural inheritance of this planet. We must revere the earth, sustaining and regenerating both nature and our communities. People are a part of nature, not separate from it. Sustainable agriculture is as attainable as it is necessary. Though we recognize difficulties in this transformation, we can state with confidence that in every region there are farm families profitably growing healthy food through a practical partnership with nature.

A sustainable agriculture that provides nourishing food, protects those who work the land, helps stabilize the earth's climate, and safeguards soil and water depends on our ability to meet a number of challenges. We must address these challenges without delay.

Seven Challenges

Promote and sustain healthy rural communities. Healthy rural communities are attractive and equitable for farmers, farm workers, and their families. The continuation of traditional values and farming wisdom depends on a stable, multi-generational population. Absentee or corporate land ownership and the ever-increasing size of farms diminish rural life.

Expand opportunities for new and existing farmers to prosper using sustainable systems. We must devise ways to help people get started in sustainable farming. Reliable information on sustainable agriculture needs to be readily available to farmers, extension agents, bankers, and others. Training and apprenticeship programs should be provided for entry-level farmers and established conventional farmers interested in making the transition. Tax forgiveness or other incentives should be devised to ease the financial stress of new and transition farmers.

Inspire the public to value safe and healthful food. The biological quality of food is known to affect the health and well-being of those who eat it. Food quality is a key factor in disease prevention. Approaches which are striving to be sustainable — such as organic farming — avoid hazardous pesticide use and maintain nutrient balance. Consumers' understanding of these facts will increase their willingness to pay prices that reflect the true costs of production.

Foster an ethic of land stewardship and humaneness in the treatment of farm animals. Sustainable agriculture recognizes that the gifts of nature upon which it depends — soil, water, plants, and animals, both wild and domestic — are to be treated with loving care and humility. The greatest calling of the farmer is to leave those gifts in better condition than when they were received. Such a responsible agriculture can only be achieved when nature is both mentor and model, and when natural systems are the standard against which success is measured. Farm animals often contribute to ecologically sound agricultural systems and they deserve humane care.

Expand knowledge and access to information about sustainable agriculture. American farmers are innovators. Given scientifically validated techniques, farmers will adopt sustainable agriculture practices. Seeing these practices in the field will speed adoption. We need demonstration farms, farmer-to-farmer field tours, and studies of successful alternative farms of all sizes. University teaching, research, and extension must be redirected toward understanding the whole farm ecology and

away from chemical dependence in farm management.

Reform the relationship among government, industry, and agriculture. Government must use resources such as subsidies, grants, and loans to convert significant portions of industrial agriculture to a sustainable system. Undue rewards to concentrated corporate interests should be replaced with fair returns to farmers who sustainably provide food and fiber.

Redefine the role of U.S. agriculture in the global community. The present global agriculture trade is placing unnecessary pressures on the sustainability of the earth's resource base. The United States has a unique opportunity to change that situation. The people of many other countries look to us for agricultural leadership. We can honor that respect by restricting our trade in dangerous substances. We can encourage the Agency for International Development, The World Bank, and international research institutions to convert to sustainable programs. The international programs of universities can become centers of sustainability training and research.

Help Meet the Challenges

The Asilomar Declaration underscores the fact that "sustainable agriculture" is more than improved crop rotations and tillage practices. Work toward truly sustainable agriculture includes economics, sociology, ethics, and especially, politics.

Two years ago a number of agricultural, religious, and environmental organizations got together to develop policy options for the 1990 Farm Bill debate. This broad-based coalition, the Sustainable Agriculture Working Group, has defined several areas that need the attention of policy makers if we are to have a more sustainable family farm system of agriculture: commodity program reform, soil conservation, water quality, ag research, and the General Agreement on Trade and Tariffs.

The 1990 Farm Bill is being discussed in the halls of Congress right now. For details about the Farm Bill and to support sustainable agriculture, contact SAWG at member organization The Center for Rural Affairs, PO Box 405, Walthill, NE, 68067.





Natural Connections

For a long time we wondered what the spring LAND REPORT could contribute to the 20th anniversary of Earth Day. We decided not to do a special section, but to emphasize a regular feature which presents the most basic theme of Earth Day, our natural connections. Humans are of the earth, and, like all our relative species in the natural world, are dependent upon the gifts and grace of creation. The distinguished writers and Friends of The Land who have contributed to this section remind us of the spiritual experience natural connections provide, especially through some kinds of re-creation (recreation). D. J.

The Land as Therapy

Harry M. Caudill

A reflective person may justly conclude that he lives in a demented society. In this century nations have squandered at least forty million lives in wars of extreme ferocity fought about issues a Washington and Jefferson could have settled over a pint of claret. The German experience with Hitler and the American hysteria of McCarthyism demonstrate the nearness of the public mind to mass madness. Ferdinand Lundberg's *The Treason of the People* (1954) shows us that Americans in mass daily betray the ideals of our republic, shun libraries and lecture halls for ball games and TV sit-coms, fail to educate themselves concerning the most elemental matters, avoid their basic duties as citizens, trash up their country quite unconscionably and complain incessantly about matters which common sense and displays of individual responsibility would eliminate. A recent poll revealed that America's favorite recreation is shopping. If this is true, what hope is there for a society that shuns Shakespeare, Darwin, the revelations of science, great books, theaters, museums and lecture halls to throng shopping malls in mindless pursuit of unneeded possessions? This piling about in quest of "diversion" and "sensation" surely stirs a desire to escape the madding crowd to an island of peace. Real islands set amid silver seas are hard to find and are usually not paradisaical when reached.

I have found a substitute that is quite as soothing and much more constructive. Millions of Americans can afford its cost, and its benefits can continue to the end of one's days. It can help one to become a sage and to accept with equanimity the inevitability, the necessity, and the justice of one's death.

I speak of the adoption of a bit of ill-used, exhausted and desolate land as a personal responsibility—the same responsibility displayed in the adoption of a child. The nation abounds in worn-out farms, hills eroded in places to bedrock, soils leached and acidic, and near-deserts in the matter of wildlife. In a headlong rush to occupy the mountains and plains our ancestors burned the trees or sent them to sawmills, plowed up the mighty turf of the plains, and made farms everywhere from Appalachian hollows to desert gulches. Then in our own time, they scuttled into towns, cities, and immeasurable string communities that turn highways into main streets. This process has left behind a vast legacy of land that cries out in subtle ways for intelligent intervention and rescue. If a family undertakes such a project it will prove immensely educational and satisfying. It will also provide beneficial exercise as a substitute for the witless toil of jogging and "pumping iron."

Soil rejuvenation need not be expensive or complicated. As a matter of fact, there are federal agencies that will pick up nearly all of the bill. Nature and time will do most of the work if the land's legal owners will give them a reasonable chance. My wife and I have brought a dozen acres of useless Appalachian hillside back to a diversity of life and utility in a twenty-seven-year undertaking that has cost us less than a thousand dollars. It has given us many times that in pride and peace of mind.

From hill base almost to the caprock our land had been a clear field for more than a century. It had been cultivated in corn until hoe and plow sent the last of the fertile soil to the Mississippi delta. Then cattle browsed it for decades until the exhausted ground gave up the struggle to generate new trees. Thereafter it collapsed into such extreme

acidity that it could support nothing except clumps of broom sedge and an occasional spindly pine or cedar. It had continued in this state for about fifty years—unsightly, economically valueless, an expanse of hard soil and protruding rocks that shed rainfall almost instantly, thereby contributing to frequent regional flooding.

In 1960 we planted the land in white and southern pines at intervals of six feet. The soil was too poor to support any other species of trees, and for a long time our seedlings scarcely grew at all. But they survived, slowly strengthened their roots and suddenly, after five years, began to grow. By 1981 they were crowding one another and we hired men to use chain saws to fell about half of them. These felled saplings were stripped of their branches and the resulting detritus of limbs and trunks was left to rot on the ground. The decaying wood caught and held the annual needle fall and bark scale, and a slow increment of soil began.

Later we had the lower branches removed from the surviving trees and they were added to the rot. At this point growth sped up and young tulip trees appeared as competitors. Then some hemlocks and beeches raised their crowns along a narrow bench. A dozen black walnuts carried in by rodents sprouted and took root in a ravine.

Most of the next thinnings went into brush piles to shelter wild life. The tree growth quickened anew and today our once-desolate hill is a lively place. The biggest of our white pines could provide in their butt cuts some two-by-eight planks. Our tulip "poplars" are at least eight inches within the bark. Insects moved in to eat the wood and birds showed up to devour the insects. The place is alive with spring-time titmice, robins, warblers and chickadees. Black snakes and copperheads have returned to the pioneers' old rock piles, and there are opossums, rabbits and ground squirrels. I have twice spotted a bobcat taking liberties with our premises, and on a walk in March I startled five wild turkeys which flew away amid frantic commotion and much beating of wings. All of our wild neighbors treat us with condescending sauciness.

Springs, or rather seeps, trickle under the new layer of mold. The rate of growth is now quite startling. The pines thrust up about fifteen inches annually, and the voracious tulip trees do nearly as well. This once barren land has become an encouraging woodland with splendid prospects for the future.

"The Land as Therapy" is reprinted here by permission of the author, Harry M. Caudill. It was first published in *MANAS*, October 14, 1987. Harry Caudill has written many books about the desecration of Kentucky by coal mining, the most famous of which is a novel, *Night Comes to the Cumberlands*, published in 1963.

Another human generation will bring our little forest to a mixed environment of soft and hard woods, ferns and flowers, and the settled habitat of a varied wild life. If the nation needs them the trees will be grist for sawmills and particle-board factories. After that the site will be ready for a new cycle of growth, this time with oaks, hickories and other hardwoods.

Throughout we have had to struggle against fire and vandals. Fire can spring up from a discarded cigarette, a lightning bolt, or in some other wholly mysterious way. Many hunters do not hesitate to fire a .30-30 slug into a four-inch sapling. We had our problems with both of these menaces but we survived, and so did our trees.

When I walk amidst the smooth slender trunks and contemplate the rapidity of the land's revival I am immensely encouraged. Clusters of wild violets amid shaded stones that were once sun-baked and unspotted with moss have led me to muse with Shakespeare that there are indeed more things in heaven and earth than are dreamed of in our philosophies.

I urge all who will listen to do as my wife and I have done. Find some jaded land and buy it. Consult the county agricultural agent and state forestry experts about it. If it is practical to do so put some limestone on it to counteract its acidity. Plant it in trees and thin the stands as they grow or, if circumstances allow, turn it into a clover-rich meadow. Then watch the wild things discover it and make it their nesting and burrowing ground. In transforming itself from aridity to abundance it will provide a strong new bond between an American family and the vast rich continent their ancestors so precipitously cleared. They will acquire practical knowledge of planting bars, saws and axes. They will come to know the seasons and when to expect their furry, feathered and slithering tenants to appear. They will learn in microcosm geography, geology, zoology and meteorology. And their new knowledge will come so quietly and easily that they will scarcely be aware of their fresh understandings.

It is a wonderful way to grow in wisdom, while enriching a nation that cannot grow by a single inch though its people multiply ceaselessly. A healing land can be therapeutic in the treatment of many human ills.



