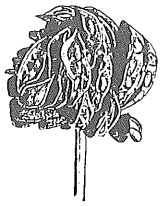
THE LAND REPORT

Number 34

Fall 1988

Contents

Number 34  Fall 1988

Sketches on pages 10,11,18,19 by Jake Vail. Photographs by interns and staff of The Land Institute, except pg. 24 by Harry Mason.

ON THE COVER

John Thelander took the photographs of Illinois bundleflower pods and printed them in the new darkroom he set up at The Land. See page 19 for more information about The Land Institute's research on this native prairie legume.

At The Land

News Bits

INTERNS AND STAFF

----Beth Gibans and Jake Vail, 1988 interns, will return for the 1989 term to work as Research Fellows.

----Doug Towne resigned his internship at the end of August following the death of his mother.

----Gabriel Hegyes resigned as Director of Development at The Land Institute to become the Assistant Director of the Library/Resource Center at Kansas College of Technology in Salina early in December.

----Thom Leonard is the author of a feature article called "Staff of Life" in the December issue of *Organic Gardening*. Thom is director of The Grain Exchange, a project he brought to The Land in February 1987.

GETTING AROUND

-----Since the first of September, Wes Jackson has given talks at Ball State University. (Indiana) Mankato State University (Minnesota), the New Alchemy Institute and Amherst College (Massachusetts), Kansas State University, Malabar Farm in Ohio, and Claremont School of Theology, California. He also spoke at meetings of the Rocky Mountain Farmers Union, Nebraska Holistic

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Beth Gibans analyzes her data.

Resource Management Association, and the Entomological Society (Louisville, Kentucky). He attended international conferences in Washington D.C. (global warming) and in Tunis, Tunisia (environment and development).

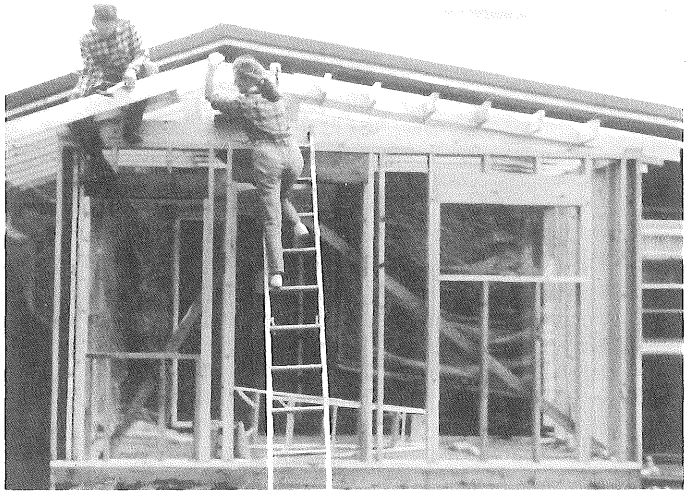
On January 18, Wes will speak at Brigham Young University in Utah, then later in the month at the Heifer Project in Little Rock, Arkansas, and at a Zero Till meeting in Winnipeg, Canada. He will be at Yale on Feb. 2, University of Guelph in Canada on Feb. 4, St. Olaf College in Minnesota Feb. 17 and in Virginia at Emory and Henry College and Virginia Polytechnical Institute in March.

----In October, Dana Jackson attended the Lindisfarne Fellows Conference in California and the third of a series of seminars for non-profit organizations on publishing in Washington D.C., as well as the environmental educators' conference at Meadowcreek Project in Fox, Arkansas. She addressed the Iowa Soil and Water District Commissioners in Des Moines in November and the Soybean Research Conference of the American Seed Trade Association in Chicago early in December.

----Peter Kulakow presented a paper at the First National Symposium for New Crops in Indianapolis, Indiana in October. His paper will be published in the conference proceedings.

----Brad Burritt, Danielle Carre and John Thelander represented The Land Institute at a demonstration in front of the state capitol building in Topeka which called attention to the problem of agricultural pesticides. Brad was one of the speakers. The meeting announced the release of a report by the National Toxics Campaign called "Shadow on the Land: a Special Report on America's Hazardous Harvest."