The Mad Farmer's Letter to Some Relatives in Town

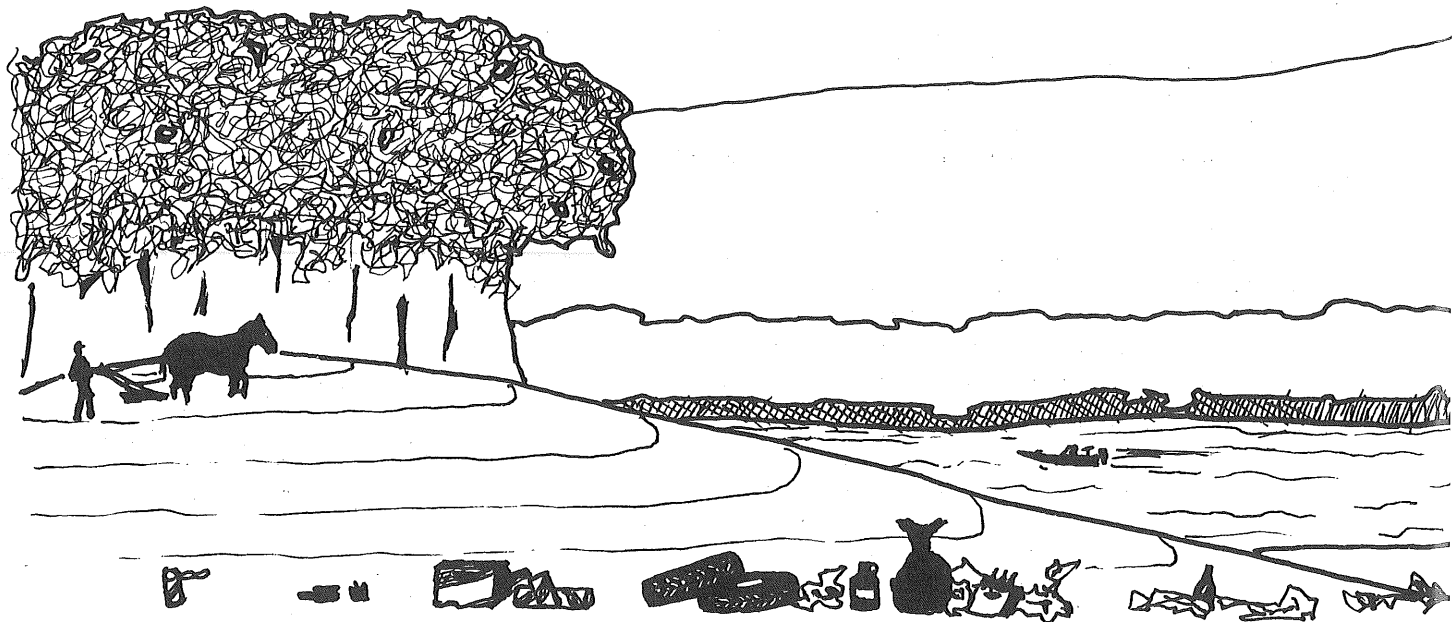
Dear Folks,

We hear that you all have had a right hard week. We know you're just worn out, empty as an old beer can. You need to be recycled. Lots of recreation will do the trick. Recreation is what we got out here. Come use it up. Spend a restful weekend, going fast and making noise out here where it's natural and wild and uncluttered, and a man (women and children too, of course) can be free. You can do just as you please out here because nobody lives here but country people.

If you hear that rural unemployment rates are 31% higher than in the cities, don't worry. Don't worry about farmers going broke. That just gives them more time for recreation. If only 12% of the doctors and 18% of the nurses live in rural areas, don't worry. We got plenty of recreation. It keeps us healthy.

When you come, bring your boat. Go fast up and down the river. Speed will increase the amount of recreation per mile per day. You will be surprised how the recreation will add up if you hurry. Recreation equals distance times velocity squared. Drink lots of beer. Pitch the can. You know Nature just loves to recycle stuff. When you eat throw your plastic dishes overboard — a good way to recycle them. They can be used again by all the hungry people downstream.

Or bring your bassboat. We can see that you folks are realists. If you really want to fish, you got to put out the money. If you haven't got the money, just borrow it. Out here, we can still remember a few backward country people who thought you could fish with a willow pole and a minnow or a worm. They caught a lot of fish, but there was no recreation in it. Why, some of them would sit still in one place a half a day at a time.



But fish were slower back in those days;
If you want recreation now, you got to move.
Fish equal dollars plus distance times velocity squared.
Drink plenty of beer to prevent dehydration
and sunstroke. And repay Mother Nature
for the fish you catch: Throw your beer cans overboard.

There is something out here sometimes
known as peace-and-quiet. Don't
let your children find out about it.
Whenever your motor is turned off,
play your radio loud. Or just holler.

Come back in deer season. Bring your pals.
We love to see you riding up and down the roads
in your Jeeps and red suits, rifles at half cock,
like Santa Claus's army. Bring plenty of beer.
You'd rather not be caught, waiting for a big buck,
way out here in nowhere with nothing
to do; you'd just as well be at work.
Leave your beer cans in the woods to pay
for the deer. You know how Mother Nature loves
little things like that. If you don't find a deer,
shoot a cow. We want you to have a good time.

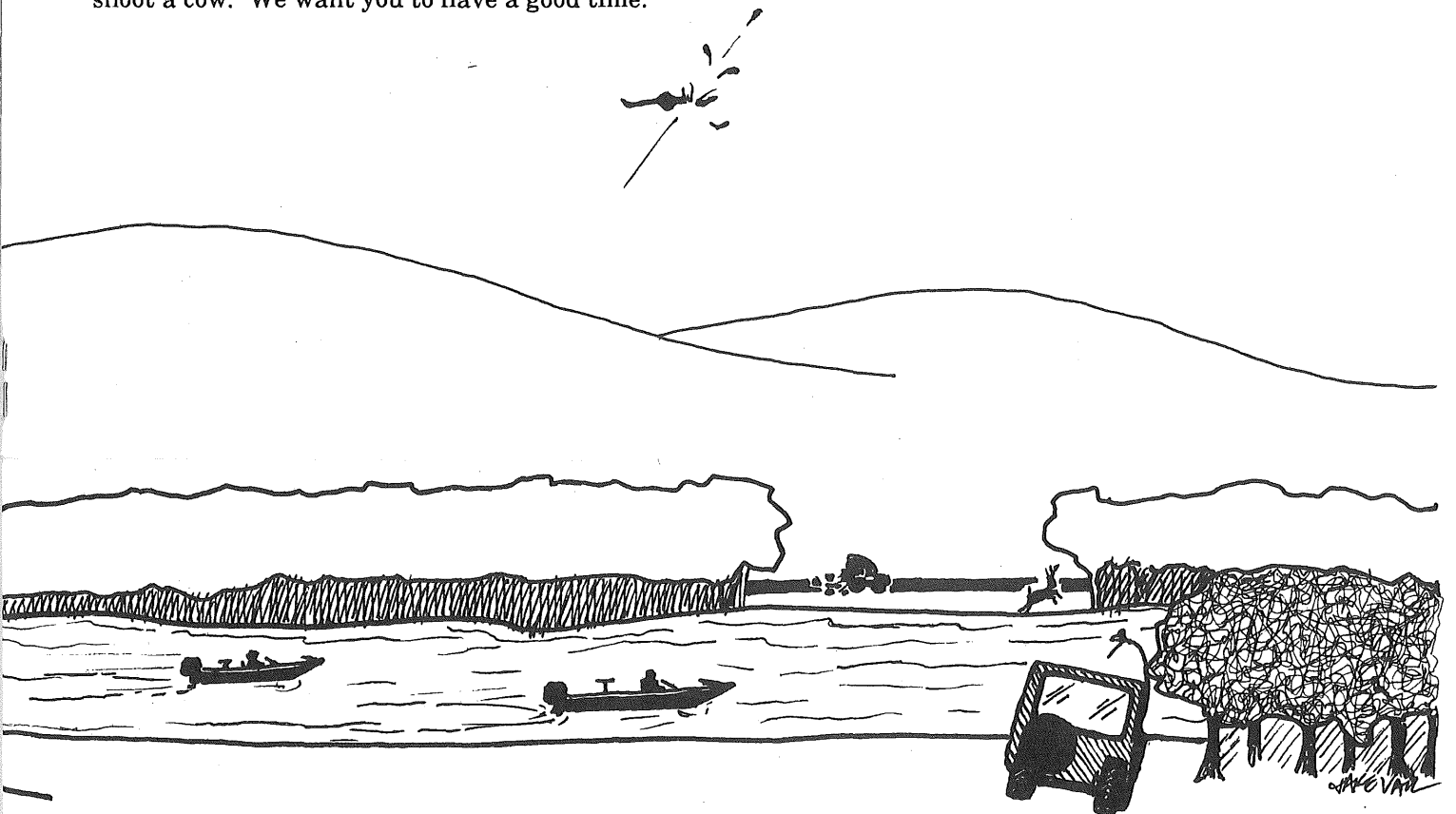
Keep your city clean. Throw your trash
out the car window on the way home.
Pitching in, you know, requires pitching out.
Out here is where it will end up, anyhow —
in a sanitary landfill, natural, wild, and uncluttered.

As you drive along, recreationally drinking beer,
please throw the empty cans onto the roadside
where they can be picked up and recycled.
This is a highly recommended charity to the poor.
If possible throw the cans in people's yards
where the grass is short and they will be
easier to see. All the world loves a recycler.

The poor, you know, can be recycled too,
once they pick up enough cans to afford a boat.

When you go by our house on your way home
past midnight Sunday night, blow your horn
and holler. Break a bottle on the road.
We'll want to know you're all right.

Wendell Berry



What Did You Do For Recreation?

Nina Leopold Bradley

"Barring love and war, few enterprises are undertaken with such abandon, or by such diverse individuals, or with so paradoxical a mixture of appetite and altruism, as that group of avocations known as outdoor recreation."

(Aldo Leopold, 1949)

Talking to a group of high school students recently, I was rehearsing the details of the land restoration project on our farm in central Wisconsin which began in the 1930s. The project involved an attempt to restore to health a piece of land that had been badly treated—overfarmed, mined, and abused. My father put his own shovel and his own back and his own family to work on it. As I discussed the project, one fellow from the group asked, "What did you do for recreation?" Never had this question occurred to us. The work was hard, but there was pleasure, satisfaction, even fun in the doing. That was especially true as the vegetation began to take hold and the land to heal and regain its beauty.

Of course there was the tree house in the old elm, from which gay laughter and guitar music could be heard during every weekend and school holiday. There were broad jumps on the sand bars along the river edge. There were tracking games in the snow, and competition for who could find the white pine with the longest candle. I guess these, too, would be classified as "recreation."

Today, fifty years later, we Leopolds spend much of each year collecting prairie seeds, planting more and more acres, working to convince our local highway commissioner that roadside prairies would save him money and enhance wildlife and people's perception. Recreation?

Today I wonder if my father had any idea what a learning process restoring this abused land was to become. Did he realize in the 1930s that a good way of learning about ecology is to try to restore an ecosystem? Did he know then that by attempting to bring back prairie vegetation we would learn which plants get along together and which do not, or what a remarkable landscape architect is nature? Did he think that some of his *kinder* would live long enough to watch and even measure the restoration of the soil? Did he know then that "sun, wind and rain" would again determine the outcome of all our hard work? Did he know that something more important than pines and prairie would come out of this experience and this Wisconsin soil?

Surely the ancestor of the word "recreation" is "re-creation." But verbal metamorphosis has somehow left the offspring with a different, broader and somewhat shallower meaning. To most people, recreation relates to having fun, and that can be almost anything. However, there is no law specifying that re-creation cannot be fun. Perhaps the point at which the two terms approach synonymy is where the ultimate in recreation lies.

The "Greening" of Religion

David Stewart

There is evidence that the land has become a more central issue in religion these days. Some who have observed this recent trend have described it as the "greening of religion" (Roderick Nash, *The Rights of Nature*, 1989). In the short view, perhaps it is right to say that there is a greening of religion. But in the long view, it is also right to suggest that, beyond the present greening, religion is coming home. The primal roots of religion are sunk deeply in the land and in the human creature's attempt to understand and to live in harmony with the land. Coming home—and none too soon.

Virtually every major Christian denomination (that part of the religious community with which I am most familiar) has taken up some agenda that relates to creation and, more specifically, to the land. The recent farming crisis that has victimized thousands of

farm families and hundreds of rural communities has been a major focus of religious groups, particularly in the central United States. As religious groups have worked with personal crises in this setting, they have discovered that a root cause of the farming crisis is how current farming practices relate to the land itself. Small-scale, localized farming operations do not survive very long in the large-scale, high-tech operations of international agriculture. The small-scale farmer is forced to either expand, which means take over the neighbor's land, or be eliminated. The fallout is the displacement of farmers from the land that they have known, worked and loved, and with which they have a spiritual bond. Those farmers, in a majority of cases, have been vital members of religious groups, and so the issue is joined.

Religious groups are also learning that the land itself cannot sustain and will not survive the current practices of large scale, high tech agriculture. The costs to the land are becoming increasingly apparent through the erosion of soil, the pollution of

water and the depletion of non-renewable resources needed to sustain this kind of agriculture. Religious questions abound in the face of such conditions. Who owns the land? What should be our relationship and responsibility to the land? How do we live together in community on the land?

It has also been recognized that many and, in the final analysis, all the issues to which religious groups are drawn ultimately have a connection to the land. Hunger and homelessness, for example, are the result in part of inaccessibility to the land. Racism leads back to our relationship to the land in the sense that a majority of the homeless are people of color. In the United States, people of color have been so displaced from the land that they are almost non-existent as independent farmers. The dumping of toxic wastes has been concentrated in poverty areas and near the living areas of people of color. Such conditions have moved religious groups to respond through their periodicals, through public policy statements and special action projects.

Religious periodicals have been saturated with articles on the land and creation. A special issue of *Sojourners* magazine (Feb.-March 1990) entitled, "The Cry of Creation" carried five major articles on ecological concerns. The Jan-Feb. 1990 issue of *The American Baptist* magazine features a discussion of the question, "Are we Destroying God's Earth?"

Religious leaders have issued public policy statements that call us to accountability. Pope John Paul II called for "peace with God the Creator, peace with all creation," in his World Day of Peace message on Jan. 1, 1990. Bible scholars and theologians at the Au Sable Institute of Environmental Studies stated that "environmental responsibility lies at the center of Christian faith and life, requiring every (Christian) to be faithful in care and keeping of the Creation." In addition, the governing boards of religious denominations are developing policy statements in defense of the environment. A major statement on "justice, peace and integrity of creation" was proposed to representative members of the World Council of Churches in March 1990.

Some religious organizations have become more active in expressing their concern about the environment. The National Council of Churches has been studying the effects of toxic and hazardous waste dumping in Louisiana. A United Methodist-sponsored conference in that area confronted Dow

Chemical over current dumping practices. The Land Stewardship Project, an organization that has worked closely with several denominations, promotes farm-land stewardship and sustainable agriculture through public programs featuring music and drama, as well as through farm tours and special projects with farmers. Saving soil and saving souls are more closely related than most people realize, according to Lincoln Paulson, a Minnesota farmer involved with the organization. The Public Mission Team of American Baptist Churches, USA, has focused its agenda for the 1990s on "Land and Justice: A Call to Stewardship," which will involve a series of national consultations and conferences designed to sensitize constituents and to impact public policy into the next millennium. The first such consultation will be held at The Land Institute in September 1990.

Environmental and ecological issues have been on the agenda of religious and theological scholarship a bit longer than the current activity among religious organizations may suggest. Books began to appear in the mid-1970s that pointed to the interrelationship between human and ecological concerns. Owen Owens' book, *Stones into Bread* (1977) addresses the human concern of hunger at the same time that it raises serious questions about how food is being produced. Owens suggests that Jesus was tempted to turn stones into bread to satisfy his hunger, but he refused to do so. In contrast, modern agriculture is succumbing to that same temptation as it extracts fossil fuel from the earth to produce food. On a biblical basis, Owens outlines strategies to change from an extractive agriculture and lifestyle to an eco-justice relationship that works and lives with the recognition that all life is interdependent. A similar discussion is found in *The Earth is The Lord's* (1978) edited by Jegen and Manno. The human concern of hunger is addressed once again, but it is also recognized that land stewardship and economic, political and environmental policies are major elements in the hunger issue. A more recent statement is Dean Freudenberger's work, *Food for Tomorrow* (1984). Freudenberger, who has formally trained and worked as both an agronomist and social ethicist, points out that the biblical tradition does not separate humanity from the rest of creation. The distinction between "sacred" and "profane" does not exist. Rather the whole cosmos is one great sanctuary. Freudenberger goes on to outline "A New Ethic for Agriculture," based on justice, participation and sustainability.

The work of Matthew Fox, director of the Institute for Creation-Centered Spirituality, has been a major contribution to the greening and coming home of religion. In *Original Blessing* (1983), he challenges the fall-redemption paradigm of biblical religion, saying that it has alienated humanity from

Thanks to Nina Leopold Bradley and David Stewart for writing these articles for the Spring LAND REPORT. Nina lives near the famous Leopold "shack" close to Baraboo, Wisconsin, and is still involved in ecological restoration. David Stewart is Campus and Resource Minister for the American Baptist Churches of the Central Region and runs the Baptist Campus Center near Kansas State Univ.

creation and, in turn, justified human exploitation of the earth. Fox says that those who begin with the fall, or original sin, omit the first twenty billion years of creation history which was blessing. Beginning with original blessing, he calls us to see in all things the creative and ongoing presence of God and to become co-creators in partnership with the Creator.

A sequel to *Original Blessing* is *The Coming of the Cosmic Christ* (1988), in which Fox relates a powerful dream he had from which came the message, "Mother Earth is dying." After recounting various expressions of this matricide in contemporary culture, he calls for a new mysticism that centers in a Cosmic Christ. The Cosmic Christ includes an historical Jesus, but is also manifested in other forms as the creator of mindfulness, the bearer of coherence, the pattern that connects the entire living cosmos and, generally, the unifier of all creation. Fox's mysticism includes the learnings of science about the universe, a response of reverence and awe, and art which gives expression to both the learnings and the response. Authentic mysticism has to do with justice-making and compassion, focused on all creation and on all creatures. We cannot have peace on earth without peace with earth. A deep ecumenism is needed, according to Fox, to include a dialogue

with the religions of native people whose spirituality and wisdom are so closely related to creation itself.

In an earlier work edited by Fox, *Western Spirituality* (1981), the long-standing creation-centered spirituality of the West is revisited. The problem has not been the absence of such spirituality in the West, but rather the choice to ignore this part of its tradition through the centuries.

Old Testament scholar Walter Brueggemann, sees land as a central theme in the biblical faith. The story of Israel involves movements from landlessness to landedness to exile to kingdom (*The Land*, 1977). God's relationship to the people is conditioned by how they live on the land. Indeed, there is no relationship to God without a relationship to the land. Our production-consumption culture finds it acceptable to uproot and displace. But this disregards the sacredness of place that keeps us rooted in the land and reminds us of the needs and claims of the land itself. Having land, Brueggemann says, is as much of a problem as not having land, for it carries with it heavy responsibility for just and compassionate stewardship.

In a similar vein, Geoffrey Lilburne, in a paper called "Theology and Land Use" (1987), says that how we relate to the land is ultimately a religious issue.



Drawing by Mary Kay,
Professor of Art
Bethany College

On the one hand, "image of God" and "dominion" interpretations of scripture have created real theological dilemmas. On the other hand, very clear and direct rules are set forth in the biblical tradition that demand proper treatment of the land and its creatures. In an address at The Land Institute (June 1988), Lilburne also applied incarnational theology to the land. He suggested that the incarnation means that where we live, God also lives. The human vocation is to keep our places fit for God to dwell in them. Part of keeping our places fit involves taking care of those life forms that are native to those places.

After describing the rift between science and religion, Sean McDonagh calls for a new story of the earth that brings together the learnings of science and the spirituality of religion (*To Care For the Earth*, 1986). Interestingly, this new story is first fashioned by scientists — like Teilhard de Chardin and James Lovelock — who integrate the physical and spiritual dimensions of life. The new story locates humanity within the earth community rather than apart from it. The new work for science and religion is to collaborate with each other on a just and compassionate response to the whole community of an endangered creation.

The new story that McDonagh, Lilburne, Fox, and others, are now rehearsing in this greening of religion is essentially the old, old story. It is the first story that our earliest ancestors told as they began to experience the patterns of the earth. The earth and all its creatures were filled with gods and with the activity of the gods. The journey of the sun across the day and the moon at night, the rising and receding of the flood waters, the growth of plants, were all part of the story of the gods.

Joseph Campbell in *The Power of Myth* (1988) points out that the planting process for the ancients involved killing a deity, cutting up its members and burying it, so food would grow and the deity would thus be resurrected. In hunting cultures, the animal that was hunted was respected and revered. It was seen as being superior to the hunter and was understood to be making the ultimate sacrifice of giving up its life for the feeding of others. The killing of the animal, a messenger from God, was part of the process of participating in the divine plan of nature. Planting, hunting and eating were entered into with the awareness that they were sacred gifts and acts.

Much of this old story is amusing at best and offensive at worst to our modern sophisticated minds and spirits. We, after all, can explain the cycles of nature without the benefit of the gods. But in our explanations we have lost the wisdom of the old story that told of the divine presence in all the earth and in all forms of life. In our modern stories that explain away the exploitation of earth, we have lost the recognition that life is supported by sacrifice and we

should receive the sacrifice with grace and reverence. Our sophisticated stories have taken us out of this world and segregated us from the rest of life, and we have lost the wisdom that we are sisters and brothers to all creatures.

Through the new story of "greening religion," we hope to recover the wisdom of the old story and find our way back home.

Creating a New Picture of the Earth

Paul Gruchow

We happen to be at one of those moments in history when we have lost a coherent picture of our own place in the world. We have made many such pictures in the past, but they inevitably change as our knowledge of the world changes. The historian Edward Harrison calls them our masks of the universe. We've thought until recently in terms of two masks, which we now know to be outdated. We have imagined the universe as a chain and as a machine.

The chain — The Great Chain of Being, we called it — was a lovely idea and it worked for along time. As we saw it, each species of living thing was linked together in a chain reaching ultimately to God in heaven. The chain began with the most insignificant things on earth, which constituted very small links, and the links got bigger and bigger as increasingly important kinds of life were added to the chain. We humans were almost with God. There were a few angels between us and God, but we were the biggest link in the earthly portion of the chain of life.

The Great Chain of Being was a lovely idea for two reasons. First, it connected us irrevocably with all the rest of life. And second, it made us in the most serious way *responsible* for life. If one of those links broke, disappeared, was destroyed by us, then our own reach to God was also shattered. But the idea had a fatal flaw. It depended absolutely on the belief that life never changes. The chain worked only if there were never any new species, only if no species ever died, only if the earth were a static organism. We know now that that's not true; species come and go, and the earth changes, even dramatically, from epoch to epoch. So the chain doesn't work for us as a picture anymore.