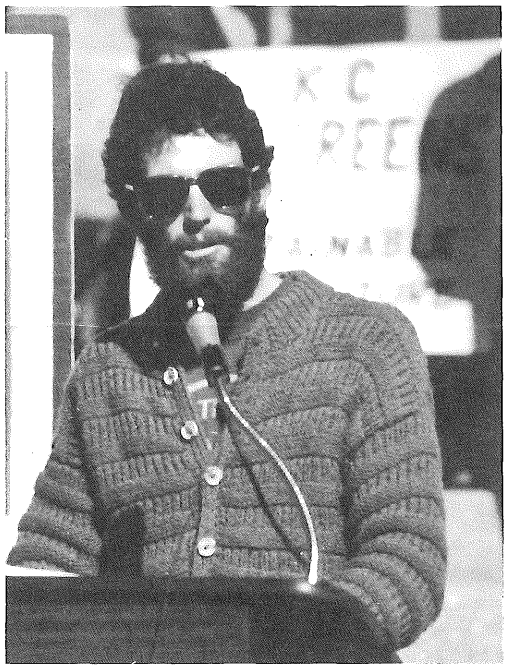
----The research staff will attend a conference on Eastern gamagrass at the Kerr Center for Sustainable Agriculture, Poteau, Oklahoma on January 23-24. James Henson, a post doctorate at The Land Institute in 1986, is organizing the meeting.



Rob Fischer and Laura Benson work on bathroom addition.

CONSTRUCTION

----This fall Rob Fisher, operations manager, has been building an addition to the east side of the classroom building. The bridge plank porch will be a bathroom and an entryway with a place for coats and boots. With the classroom that was remodeled last winter and the new bathroom, The Land Institute will be able to schedule more public programs in this building. During part of January and early February, Rob will also work with Paul Rasch, John Thelander and Brad Burritt on the greenhouse. Work on the heating system has been a priority this fall, but they are ready to finish the inside. They will turn the large open room in the headhouse into a work area with sinks and shelves to mix soil and pot plants and also construct an office and bathroom.



Brad Burritt speaks at Topeka demonstration.

BOARD OF DIRECTORS

----Eleven members attended a day-long board of directors meeting at The Land Institute on December 3. President Mari Detrixhe, former research associate in energy at The Land Institute, chaired the meeting. Part of the afternoon business included a report from the long-range planning committee which began meeting last summer. Ivy Marsh, John Simpson, Conn Nugent and Mari Detrixhe represented the board; Paul Rasch, Peter Kulakow and Gabriel Hegyes represented the staff. Wes and Dana Jackson met with the planning committee as members of both the staff and the board. The final planning report will be presented to the board at the annual meeting in the spring.

----Terry Evans, arts associate at The Land Institute and board member, is now an instructor in photography at Bethany College, Lindsborg, Kansas.

----Donald Worster, author of *Nature's Economy and Rivers of Empire*, and member of the honorary board of directors of The Land, will be moving to Lawrence, Kansas to accept a chair in environmental history at the University of Kansas.

"PLANTING IN THE DUST"

Dona Freeman will be performing the one act play, "Planting in the Dust," for The Land Institute again in 1989. From fall 1987 through summer 1988, Dona played the role of Annie 25 times in communities across the state. The 35 minute monologue on land stewardship is suitable for a wide range of audiences and events. Anyone who is interested in scheduling the play should contact Dana Jackson at The Land Institute. The following performances have been set for 1989:

--January 12 - Kansas Farmers' Union Convention, Mcpherson, Kansas.
--January 30 - Ellsworth County Conservation District Annual Meeting, Ellsworth.
--February 6 - Leavenworth County Conservation District Annual Meeting, Lansing.
--February 27 - Kiowa County Conservation District Annual Meeting, Greensburg.
--June 13 - Prairie Quilt Guild, Wichita, Kansas

PUBLIC TELEVISION PROGRAMS

Two public television programs featured The Land Institute this fall. Station KBDI in Denver, Colorado, filmed at The Land for a program called "Hot Wiring the Farm," which was part of a series called "Fueling the Future." A weekly production of Iowa Public Television, "Market to Market," which is carried on public stations around the country, showed an eight minute feature of The Land Institute research program in November.

DARKROOM

----The good quality photographs in this issue are the work of John Thelander. Last summer he transformed a utility room in our office building (formerly the Krehbiel house) into a darkroom and equipped it for processing black and white film.

Dana Jackson decaps a frame of honey.

FALL HARVEST

----The broccoli, cauliflower and Chinese cabbage in the market garden were exceptionally good tasting this fall. When it frosted hard enough for crystals to form on the cauliflower, Brad Burritt picked all that was left in the field and sold it to customers who wanted to stock their freezers.

----The community garden provided meals late into the fall. Several different kinds of greens were abundant, as well as leeks, parsnips and beets.

----The two bee hives yielded 185 pounds of honey. On October 17, Jake Vail, Karen Finley and Dana Jackson removed supers from the hives while other interns readied the equipment for the extraction and bottling process. The honey harvest was distributed to staff and interns and given as gifts to friends of the Jacksons and The Land.

NEW EXPERIMENT

During the first week of November, Wes Jackson drove straight north of Manhattan, Kansas, to within five miles of the Canadian border, making plantings of The Land Institute's experimental crops along the way. Wes will return to see which plantings have become established and then check them periodically to find out how far north they can survive. In each location he planted gamagrass seed from bulk, which contained both normal and pistillate seeds, plus rhizomes from both pistillate and normal. He also planted Illinois bundleflower and leymus seed.

Fall Visitors' Day

September 24 was Fall Visitors' Day at The Land Institute. The public was invited to walk over the grounds, talk to interns and staff, and participate in two organized morning activities: (1) an introduction to ecosystem agriculture and tour of experiments and (2) a workshop on fall vegetable gardens.

Instead of interns leading tours of the buildings and grounds as we have done in the past, we offered a map and an explanation sheet for individuals to do self-guided tours. Jake Vail drew the map, and several staff members wrote descriptions of the eleven stops marked by painted wooden signs. We left the numbered signs standing after Visitors' Day so we can offer the tour to unexpected visitors at times when there is no one free to do a guided tour.

Those interested in research on the development of perennial polycultures did get a guided tour of the experiments. To speed up the time to get from one experiment to another, visitors rode on a wagon pulled by a tractor.

Other visitors worked in the community garden under the direction of Thom Leonard.

In conjunction with Visitors' Day, The Land sponsored a seminar led by William Irwin Thompson, author and cultural historian. The program began with a lecture by Thompson on Friday evening followed by a discussion and a reception. Participants met for breakfast at The Land on Saturday morning and then took part in the second session of the seminar.

There was a potluck lunch at noon in the new greenhouse followed by an afternoon program featuring a discussion between Wes Jackson and William Irwin Thompson. The Visitors' Day program concluded by 4:00 P.M.

The next organized program for visitors will be the annual spring Prairie Festival on May 27-28, 1989. We will send invitations to all subscribers to *The Land Report* and Friends of The Land in April. Invitations will also be mailed to people who request them.

Visitors, both individuals and groups, are welcome at times other than these special days. However, we do ask anyone who wishes to visit to please call or write ahead of time and make arrangements.

Bill Thompson at The Land — A Recital on "Nature"

For two fine days in September, The Land was "showered" by the musical words of William Irwin Thompson, founder of the Lindisfarne Association and author of wide-ranging works of cultural history.

Bill spoke twice about changing cultural understandings of "nature" before a seminar of about forty. People came from across the state, and from as far as Manitoba, for the evening-and-morning sessions. Then Bill joined Wes Jackson for a give-and-take session which highlighted the afternoon of The Land's fall Visitor's Day.