We have also imagined the earth as a great machine, a machine that works in mechanical and clock-like ways. This image has appealed to us so powerfully, I think, because it's in the nature of machines that they must be tended. And by whom? By us, of course. So the picture of the universe as a



Paul Gruchow at The Land . Paul is an author and a former newspaper editor who teaches at St. Olaf College in Northfield, Minnesota. He presented this article as a Sunday morning "homily" at the 1989 Prairie Festival.

machine is one that makes us into little gods. And that's how we've behaved. We've behaved towards the rest of life as if we possessed the impunity of the gods. But we know now that the earth does not work like a machine, or at least like any machine that we are able to manage. The mess that we've made of the natural earth is the evidence of that.

One reason why the political will to be good stewards of the earth is hard to develop is that we haven't yet devised a new picture of the universe to replace these outdated pictures, an image that we can all agree upon, that unifies our thinking, is consistent with our present knowledge of the world, and offers us a sense of our proper place in nature. Only when we have created such a picture can we summon the political will to live in the world with a suitable sense of responsibility, with sensitivity to the requirements of our place.

It is a tremendously exciting time to be alive. We are called upon to be present at the creation of a new picture of the earth and of our place in it, a picture that has the potential to shape, in good ways, life for generations and centuries to come.

How will we know when we have succeeded in making the right picture? I think we will know that we have found the right picture of the universe when we have found an image that we can love. Of course, it must be consistent with what we know intellectually, but above all, if we are to behave responsibly toward it, we must imagine the earth as lovable.

And what is the minimum necessary condition for loving something? That is the question. I think the answer is that it is inconceivable to love some-

thing without knowing its name. So the process of re-picturing the world will begin with the act of renaming it, of becoming reacquainted with the earth on a first-name basis, with its wild constituents as well as its human ones.

This is the strongest reason I know for acting with absolute restraint toward the natural world, for saving every one of its pieces. Every piece that we destroy robs us of another name for the puzzle we are struggling to reassemble, the puzzle that, when solved will reveal to us a new picture of the world.

Bruce Chatwin has recently published a provocative novel called *Songlines* about an encounter with the Australian aborigines. They are, of course, nomads in a land as spare and parsimonious as any upon habited earth. And so they are obliged to be almost constantly on the move across vast stretches of desert, vast particularly if you consider that they move on foot, carrying all that they possess. Every aborigine comes to know every water hole, every patch of vegetation, every animal there. How do they do it? They have no written language, make no notes, carry no maps. How do they memorize so much information and keep it in memory? The answer is that they sing the landscape. Every landmark in an aborigine's territory has its own verse, its own snatch of melody, its own fragment of poetry, and the sum of an aborigine's territory is the accumulation in sequence of its songs: its songline. Chatwin writes: "Richard Lee calculated that the bushman child will be carried a distance of 4,900 miles before he begins to walk on his own. Since during this rhythmic phase, he will be forever naming the contents of his territory, it is impossible that he will not become a poet."

Chatwin's thesis is that we are born like the Australian aborigines to wander. He believes that the nomadic life is the natural way. I think he's wrong. I think the real meaning of his story is that even wanderers have found, sometimes with awesome vision and beauty, as in this case, how to make for themselves a place in the world. And his story means further that the deepest and most satisfying sense of place comes from the keenest appreciation of its multifold distinctions. When the uniqueness of a place sings to us like a melody, then we will know at last what it means to be at home. But how shall a place sing to us like a melody if it has become nameless to us and, therefore, unknowable and unlovable?

We have lots of utilitarian answers to the question, "Why must there be wild places?" But the most important answer is not utilitarian. It is wildly, hopelessly unscientific. It is that except by the measure of wildness, we shall never really know a place on earth. And without a sense of place, we shall never really make a poem. And if we never make a poem, we shall never really be fully human.

Traditional Roots of Agriculture Gardening

Green Thumbs Gather

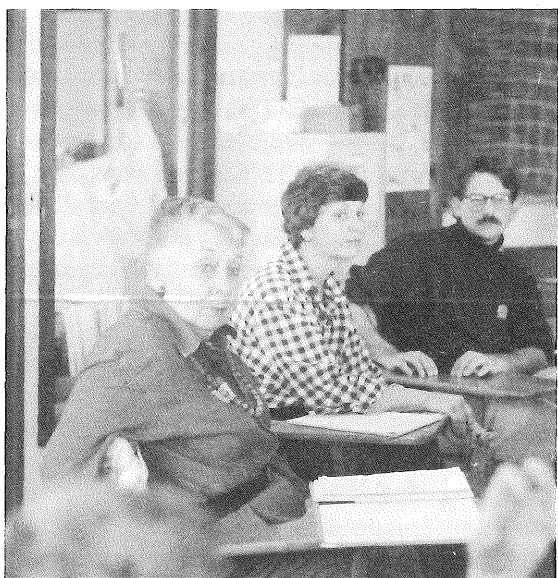
Kathy Collmer

"The wearin' of the green" took on a whole new meaning at The Land Institute on March 17, for it was not only St. Patrick's Day, but more importantly, the day of the biannual Green Thumb Gardening Workshop! Organized and moderated by Dana Jackson, this organic workshop has become a Land Institute tradition.

As a beginning gardener, I had been looking forward to the event for weeks. But the workshop was far more than useful instruction for greenhorns like myself. Veteran gardeners as well welcomed the opportunity the workshop provided to share experiences and learn from each other. Among the nearly fifty participants were several old-timers who have been attending the workshop for years and gardening for decades. They bore ample testimony to the adage that no matter how long you garden, you will always have more to learn.

The atmosphere was warm and friendly as the day began and old friends who had traveled from all over Kansas greeted each other in the sun-filled classroom building. Each participant brought her or his favorite vegetable to contribute to two big soup pots that simmered until lunchtime.

To kick off the workshop, Dana introduced the three people who were to initiate each of the day's



Resource gardeners Betty Fury, Dana Jackson and Dan Nagangast listen to participant comments.



Lynn Byczynski and workshop participant Lucrecia Crimmins check garden seed catalogues.

five discussions. These "resource gardeners" were Betty Fury, a long-time Salina gardener and Saline County Horticultural Club member who maximizes a relatively limited space by using raised beds and all manner of containers; and Dan Nagangast and Lynn Byczynski, the owners/operators of Fairplain Farm, a commercial organic vegetable farm outside Auburn, Kansas. Dan and Lynn quit other jobs last year to devote full time to market gardening.

Since healthy plants depend on healthy soil, soil was the day's first topic of discussion. Gardeners traded stories about what had worked best for them with respect to composting methods, manures, and cover crops. Rabbit manure has been found to work especially well, and it's rumored that elephants produce the best manure of all! But if Barnum and Bailey aren't passing through town anytime soon, you can hardly beat horse and cow manure for their soil-building qualities.

All central and western Kansas gardeners (who made up the majority of the participants) must deal with water shortages, so water was the next subject examined. Pros and cons of double-digging and raised beds were discussed, as were the various kinds of hoses available for providing maximum water to plants with minimum waste of water, and avoidance of hose clogging due to mineral deposition.

It is perhaps in the area of insect and weed control that organic systems differ most from chemically dependent gardening — a point that was made

clear in the next discussion. Organic gardening focuses on prevention. Methods we talked about included installing chickenwire with fine netting over it, using predatory insects, mulching, companion planting, and making a portable "chicken tunnel" around the garden's perimeter that would allow chickens to pick off insects and weeds that might otherwise spread into the garden.

As unappetizing as the subject of bugs might be, our minds turned to food before the discussion was half over, as mouth-watering aromas from the kitchen began to waft into the meeting room. Lunch was served buffet style and we ate on the patio in the beautiful sunshine that had been beckoning us all morning— as we sat indoors talking about the outdoors!

Once nourished and sunned, we began the afternoon session with a discussion of seeds, seeding, and transplanting. Lynn exhibited the cell blockers she and Dan use for germinating and transplanting, and the group exchanged names of useful seed companies, among them: Johnny's Seeds, Cook's Garden, Shepherd's Garden Seeds, Southern Exposure, and Blum's Seeds. There was some lively debate on the pros and cons of using patented seeds, but all agreed that that issue would require a whole workshop unto itself.

The final topic of the day was "My Biggest Garden Problem Is... My Greatest Garden Success



Was..." In this session, as in the previous ones, individuals described problems they'd encountered, and others offered possible solutions based on their own experiences. Beginning gardeners appreciated the sharing of knowledge that their more experienced peers had gleaned from the school of hard knocks (as well as from some delightful surprises!), but even seasoned gardeners collected ideas for new ways to do things.

Best of all, besides the wealth of information exchanged, the workshop offered a hearty dose of laughter, camaraderie, and enthusiasm that left us energized and ready to go home and put those green thumbs to work!

Solarize Soil to Control Wilt

Mary Handley

What is healthy soil? How do you know if you have it? More importantly, how do you know if you don't? By most standards, the soil in the garden at the Land Institute is healthy. It is rich, dark, and easily worked. No chemical fertilizers or pesticides have been applied for over a decade. And yet in a large portion of the garden, okra and strawberries won't grow at all, and eggplant or non-hybrid tomatoes are weak and stunted. Why?

The symptoms on these plants resemble those of vascular wilts. Vascular wilts are widespread, very destructive, spectacular plant diseases. They first appear as slight wilting and lighter green or yellow-green color in the leaves. This progresses to severe wilting of leaves and young shoots, browning and death of leaves, and eventually death of the whole

plant. What has happened is that a fungus has entered the vascular, or water-transporting, system through the plant's roots, and begun to grow through the water vessels, killing neighboring cells and physically blocking vessels. The plant reacts by secreting gummy gels into the vessels in an attempt to stop the fungus.¹ The net result is that water can't be moved from the roots to the leaves. The plant dies of thirst even though the soil is wet.

The most likely causes of wilt in our garden are *Fusarium*, *Verticillium*, and parasitic nematodes.

Fusarium wilt

Fusarium wilt is caused by the fungus *Fusarium oxysporum*. It is a host-specific fungus; *F. oxysporum* f.sp. *lycopersici* only infects tomatoes, *F. oxysporum* f.sp. *cepae* only infects onions, and so on. (f.sp. means *formae specialis*, or the form of the species found on the specified host plant. They all look alike, but can't infect other plants.) The only

Fusarium wilt you're likely to encounter in a garden is on tomatoes, unless your garden site used to be an old vegetable farm. Fusarium is often introduced into a garden with locally purchased tomato transplants that were grown in infested soil in the southern states. This is a warm season fungus, and is relatively uncommon in cooler parts of the temperate region.¹

Verticillium wilt

Verticillium wilt is caused by two closely-related fungi, *Verticillium dahliae* and *Verticillium albo-atrum*. These fungi are widespread, and can infect literally hundreds of species, including many vegetables, annual and perennial flowers, small fruits, weeds, fruit and forest trees. Verticillium prefers cooler climates.¹

Parasitic nematodes

Nematodes are microscopic eel-worms which feed on plant roots by inserting their spear or stylet mouthparts into root cells and sucking out the contents. Nematodes can cause damage by themselves, and they magnify the effect of vascular wilts when present together.¹

The big problem with all of these things is that once you have them, you have them forever. Vascular wilt fungi are soil inhabitants, and they can survive almost indefinitely on plant debris and as thick-walled resting spores. Nematodes are also normal soil inhabitants which can feed on a wide variety of plants. Wilt fungi and nematodes spread slowly by themselves, but many of a gardener's normal activities can make a small problem into a much larger one very rapidly. Anything that moves infested soil to a new location—walking with muddy shoes, spading or rototilling, plowing, moving plants or plant parts, or allowing water to flow across the surface of the soil—will spread the problem. Wind-blown or water-splashed soil can also spread these organisms.