Jon Piper explains prairie studies.

William Irwin Thompson

"This isn't a lecture. This is a recital. Something like the jazz of Keith Jarrett."

"Nature isn't a state or a place or a ground. It's something defined by our values."

In a friendly fashion, Bill took issue with one of the favorite phrases at The Land-- "nature's wisdom." There isn't such a thing as "nature," he said. "nature is at the outer edge of culture. You can't experience nature any more than you can jump over your own shadow. Nature is the cultural horizon. We think about it with language and structure. Nature isn't a state or a place or a ground. It's something defined by our values." Thus, Bill said, the search for "nature's wisdom" is "a grasping for something to hold onto in a time of anguished transition."

Bill, a longtime member of The Land's honorary board of directors, urged Land researchers to pay more attention to the lessons of "the new biology." We're in a time of dramatic transformation in the way we see and interpret the world, he argued, and the next phase will be marked by a meta-synthesis of the insights of the sciences of virology and artificial intelligence. People soon will realize that we can't draw rigid lines between human and non-human, because "humans are just organelles in a giant organism. The Amazon rain forest is just as essential to our metabolism as our lungs." And that means we have to take to heart in a new way the Biblical teaching: Love thy enemy.

The human immune system is a great symbol, Bill argued. It is actually "a cognitive system," constantly in the process of trying to identify what is Self and what is non-Self. It works best when it can integrate "alien" things into the organism. When it draws rigid boundaries, attacking the "other," it often breaks down.

Bill urged environmentalists to learn from the symbolic lesson. Too often, he said, we divide the world into Us and Them, although such a division can lead to counter-productive fundamentalism. By dividing the world, you can become what you fear, he said; or you can become an island, easy to encircle or isolate or coopt. Instead, Bill argued, people have to deal with what they don't like, and what they aren't comfortable with--technology, for example.

In relating to "nature," we should think and act in the same integrating spirit, Bill argued. "We need to make wild the cultured, and culture the wild," he said.

Bill in characteristic form, ranged widely across vast stretches of human history and intellectual endeavor. He spoke of artists as the real "reporters" of the news, traced the evolution of the geography of cities, and explained the revolutionary experiments by one of the new biologists about perception of color, sound, space.

Throughout, as Bill put it, the sessions were a kind of performance. "This isn't a lecture," Bill answered Wes at one point. "This is a recital. Something like the jazz of Keith Jarrett." Earlier, Bill had spoken of his talks as a "shower"--a long, hot shower. "Just let the words flow over your body," he said.

There was good discussion, with questions about "nature as standard," art, and extremism. At the end of the Thompson/Jackson forum, their differences didn't seem all that great; after all, Bill acknowledged that he, too, looked to nature--in the form of the immune system--as a guide of sorts. And Wes, repeating a phrase he uses often, granted that "nature is an elusive standard." But it's still "the best standard we've got." ◁

Prairie Music with a Human Voice

Caton Gauthier

"I think the human voice will be one of the elements in the music I write about the prairie," explained cellist Eugene Friesen, while sitting at our warm-up circle on a cool October morning. Gene is a member of the Paul Winter Consort who has the responsibility to compose prairie music for the Consort to perform.

This fall Eugene and his cello spent three days visiting The Land Institute and Kansas grasslands in order to become familiar with the music of the prairie. In a previous visit last June, Eugene listened to the constant echo of the Bob White quail singing its own name over the fields of rejuvenated prairie grasses greening the landscape. In contrast, this fall he experienced the high pitched bugling of elk, and the silent boldness of the bison grazing in reddish-gold tall grasses.

During these two distinct seasonal visits to the Kansas grasslands, Eugene has realized that the historical presence of humans on the prairie is an important concept to translate into music. A musical description of The Plains Indians at one with their environment would contrast greatly with that of the settlers traveling by covered wagon across an unknown and wild landscape. The homesteaders and later the settlers tilling the prairie to plant Kansas' wheat fields would require another interpretation.

Human voices have been an integral part of Gene's growing friendship with the prairie's beauty and stability. He will draw upon such experiences as an October trip to Horse Thief Canyon with Land interns and staff where we hiked, played, identified plants, and looked at Indian petroglyphs and contemporary graffiti on the sand stone cliffs.

We walked along a sandy trail surrounded by tall yellow Indiangrass and reddening little bluestem. Together we savored the brownsugary fragrance of the sweet everlasting flower. The trail passed through a patch of head-tall thistles with white seed heads. Only one flower still held its youthful purple color.

We climbed up a sandstone cliff and entered a small cave. Sitting in quiet darkness, we looked out the cave's entrance at the bright sunny sky and listened to the sound of a bamboo flute played within the cave.

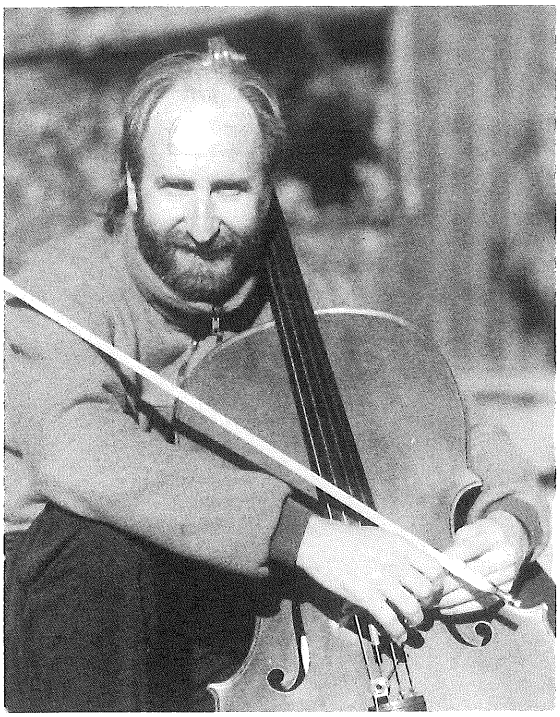
Further down the trail, we all sat on top of a cliff and looked to the four directions. Everywhere we could see patches of gold, brown, red, yellow, dark green, and gray.

At the end of the afternoon we had to cross a stream to get back to our cars. Everyone gathered dead branches and sticks to make a bridge. In single file we teetered across, encouraging each other and laughing each time someone would almost lose balance. Adam Rome, wearing the newest and whitest shoes, fell in the water. As we all laughed, he took advantage of the situation to stomp through the muddy stream the way a child splashes through a puddle on a rainy day.

The chattering, laughing, shouting, and whispering of that afternoon are all a part of Gene's prairie experience that he would like to capture in music.

The voices of the Salina Chorale that performed with the Paul Winter Consort last May also blend into Eugene's experience of the prairie. While reflecting on the time he spent here, Eugene told us, "I'm not sure that my composition will include words as much as it will use the voice as an instrument in the background, or even to carry the melody." He has thought about having the Salina Chorale sing the part of the prairie voice in the future recording of his music.

Caton Gauthier and Eugene Friesen savor the fragrance of the sweet everlasting flower.



Eugene Friesen, cellist

During his October visit, Eugene Friesen played a cello concert in Christ Cathedral, the gray stone Episcopal Church in Salina. To the audience's surprise, Eugene announced that he wanted to "jam" with Wes Jackson. Wes read seven selections, including "The Mad Farmer" by Wendell Berry, and "Old Salsola" and "Living Nets in a New Prairie Sea" from his own book, *Altars of Unhewn Stone*, while Eugene colored the moods and images with his electric cello and the occasional humming of his own voice. This performance established the human voice as an instrument in the musical expression of the prairie.

Prairieland Food Cooperative Thriving

Paul Rasch

Long-time subscribers to *The Land Report* have been kept abreast of changes which have occurred in the history of the Prairieland Food Co-op. This article is not about further changes but about the lack of change in the co-op's recent history. Born out of idealism and the interest in whole foods awakened in the 1960s and 1970s, the Prairieland Food Co-op not only has survived, it has become a stable food buying alternative for health-conscious people of Salina.