So what can you do? Rotation obviously won't work, unless you can envision a thirty year or longer rotation. The most common "control" for vascular wilts is host plant resistance. Hybrid tomato variety names are often followed by a string of letters such as "VF1F2NT." V is for Verticillium wilt, F1 and F2 are for two forms of Fusarium wilt, N is for root knot nematodes, and T for tobacco mosaic virus. These hybrids are resistant to each of these diseases, and can produce tomatoes even in infested soil. Resistance is a relatively benign method of controlling a problem, but it doesn't help if you want to grow heirloom varieties. There also aren't many resistant varieties of okra, for example.

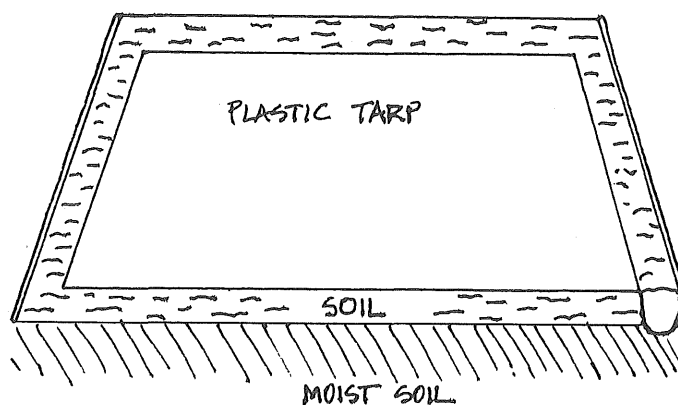
Commercial farmers have relied on chemical fumigation of the soil for many years. This process

injects gases such as methyl bromide or chloropicrin (tear gas) under a plastic covering over the field. This treatment eradicates wilt fungi and nematodes, along with all other soil life. It is dollar-expensive and environmentally expensive and obviously unacceptable for sustainable or organic agriculture.

A third option which has received increased attention from conventional farmers is soil solarization. This is a process of covering moist, well-prepared, level soil with a clear plastic mulch for four to six weeks during the summer months. Solar energy heats the soil under the plastic to reduce or eliminate disease-causing agents.² (The plastic has to be clear in order to work well.) This non-chemical solution to difficult soil-borne problems merits further attention by organic farmers and gardeners.

During solarization, soil in the upper soil layers reaches 50 degrees Centigrade or higher, which will kill many microorganisms within a few hours. The soil will be heated, to a lesser degree, to a depth of over one meter. Many soil organisms are affected during solarization, including disease-causing fungi, nematodes, bacteria, weeds and weed seeds, soil insects, beneficial fungi and bacteria, and other organisms.³ Populations of many of these organisms are greatly reduced, although certain organisms will increase very rapidly following solarization and may actually show increased numbers. Reduced populations doesn't mean total elimination of the problem. According to Dr. Jim DeVay, one of the few U.S. scientists studying solarization, we could expect to control the wilt problem in our garden for at least two seasons after the season of treatment, but we would eventually need to solarize again.

What else does solarization do? Solarized soil is usually higher in soluble nutrients following treatment. Increases in ammonium-nitrogen, nitrate-nitrogen, calcium, and magnesium are commonly



Thoroughly moisten the soil beneath the plastic prior to or just after its placement.

Bury the edge of the plastic 8-12 inches below the soil surface.

found. 4 In some soils, soluble phosphorus, potassium, and chlorine levels also increased. The nitrogen increases range from 26-177 kg/ha, depending on soil type, with soils high in organic matter releasing the most nitrogen.⁴ This increase is temporary, although it can often benefit the first crop following solarization.

One very interesting observation is an increased plant growth response (IGR) following solarization. This can be seen in a variety of crops even when no major diseases or pests were detected.³ We observed this IGR here at the Land when we mulched a plot to eradicate some Johnson grass. That plot was distinct for several seasons as a brighter green, more vigorous part of the larger field. Researchers can explain some of the factors causing the increased growth response.

The overriding components of IGR are probably thermal inactivation of plant pathogens (both major and minor pathogens) and pests (nematodes and soil borne insects), alteration of the soil microbiota to favor antagonists of plant pathogens and pests, release of soluble nutrients from soil, and thermal inactivation of weed seeds. These mechanisms of action, and probably several others such as qualitative and quantitative changes in soil gas composition and volatile substances, weakened propagules and impaired reproductive ability of pathogens and pests, improved soil structure, and deeper penetration of soil moisture, combine in an integrated process to alter plant root environment and result in IGR. With the combination of such a broad scope of favorable components, it is likely that most crops would benefit from soil solarization.²³

With all of these benefits, is solarization a bandwagon that organic farmers and gardeners should all jump on? Some questions remain in my mind.

First, what are the long term effects on soil organisms, particularly of repeated solarization. The process only works for several seasons and then must be repeated. Are there long term changes in the balance of microorganisms that will reduce the health of the soil? The claims that beneficial organisms are increased with solarization have not been tested over the long term, nor have researchers looked at natural balances of organisms in healthy soils, ie. no chemical fertilizers, herbicides, or pesticides.

Second, where are the reported increases in soluble nutrients coming from? Does solarization increase the need for fertilizers after several seasons? Is soil organic matter reduced? At one study site, originally high in soil organic matter, decreases were observed after solarization. This would not be desirable in a sustainable system.

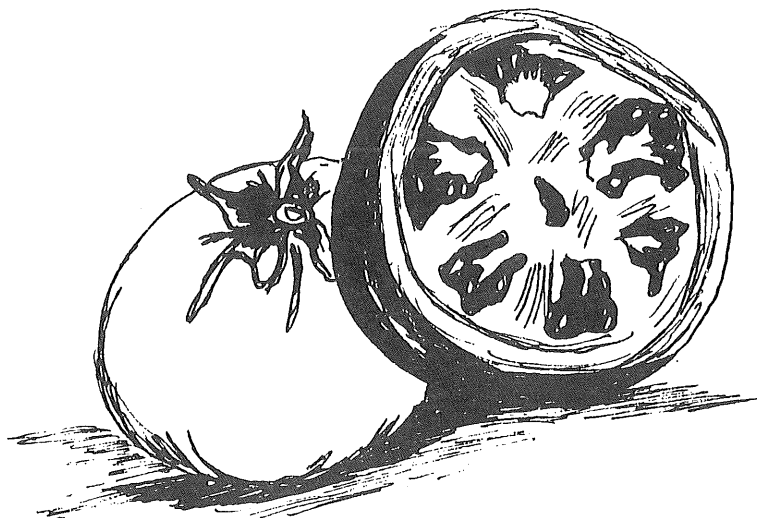
Third, how does solarization complement organically managed systems? Is it compatible with manuring, composting, and cover cropping? Does it alter the microbial balance unfavorably in soil that has been maintained with healthy practices, as contrasted with chemical intensive practices? What happens to populations of predatory and parasitic insects? Most solarization studies are relatively short term, following for only one or two seasons after treatment. They do not address the long term impact of this method. All studies have been conducted on conventionally managed farms, many of which had used annual soil fumigation for years before solarization studies began.

What will solarization do to healthy soils? These questions need to be addressed, I feel, before solarization could be widely recommended for organic systems.

Back to our garden, our soil, our problem. Is solarization the answer? Despite reservations about the long term impact of soil solarization, and despite the lack of knowledge of how it will work on soil that has not been managed chemically, I think it is worth a try. No, it will not "cure" our wilt problem. Solarization will give us two or maybe more seasons without wilt damage. It is one solution to an extremely difficult situation.

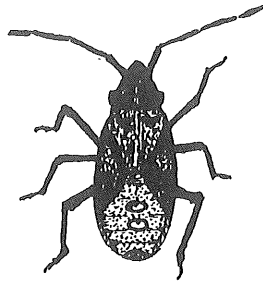
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Squash Bug Woes

Pamela Cabbage



In The Land Institute's community garden, as in any garden in Salina, one small member of the class Insecta has a heyday in early summer wherever any squash or pumpkin is planted. This beastly animal is *Anasa tristis*, the squash bug. Though it is a relatively insignificant animal in the garden ecosystem in terms of size, populations of this insect grow as quickly as a prairie fire spreads and leave in their wake similar devastation.

The squash bug is responsible for keeping Land gardeners on their toes in the garden. Each year, Dana enlists a squash bug patrol, directing everyone working in the garden to squash the squash bugs: adults, nymphs, and best of all, the beautiful coppery colored eggs found on the undersides of the leaves of squash plants.

As usual, in 1989 we saw squash bugs on the pumpkins and zucchinis in mid-June and fought them as valiantly as possible until the last yellow crookneck crumbled in the fatigue of wilt. Then we received an unexpected and terrible surprise: the squash bug battalions—literally thousands of the small beauties in various stages of development—marched next door and began sapping the strength of the cantaloupes and watermelons. Soon this whole north section of our garden was a sad battleground with squash corpses strewn about. We lost the war.

Squash bugs are members of the insect order Hemiptera, commonly called true bugs. They have piercing-sucking mouthparts. They make a living by inserting their mouthparts into the vascular tissue of plants, much like hypodermic needles, and sucking out freshly made plant sugars. A squash bug begins its life as an egg and goes through five immature stages of development as a nymph before becoming (in about thirty days) the all-too-familiar adult we know in Kansas. This adult may live another month feeding and damaging plants, and if it is a female, laying eggs of the next generation.

In Kansas, squash bug populations go through at least two and sometimes three life cycles in a growing season. Some adults of this second or third generation will live through the winter in soil in a dormant state. By late May adults that have overwintered come out of their dormancy to begin feeding and laying eggs. These eggs will generally have de-

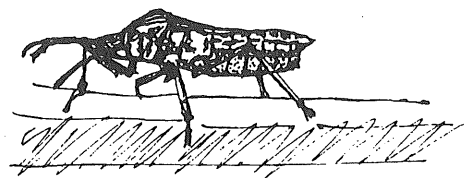
veloped into adults and be reproducing by mid-July. For several weeks in July often there will be two generations feeding and reproducing simultaneously. The stress on squash plants caused by both of these generations of pests is usually great enough in a few weeks to destroy the plants. It is a marvelous and terrible thing to watch take place. What amazed me in watching this episode of imbalance in the garden ecosystem were two things: first, the bugs alone destroy the squash plants—they do not vector diseases—and second, this species, indigenous to North America, seemed to have no natural enemies to check its soaring populations. So, upon a little prompting from Mary Handley, I went to Kansas State University to do some research.

At Kansas State I met Dr. James Nechols, an entomologist specializing in biological control. He and his graduate student Elizabeth Vogt are investigating the biological control of squash bugs by several small parasitic wasps. Since not much research has been done on squash bugs, their history as a species in central Kansas is not well understood.

Squash bugs are neotropical. They originated in the tropics of South or Central America and moved northward, either on their own or perhaps with humans who cultivated the various plants on which these insects love to feast.

Although the researchers at Kansas State have found several egg parasites of the squash bug naturally occurring in Kansas, these parasitic wasps do not seem to control populations of squash bugs where they have been found. The researchers hope to establish an effective bio-control program by augmenting the low numbers of parasites they have found in spring (when the squash bug populations begin to soar) with releases of laboratory-reared parasites. They are also studying the reproductive biology of the wasps to better understand these natural enemies of the squash bug to make their bio-control program as effective as possible. Because the squash bug came from the tropics, it is supposed that the wasps did too at some point in their history. Perhaps they are more susceptible to the extremes of the Great Plains climate and, consequently, not as well-adapted as their host.