The Prairieland Food Co-op began in 1977 when a benefactor gave The Land Institute a special grant to assess the degree of local interest in starting a food co-op in Salina. The results of the survey were encouraging, so a steering committee was formed and eventually a buying club began operations. Within two years, membership had grown sufficiently to take another big step, and the club established a storefront at 707 Bishop street.

In these early years, Land Institute staff and students formed the critical core of workers and buyers. Together with some dedicated community members they developed into a group that could weather the various problems which challenged the solvency of the experiment.

The storefront operated for over four years before growing problems caused the board of directors to consider turning the Prairieland Food Co-op back into a buying club. At that time there was a low turnover of food on shelves, membership was lagging, and finding enough volunteers to staff the store had become a serious problem.

Since the return to a buying club format, the co-op seems to have found its stride. Its eleven years of evolution has resulted in a loyal and committed membership, which meets twice a month, on the first Saturday morning of the month to order the food and on the third Wednesday evening of the month to package it. All members are required to work under the buying club arrangements, so turnout at the ordering and packaging meetings is steady, resulting in consistently large orders and enough people to get the food packaged quickly. In addition, the ordering and packaging meetings have become a time for members to gather and enjoy each others' company.

The buying club still relies on efforts above and beyond the call of duty by some members. They serve on the Board of Directors, take on the jobs of setting up and managing our River Festival Booth, clerk at ordering meetings and handle the finances. Beth Gibans, who will be the research fellow at The Land in 1989, is the current President of the co-op.

The co-op orders the bulk of its food from the Ozark Cooperative Warehouse in Arkansas. We stock a few items like tamari and molasses as well as a large selection of teas and spices. Having pared overhead to a minimum, the combination of a 20% markup on food purchases and the earnings from a food booth at the annual Smoky Hill River Festival have us on sound financial ground.

The food co-op membership changes modestly from year to year, but stays consistently at about 25 households. Perhaps even more telling of its stability is the fact that the co-op is no longer dependent on Land Institute membership and sales for survival. Even without Land interns ordering in the winter months, there are enough households who buy that the minimum order is always reached.

The success of the Prairieland Food Cooperative has been due to a group of die-hard Salinans who have slowly and quietly gone about the important business of making the ideal of "economics as if people mattered" a bit more of a reality. Through years of trial and error, their determined efforts have made the difference.

Research Advisory Group Hears Results of 1988 Experiments

On the afternoon of November 17, the staff and interns of The Land Institute presented the results of our 1988 experiments to interested faculty and students from Kansas State University and the University of Kansas. Each year since 1983, The Land has invited biology and agronomy professors from several Kansas colleges and universities to hear reports and discuss the progress of our research efforts. This year the session, which was held in a large classroom in the biology building at Kansas State University, was well attended.

After Wes Jackson's opening remarks, Jon Piper spoke on "The Relevance of Ecology to a Sustainable Agriculture." Caton Gauthier then gave her paper, "Vegetation Patterns in the Prairie Community."