We hope our entomologist friends at Kansas State will succeed in establishing populations of parasites of this devastating pest and eventually Land people will be able to leave work on a cool fall evening to go home to a nicely baked winter squash for dinner. But until they do, we'll be squashing the squash bugs and eating sweet potatoes and leeks.



Reading about Gardening

Thomas Jefferson: The Garden and Farm Books
Robert C. Baron, ed., Fulcrum Publishers,
Golden, CO, 1987.

Jake Vail

Long-haired revolutionaries who, between making up catchy political slogans and enjoying good wine, spent most of their hours puttering about in the garden, are not solely relics of the 1960s. Two hundred years before, Thomas Jefferson set such an example and in 1766 began a journal of the goings-on in the gardens and farm of his home in the Blue Ridge foothills of Virginia. With over 10,000 acres to keep track of around Monticello, his notes quickly expanded. Robert C. Baron has edited the garden and farm books and published them in one handsome volume entitled *Thomas Jefferson: The Garden and Farm Books*. Historian Henry Steele Commager provides context to the man and the land in an introductory essay, and Mr. Jefferson's books are further complemented by illustrations, photographs, letters, and an extensive bibliography.

Like Mr. Jefferson himself, the garden and farm books are a national treasure — particularly this edition, as the farm book has never before been published, and the garden book only once. As a Virginian, gardener, political science major, and student of culture and agriculture, I've been eyeing this book since I first saw it on Dana's desk last fall. More fun to study than a stack of seed catalogues on a wintery February day, *The Garden and Farm Books* contain not only extensive lists of crops planted — along with wheat, oats, and peas were radicchio, scorzonera, Jerusalem artichokes, and hops — but notes on cultivation practices and equipment, letters to correspondents ranging from George Washington to Mr. Jefferson's granddaughter, genealogies of slaves, observations of weather, weeds, and wildlife, thoughts on improving seed drills and flour mills, instructions on preserving bird specimens, and comments on new varieties of flowers. ("Mirabilis just opened. Very clever.")

Mr. Jefferson bragged that the sun had not caught him in bed in fifty years. Looking at his myriad accomplishments, one wonders how often the moon did. It's estimated that he wrote over 19,000 letters in his lifetime. 40-odd excerpts in *The Garden and Farm Books* show an unabashed love for the land, musings on the connections between strong democracy and a sense of place, and an inquisitive mind that couldn't help but, in Blake's words, "Labour well the Minute Particulars." To James Madison and George Washington he wrote not only of the new independent and united states, but of packing fruit in dry ferns instead of straw (the ferns

preserved fruit "perfectly without communicating any taste at all"), and of crop rotations.

Herein is the private side of a very public man, who said after being a president and an ambassador, "No occupation is so delightful to me as the culture of the earth, and no culture comparable to that of the garden." The delight is obvious, and infectious.

The New Organic Grower by Eliot Coleman,
Chelsea Green, Chelsea, VT, 1989.

Green Prints, P.O. Box 1355, Fairview, N.C.
28730 (\$10 per year)

Dana Jackson

I like the way Eliot Coleman's new book, *The New Organic Grower*, looks. It is amply illustrated by Sheri Amsel with pencil drawings of vegetables, tools, equipment, and crop rotation charts. The reader can leaf through it and easily spot topics of special interest because of the numerous headings

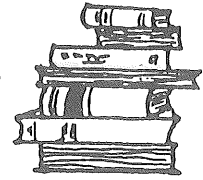
But this book has substance as well as good design. The author has twenty years of experience in biologically-based gardening and vegetable farming. He has compiled a wealth of information in four particular areas: simplifying production techniques, locating the most efficient machinery and tools, reducing expenditures for supplies, and marketing produce profitably. Coleman's philosophy speaks to all would-be and practicing organic gardeners:

Organic growing is not complicated. Nor is it difficult. It is the most straightforward way of raising plants. Difficulties usually arise from a misunderstanding of how it works. Once the principles are clear, gardeners from backyard to back forty can tune into the existing balances of the natural system and grow the crops they have always dreamed of.

For a change of pace in garden magazines, I recommend a new little quarterly, *Green Prints*, put together by Susan and Franklin Sides and Pat Stone, who formerly wrote and edited the gardening section for *Mother Earth News*.

The editors tell us in the first issue that *Green Prints* will focus on the "why-to, not the how-to. On the inspiration behind the perspiration. On the funny, frustrating, rejoicing, reflective, peaceful, poetic, the personal sides of gardening." No colored photographs or horticultural language can be found in *Green Prints*, no hype about garden equipment or tremendous yields. What one does find are short conversational pieces for meditation, such as "The Consolation of Flowers" and "The Love of Dirt," a 120-year-old essay by Charles Dudley Warner.

Green Prints contains the kind of gardening articles one writes—or reads—in winter. A cup of hot cider by the wood stove and a stack of *Green Prints* would be a lovely way to spend a January evening.



The Ages of Gaia:

A Biography of Our Living Earth

By James Lovelock

W. W. Norton Company, New York, London, 1988
252 pages, hardcover \$16.95

Reviewed by *Ed Orris*

Since I didn't know much about the Gaia hypothesis, I picked up James Lovelock's newest book, *The Ages of Gaia*, to get a better grasp on what has been termed by some as one of the most truly revolutionary scientific and philosophical ideas of this century.

In the beginning of the book, James Lovelock tells how the Gaia hypothesis grew out of his work designing surface and atmospheric analyzing instruments for NASA's Jet Propulsion Laboratory. He says that he arrived at his hypothesis independently, but gives credit to others who came up with similar ideas: James Hutton (18th century Scottish "father of geology"), Vladimir Vernadsky (Soviet scientist who developed the biosphere concept), and a handful of contemporary scientists including Alfred Lotka ("the founder of population biology").

Next, he utilizes concepts of the physicists J. D. Bernal and Erwin Schrodinger and chaos researcher Ilya Prigogine, and describes life as follows:

"If life is defined as a self-organizing system characterized by an actively sustained low entropy, then, viewed from outside each of these boundaries, what lies within is alive."

With this criteria, Lovelock views the Earth as a living organism with the upper edge of the atmosphere being its boundary. In Lovelock's theory, the organisms that comprise and regulate the larger organism, Gaia, evolved by the rules of Darwinian natural selection; therefore, Gaia is a result of natural selection.

In the chapter "Exploring Daisyworld", Lovelock presents evidence for the existence of Gaia. He compares the Earth's atmospheric, hydrologic, and nutrient cycles with the circulation and respiration of an organism. Also, he describes Gaia as having homeostasis (the tendency of an organism to maintain a state of internal stability) after past cataclysmic events such as collisions with planetimals (small planets up to ten miles in diameter).

To demonstrate the Gaia theory, Lovelock cre-

ated Daisyworld, a computer-modeled, fictional planet that revolves around a sun and is temperature-regulated by the proportions of black, white, and gray daisies. By natural selection, the daisies maintain planetary temperatures within a life-sustaining range despite catastrophic collisions and a gradual increase in heat from the sun, just as our own Sun has increased in luminosity over the Earth's history.

The Gaia story is a continuing saga of planetary regulation and changes by life forms. These phenomena include CO₂ regulation by carbon burial, the development and continuation of an oxygen atmosphere, oceanic salt level regulation, glaciation cycles, the sulfur cycle, modification of ocean waves by lipids secreted by coral reef-forming organisms, and the deposition of calcium carbonate that may affect the Earth's crustal movement.

After giving the reader Gaia's history, Lovelock adopts the role of a planetary physician, a "geophysicologist," and examines the ailments of Gaia: "carbon dioxide fever" (the greenhouse effect), "ozonemia" (ozone depletion), and "acid indigestion" (acid rain).

Lovelock is not concerned about the potential problems of nuclear fission as an energy source. Instead, he downplays the dangers of radiation and the magnitude of disaster resulting from Chernobyl. It is ironic that in a later chapter, Lovelock, a rural English resident, movingly laments the destruction of the English countryside and rural communities by agribusiness, yet he fails to show any concern for the thousands who had to be permanently moved from the Soviet countryside and the disruption of the Laplanders' culture by Chernobyl.

What does Lovelock see as the greatest threat to Gaia? "Bad farming"—fossil-fuel-powered agribusiness that alters Gaia by relying on "ecocidal" chemicals, replacing habitats with monocultures, eroding soil, and processing too much food through cattle.

In the last chapter, "God and Gaia," Lovelock, "a positive agnostic," shares his personal views of religion and discusses the implications of Gaia for religion. He includes this chapter because two thirds of the letters he received about the scientific theory of Gaia concerned religion. He draws parallels between Gaia, referred to as feminine throughout the book, and the Goddess religions of Old Europe, the Hindu goddess Kali, and Mary in Christianity. Also, he points out that Gaia, provable or not, should shape our religious world view:

"Belief in God is an act of faith and will remain so. In the same way, it is otiose (futile) to prove that the earth is alive. Instead, Gaia should be a way to view the Earth, ourselves, and our relationships with living things."

In the epilogue, Lovelock attempts to answer inquiries on how to live in harmony with Gaia. Though he thinks each person must attempt to answer that question individually, he does present one example of stewardship in describing his family's care of thirty acres of land at Coombe Mill in Cornwall, England, and he urges people to limit their use of the three C's: cars, cows, and chainsaws.

Although *The Ages Of Gaia* is thought provoking and entertaining, I see the following problems with the Gaia theory and worldview.

1. Calling the Earth an organism puts the Earth on the same level of complexity as other organisms rather than acknowledging the unknowable complexity of the Earth.

2. Looking at the evidence presented by Lovelock, life certainly does help to regulate planetary equilibrium, but life is not the only regulator; there are other geologic, chemical, and physical regulators. The conclusion that the Earth is a living organism does not necessarily follow from life helping to maintain homeostasis.

3. The Gaian view is a planetary view which is good for acknowledging that there are global problems and only one Earth. But to think that we have the capacity to clearly understand and possibly manage problems on a global scale is arrogant. Also, are humans psychologically equipped to handle the stresses of thinking on a global scale?

4. The Gaian view is novel and seductive, though probably not intended by Lovelock to be that way. On the good side, the Gaian view may influence more people to consider ecological issues. On the bad side, the Gaia view is wide open for commercial exploitation and ecotrendiness.

5. People may develop the view that Gaia can regulate and heal itself (herself) from the effects of pollution because it (she) has lived through so many past cataclysms. Lovelock voices a strong opinion against this type of thinking, but the general public may oversimplify his theories.

6. The Gaian view may hinder our compassion and responsibility toward the poor. To quote Lovelock,

"Our humanist concerns about the poor of the inner cities or the Third World ... divert the mind from our gross and excessive domination of the natural world."

One might consider this a legitimate criticism, but one could also respond as a reader of *The Whole Earth Review* did in a letter regarding Earth First's Dave Foreman: Let James Lovelock live in the ghettos of London and see how quickly he is whistling a new tune.

7. One may argue that the Gaian view is good for the general public because people may gain a new respect for the Earth and treat it better. For some, this may be true, but looking at the past record of humanity—colonial exploitations, genocides, the treatment of women, whaling, clear cutting, etc.—it's difficult to believe that our attitude toward this organism Gaia will be any different from our attitudes toward other organisms. If we do not see all things as sacred and are not filled with awe at all the life on Earth, aren't we lost anyway?

The Road Back to Nature: Regaining Paradise Lost

By Masanobu Fukuoka

Farrar, Straus, Giroux
272 pages, hardcover, \$17.95

Reviewed by *Brooks Anderson*

In *The Road Back to Nature, Regaining Paradise Lost*, Masanobu Fukuoka has expanded his discussion and analysis of the agricultural and environmental crises facing most nations. Unlike his previous books, *The One Straw Revolution* and *The Natural Way of Farming*, which tended to dwell more upon a detailed explanation of his natural, do-nothing farming techniques, *The Road Back to Nature* offers a broad critique of the conventional methods used by farmers in the United States. He also explains how these methods have replaced more sustainable traditional practices in other countries.

Fukuoka sees the environmental problems that we are experiencing today as only the most recent and severe in a long series of human errors and miscalculations which have caused, at times, the fall of entire civilizations. At the root of these errors was a faith, not in God, but rather, in the ingenuity of people and science. According to Fukuoka, humans cannot understand how to co-exist with their environment as long as we see a distinction between people, God, and nature. So long as we continue to become more and more alienated from God and nature, he maintains, we will remain out of touch with the requirements and limitations of our ecosystem.

In his travels to the United States in 1979 and 1986, Fukuoka found American agriculture "crude, unnatural, extractive, and primitive." He characterizes agriculture in the U.S. as "an industry which is

striving to curtail declines in production" through the application of increasing quantities of agrichemicals. America's production-oriented agriculture, Fukuoka concludes, is causing the desertification of our land.

This desertification has already occurred in the Middle East and Northern Africa. Fukuoka predicts that if nothing is done to stop it, the deserts will continue to spread. In other countries the same social and economic priorities that are at work in America are leading to the devastation of agricultural land. The profit motive and technological attempts to overcome natural constraints in farming are severely endangering our sources of food.

Modern agriculture is consuming the Earth's resources at a pace at which they cannot be replenished. Therefore, Fukuoka, calls us to acknowledge the need to "turn priorities around, to choose the small over the big, to decide not to develop rather than to develop." He recognizes the need for a greater transformation in agriculture and lifestyle than others have advocated.

Instead of using heavy machinery and agrichemicals to produce our food, Masanobu Fukuoka encourages us to adopt a radically different approach to agriculture which he calls "do-nothing farming." For over 25 years Fukuoka has farmed ten acres in Japan observing four fundamental principles. He performs no cultivation, applies no chemical fertilizer or compost, practices no weeding by tillage or herbicides, and uses no chemicals. Like Edward Faulkner, author of *Plowman's Folly*, Fukuoka believes that, "tilling the soil mechanically only kills it."

The principles of do-nothing farming do not have a scientific basis. Rather, they have come from Fukuoka's religious beliefs, which include the following three tenets: 1) we do not understand, 2) nothing has value in and of itself, 3) anything done with human intellect is worthless and serves no purpose.

These ideas lose much in translation and are not well served in their brief inclusion here, but are essential to understanding Fukuoka's paradigm. In the book they are dealt with at considerable length.

It is from these beliefs that Fukuoka has realized that "natural farming must move toward a rejection of science." Science is conducted with the presupposition that human intellect is quite valuable. Looking back, Fukuoka has realized that "mankind has developed through the human intellect and now through that same faculty is in the process of collapsing. Yet, even at this juncture, we continue to seek salvation through the intellect." He asks the reader, "Can you not see that the only road to salvation is by discarding the intellect?" If we do not discard the intellect, and instead continue to implement expedient measures to compensate for the consequences of our prodigal lifestyle, Fukuoka presages a "human calamity."

In order to avert this "human calamity" and bring our lives back into greater recognition of God and nature, Fukuoka calls for a return to a more natural lifestyle. To move society in this direction he has made four suggestions. First, "we must hurry to establish a human charter for the twenty-first century." By this he means we must humanize religion, philosophy, and science. Second, we must return to a nature ruled over by God. Third, science must be lowered from its almighty pedestal. We must begin to learn through observation of nature rather than from "high technology." Fourth, we must "stop desertification of the Earth."

Though Masanobu Fukuoka's suggestions for social revolution seem somewhat ill-suited for Western societies because of their Buddhist orientation, his discussion of the devastation being caused by modern agriculture, and our reliance upon technofixes, including the dangers posed by biotechnology and decreasing genetic resources, is keen and well-substantiated. Fukuoka expresses a clear understanding of the complex interconnectedness of all animate and inanimate objects in our biosphere.

Wes Jackson in the essay "Meeting the Expectations of the Land," found in his book, *Altars of Unhewn Stone*, has called this interconnectedness an "interpenetration" and has graphically depicted the whole ecosystem as an "inverted pyramid of vulnerability" in which each factor in the environment affects several other factors as one moves in any direction. Because of this interpenetration there is an effect of the parts upon the whole. This dialectical relationship between part and whole, say both Jackson and Fukuoka, is not taken into consideration by modern science. Limited by its Cartesian-Baconian paradigm, science, as it has developed and as we know it, cannot help us in our search for a more sustainable agriculture. Fukuoka and Jackson suggest that lessons about the changes which need to be made in our conventional agriculture will come from nature itself. Nature is the standard for both Fukuoka's natural farming and The Land Institute's work to develop a perennial polyculture. Science must be fundamentally reoriented to help us learn from rather than destroy nature.

However, although Jackson's and Fukuoka's motivation for their work originates from similar criticisms of conventional science and agriculture and their prescriptions for solutions sound similar, they have proceeded to offer very different suggestions for how we may work to solve our current crises.

Research at The Land Institute involves more complex natural principles than the work that Fukuoka is doing with annuals in monoculture in Japan. The Land Institute studies what nature has done with plants and the land, while Fukuoka works with what people have done with crops. He has

remained within an agronomic environment and then applied natural practices such as broadcasting the seed and returning all of the crop residue to the field. The Land Institute's work to develop a perennial polyculture proceeds in the opposite direction by investigating the potential of native plants in a natural setting for human use.

I don't expect discussion about Fukuoka's book to be as serious or widespread in America as we may find it to be in countries in Asia which share a similar cultural and religious heritage. However, the Earth's tolerance of our profligate living is sure to be ephemeral in geologic time. The sooner we listen to the warnings and prescriptions of Masanobu Fukuoka and others like him, the more likely we will be in to avert the "human calamity."

The End of Nature

By Bill McKibben

Random House, New York, 1989
226 pages, hardcover

Reviewed by *Jake Vail*

Silent Spring. The Fate of the Earth. The End of Nature. Sounds like a doom and gloom science fiction trilogy, coming soon to an environment near you. Or perhaps science fact?

Bill McKibben's new book, *The End of Nature*, indeed has much in common with Rachel Carson's and Jonathan Schell's works. All ring like clarions above the cacophony of concerned voices; all are at their roots about our need to recognize limits. We have failed to limit industrial pollution and nuclear proliferation and have now trespassed the limits of our biological heritage. Without knowing it, or refusing to believe it, we have killed off nature. We are only now beginning to appreciate the implications.

And still we blindly go on.

This is a very difficult book to read, not only because of the complexity of global warming, or the enigmatic and expanding hole in the ozone, or the slippery issue of biotechnology, or the confounding figures behind it all. It is difficult too because on every page an idea is presented, or some history, or a projection into the near future which makes you slap yourself on the side of the head or throw your arms up, and you lose your place. To wit:

- The world's population has more than tripled this century; industrial production has grown 50-fold, almost all based on fossil fuels.

- CFCs are so chemically unreactive that they often stay intact for a century or more.

- By 1987 global ozone depletion was at the level forecast for the 2020s.

- If ozone levels declined 20%, two hours in the

sun would blister exposed skin.

- In 1988, only seven of 330 North American prairie potholes held water.

- Forget the carbon for a moment, forget the feedback loops. The trees will die. Consider nothing more than that — just that the trees will die.

Hardly could Mr. McKibben have picked a broader subject, but in *The End of Nature* the discussion is concise and the pace measured. One is struck by the easy tone as well. I kept wondering, thinking of the outdoorsy photo of the beaming author which adorns the dust jacket, "Why is this man smiling?" Whistling on his journey through the graveyard, his tone belies the seriousness of the facts presented.

Part One is entitled "The Present," and refers not to a gift but to the time in which we live, a time when the gift of denial reigns supreme. While symbols of a nation addicted to the quick fix wash ashore on the beaches of New Jersey, we deny the truth of ecological interconnectedness, that "there's no such thing as 'away'." By denying the limits that are part of a finite planet we alter the very air we breathe. The average American car driven the average American distance — 10,000 miles — in an average American year releases its own weight in carbon into the atmosphere. That along with deforestation (often by burning), rapidly rising population and industrial levels, methane, CFCs, and ozone depletion puts us in a time we've denied we would ever find ourselves. The decade that just drew to a close holds the six hottest years on record (in order: 1988, '87, '83, '81, '80, '86). In the last five years 50% of the West German forests were damaged by acid rain. In 1988 Americans ate more food than they grew for the first time since the Pilgrims.

All that and more just in chapter one makes one feel the human race ought to file chapter eleven — disciplinary bankruptcy. We seem to be deeply in the red, with a slowly dawning awareness that we've no rich uncle to bail us out. This is more than unnerving, for our very faith is fraying. The intricate and continuous harmony of nature has been undone and there's no one to blame but ourselves. We live not in a post-modern world, but in a post-natural world, the tragedy of the commons writ global. How to proceed, wonders Mr. McKibben, when we can trust neither ourselves nor, consequently, the changing seasons? The journey will surely be tremendously difficult and take much time; similarly we may feel tremendously sad and full of self-loathing. Part Two of the book takes the reader down "the path of more resistance" from the present to an uneasy future as these concerns are addressed.

We humans are adventurers; adventure is a joy and generally rewarding. But with climate changing ten to sixty times faster than its natural rate, sea

level already rising an inch a decade, the hole in the ozone growing fast, and crop yields declining, suddenly adventure becomes a source of fear. Ironically, we're exhorted on, even by Mr. McKibben. "We must act, and in every way possible, and immediately," he demands.

Herein lies an enormous paradox: time's a-wastin', we're at nature's end, it's imperative that we fix this mess. Yet the harder we try, the harder we'll fall. The defiant reflex of "macro-managers" to heroically press on is, simply, more of what brought the end of nature in the first place. But it's happening now, with a vengeance — witness *Scientific American's* special issue last fall on "Managing Planet Earth." (Brought to you by GM, DuPont, Amoco, Union Carbide). The lesson seems to be: With our cleverness cleverly applied we can create a world that will support us and our habits. Further, faced with the end of nature, the method that offers the most hope of allowing us to continue our way of life is biotechnology.

Of course, explains Mr. McKibben, biotechnology represents the second end of nature.

"I cannot imagine any change more extreme than the change from four billion years of nature to year one of artifice. If industrial civilization is ending nature, it is not utter silliness to talk about ending — or, at least, transforming, industrial civilization." Indeed it is! Time to do more than talk about it, for we've been doing that all along. The author realizes this, and toward the end of the book pokes his nose in on deep ecology, Earth First!, and the late Ed Abbey's monkeywrench gang — examples nonpareil of this

sort of action. Talking with Walkin' Jim Stoltz, Mr. McKibben is struck by a "quietly radical idea" which provides some groundwork upon which to envision, if not build, a path out of the acid rain-damaged woods. Jim says that when you're forty feet from a grizzly bear, "you realize you're part of the food chain."

What follows is a humble philosophy that is the opposite of the defiant course we've traditionally followed.

The End of Nature is a powerful book which deserves wide attention and great discussion. But it has some problems, which sort of bubble under the surface as one reads the last chapter. Bill McKibben is caught on a Mobius loop, himself a part of the problem he's grappling with, and almost gets to a jumping-off point when suddenly he's back in the middle, upside down. In chapter two he argues that part of our idea of nature is its separateness. "Nature's independence IS its meaning." But, by taking this thesis as a given rather than pursuing it further, he ends up wringing his hands when he could be clapping them. It is this peculiar notion, that of the separation of the human from everything else, that is ending, albeit slowly. Not nature. And THIS ending is cause for celebration. The sooner we recognize that we are of nature and act accordingly, the better. Automatically the humble philosophy Mr. McKibben has a glimmer of, "not nature apart" (to paraphrase Jeffers) would transform industrial civilization, and rather than sadness and self-loathing we would be filled with awe and joy. "The end is where we start from," said T.S. Eliot. Let's go.

Public Policy ————— Perspectives ————— Agriculture

The Greening of Agricultural Policy

Can it Happen in Kansas?

Dana Jackson

This is the environmental era in agricultural policy. Farmers and politicians, as well as environmentalists, acknowledge that modern farming causes environmental problems. Information about agricultural chemical contamination—nitrates in groundwater and herbicides in lakes and streams—has alarmed urban as well as rural residents. Consumers have grown increasingly wary of produce that may carry pesticide residues. Farmers who apply pesticides worry about their own health. The loss of wildlife habitat, depletion of groundwater for irrigation, and the siltation of streams are other concerns. Closely related to the environmental problems are social

justice issues: concentration of land ownership, high capitalization costs making it nearly impossible for young people to get started in farming, the depopulation of the rural countryside and decline of communities. Environmentalists and family farm advocates share common concerns about competitive, industrial agriculture. They do not want larger farms and larger equipment run by employees of corporations who treat farms as food factories; they prefer natural landscapes that produce healthy food for people. The greening of agricultural policy is about bringing the land and people together, caring for both, and protecting the nation's long-term ability to produce food.

The 1990 Farm Bill

A coalition of farm organizations and environmental groups has been working with friends in Congress to bring about the greening of agricultural policy. When Senate and House agricultural subcommittees met during the early part of April, they considered bills and amendments that would direct federally funded research towards sustainable agriculture and family farms and strengthen soil and water conservation programs. Several bills asked for increased funding (from \$4.5 million to \$50 million) for the Low Input Sustainable Agriculture (LISA) research program. Sen. Patrick Leahy (D-VT) proposed special programs to train extension agents in sustainable agriculture. Sen. Wyche Fowler's (D-GA) bill encouraged crop rotation by allowing farmers to plant soil building legumes and retain their base acreage, so that when they return the land to commodity production they can receive subsidy payments again. Sen. Robert Kasten (R-WI) introduced a bill that would reinstate the requirement under the 1985 conservation compliance provisions that farmers receiving crop subsidies must reduce soil loss on highly erodible land to the tolerable level ("T") of 5 ton/acre/year. The U.S. Department of Agriculture (USDA) relaxed these standards nationwide in 1986 and allowed conservation districts to approve "alternative" conservation systems when farmers found compliance to "T" too costly. They could have reduced the standards as needed on a state-by-state basis.

The making of a farm bill is a long and arduous process, but the protection of groundwater is a popular goal as is flexibility in the crop base. Environmentalists are optimistic that measures related to these two issues will still be in the legislation after the debates are over and compromises forged.

Kansas Legislature Lags

The greening of agricultural policy can be accomplished at the state level also. State governments have legislated programs to mitigate the environmental impacts of agriculture. The Iowa legislature passed a bill that increased pesticide registration fees for chemical companies in order to fund research, demonstration and education programs to help farmers decrease their use of agricultural chemicals. Wisconsin is using oil overcharge funds to support a sustainable agriculture demonstration program.

Unfortunately, there has been no visible greening of agricultural policy in the Kansas legislature. In 1987 the Kansas Rural Center organized a citizens' committee to promote sustainable agriculture in the state. Last summer the joint house and senate agriculture committee invited members of the Citizens Sustainable Agriculture Committee to present their views of research done by the Kansas

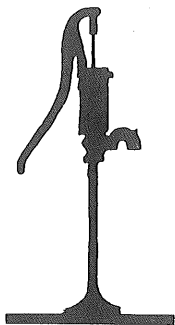
Agricultural Experiment Station (KAES). Since 50% of KAES funding comes from state taxes, the legislature reviews its program yearly. The four members of the citizens' committee criticized Kansas State University for not addressing the problems of diversified family farmers making the transition to low chemical input methods and asked that the experiment station direct research to meet more of their needs. The legislators openly disapproved what they called "going back." and doubted that agricultural chemicals caused problems because Kansas farmers were already using "best management practices."

Ag Chemicals in Kansas Water

The legislators need to get their heads out of the sand, because farm chemicals *are* a pollution problem in Kansas. According to a 1988 study by the U.S. Army Corps of Engineers, atrazine, a commonly used herbicide, has been found in Perry, Pomona and Tuttle Creek reservoirs in concentrations that approach or exceed the EPA's maximum contaminant level for finished drinking water as well as its criterion for protection of aquatic life. Levels *above* established safe concentrations for protection of aquatic life have been found at Clinton, Melvern and Milford reservoirs, according to the Army's study. A 1985 study by the U.S. Department of Interior reported that Kansas has the second-largest percentage of wells in the nation above maximum federal standards for nitrate accumulations in drinking water. 20% of the 1,140 wells sampled in Kansas had nitrate accumulations greater than 10 milligrams per liter, the maximum contaminant level established by the EPA for drinking water. *Alternative Agriculture*, the 1989 report by the National Research Council of the National Academy of Science, contains a USDA map on page 110 that shows agricultural counties with nitrate nitrogen in groundwater. One's eyes go immediately to Kansas, not because it is in the center, but because almost all of it is shaded black (for areas greater than 10 mg/l) and gray (for areas between 3 and 10 mg/l). Obviously, "best management practices" aren't preventing groundwater contamination from nitrogen fertilizer.

Some lawmakers seem to understand the need for an environmentally sound agriculture, but they have been supported by agribusiness and can't promote alternatives to chemicals. Since the *Alternative Agriculture* report, chemical companies, motivated by a fear of declining sales, have increased efforts to convince people that farming is impossible without their products. In Kansas they have established the Kansas Agricultural Education Foundation "devoted to disseminating 'science-based' accurate information about agricultural chemicals." One of their "fact sheets" blatantly misinterprets data published by David Pimentel, Cornell entomologist.

Support for Groundwater Protection



Studies show that the general public and *farmers themselves* support the restriction of certain farming practices and the encouragement of others to protect the environment. The Agricultural Law and Policy Institute (Washington D.C. and Minneapolis, Minnesota) asked 568 farmers in different counties in Iowa, Pennsylvania, Florida, Wisconsin and California if state governments should

have the right to prohibit use of agricultural chemicals near water wells. Most farmers in three of the five counties said yes. Between 64% and 88%, depending on the county, agreed that chemicals in groundwater need to be reduced ("Agriculture and Groundwater Quality: Farmers' Perceptions in Five Diverse Sites," edited by J. Dixon Esseks, May 1989). In a 1989 Iowa State University survey conducted by Paul Lasley, ISU extension sociologist, and Michael Duffy, extension economist (the annual Iowa Farm and Rural Life Poll), 76% of 2,001 Iowa farmers polled said that they agree with the statement that modern agriculture depends too heavily upon chemical fertilizers and 78% said that modern farming relies too much on herbicides and insecticides.

Some agricultural colleges are responding to this farmer interest. Three notable examples are the University of Nebraska, which has been a leader among land grant universities in sustainable agriculture research; Iowa State University, which gained attention by establishing the Leopold Center for Sustainable Agriculture; and the University of Maine with a curriculum in sustainable agriculture and programs applicable to small farms. And everywhere there are individual students, faculty members and extension personnel trying to direct their research towards more ecologically sound agriculture. At Kansas State University, as on many campuses, the discussion of sustainable agriculture mainly takes place at informal seminars sponsored by "interest groups" started by graduate students and a few faculty members.

KSU True Blue, not Green

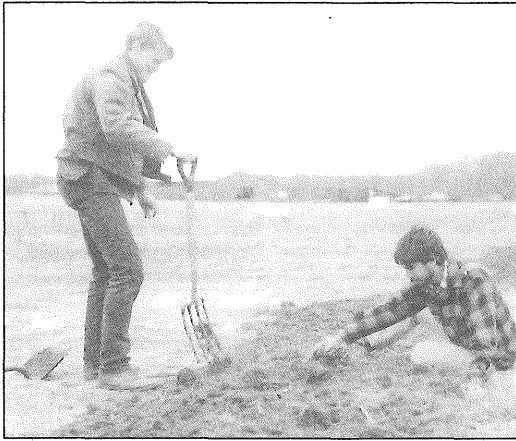
The Citizens Sustainable Agriculture Committee has tried to influence the College of Agriculture at Kansas State to exercise leadership in "greening" agriculture. But the administration is still "true blue" to the conventional model. They claim that current research already "relates" to sustainable agriculture. This justifies the granting of sustainable agriculture funds to old projects. The college did award nine in-house grants for sustainable agriculture in 1988. Though commendable, one must keep in mind that nine out of 600 total research projects

will not turn around agriculture. And one of the nine projects was research on the use of drip irrigation to grow corn in Western Kansas over the Ogallala Aquifer for feedlot cattle, so they still don't understand the meaning of sustainable agriculture.

In 1986 the dean of the college appointed a faculty/extension committee on sustainable agriculture. Farmer outcry had been strident the previous spring and summer; many were angry that they were about to lose their farms after following university advice during the 1970s orgy of expansion and debt. Farmers who wanted to lower production costs by lowering purchased inputs could not get much help from the extension service because agents were still advising them to buy chemicals for high production. So, to quiet the critics, the dean asked a committee to look into what university-related activities supported sustainable agriculture and to recommend future programs. It took the committee three years to produce a report. Then it was rewritten by the College of Agriculture's editing office, combined with a report on agricultural diversification, and titled "Agricultural Diversification and Sustainment: a Report by Agriculture at Kansas State University." The use of the term "sustainment" rather than sustainable agriculture was not a choice of the committee, but the editor. I suspect that because the clamor for sustainable agriculture had subsided since 1986 (many of the concerned, angry farmers had gone bankrupt or had given up on the university as a source of help), the administration decided to distance itself from the concept of sustainable agriculture in this skimpy final report. It did not even mention research funded by LISA grants at KSU.

Where It's Happening

The greening of agricultural policy won't happen in Kansas as a result of leadership in the legislature nor in the state college of agriculture. It will happen because of federal legislation and the work of environmental activists and small non-profit farm advocacy groups. Organizations such as the Center for Rural Affairs in Nebraska, Wisconsin Rural Development Center, Practical Farmers of Iowa, the Land Stewardship Project in Minnesota and the Kansas Rural Center have helped start sustainable agriculture societies and develop networks of farmers who share information on alternative farming systems. Currently the Center for Rural Affairs, Land Stewardship Project and the Kansas Rural Center share a small LISA grant to carry out on-farm research on alternative practices with farm cooperators in their areas. A growing farmer constituency, the state environmental organizations, and a larger number of Kansas citizens who understand the benefits of sustainable agriculture will bring about the greening of agricultural policy in Kansas.



Prairie Festival to be June 2-3

"The Future of Prairie Communities" is the theme for the 1990 Prairie Festival. This annual gathering offers fellowship, learning, discussion and inspiration. See page 11 for more details.

Visiting The Land Institute

If you would like to visit The Land as an individual or with a group, please call (913) 823-5376 or write ahead of time and make arrangements. Office hours are 8 to 5 weekdays.

Photo at left: Early in the spring, interns Doug Romig and Paul Muto prepare area by Herbarium path where prairie flowers will be transplanted.

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