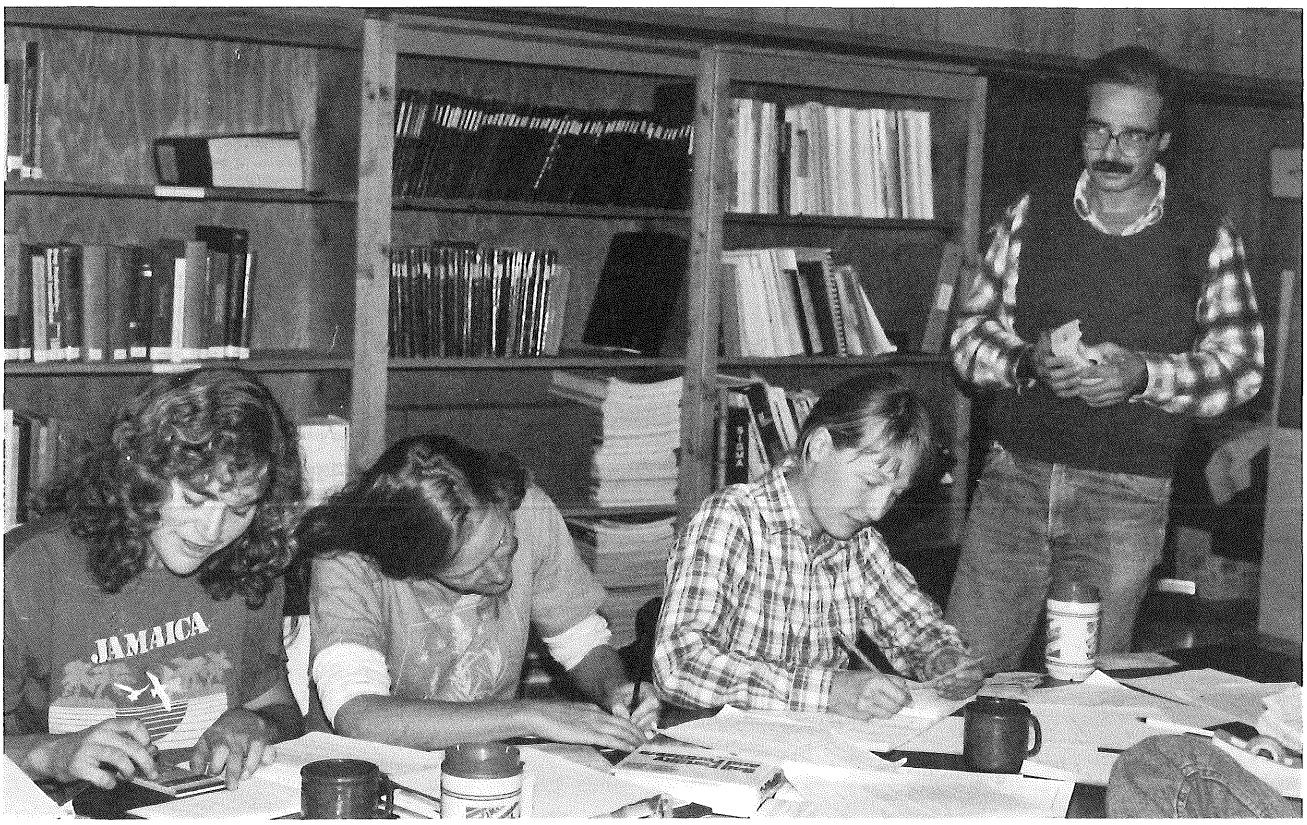
Peter Kulakow gave an "Introduction of Five Candidate Perennial Seed Crops" and then introduced each intern who presented a paper. Karen Finley spoke on "Plant-Soil Interactions in Plots of *Desmanthus illinoensis*, *Tripsacum dactyloides*, and *Leymus racemosus*. Laura Benson's paper was entitled "Germplasm Development of *Desmanthus illinoensis and Tripsacum dactyloides*. After a break for coffee and cookies, Jennifer Delisle talked on "Breeding a Perennial Sorghum," and Tom Clemetson spoke on "Variability for Disease Severity and Agronomic Characters in *Tripsacum dactyloides*, Segregating for Normal and Pistillate Sex-Ratio Varients." "Investigations into Perennial Polyculture" by Beth Gibans was the last presentation of the afternoon.

Following the afternoon program, The Land Institute staff and interns invited the participants to join them for dinner and discussion at a local restaurant. The development of sustainable agriculture as a legitimate field of research within the university was a major topic of conversation at this more informal gathering.

The papers presented by the interns will be published in *The Land Institute Research Report* 1988, edited by Jon Piper. Analyzing data from the experiments they managed over the summer, making oral presentations of the research results at Kansas State and writing papers on the work for publication are tasks required of all interns in The Land Institute program.

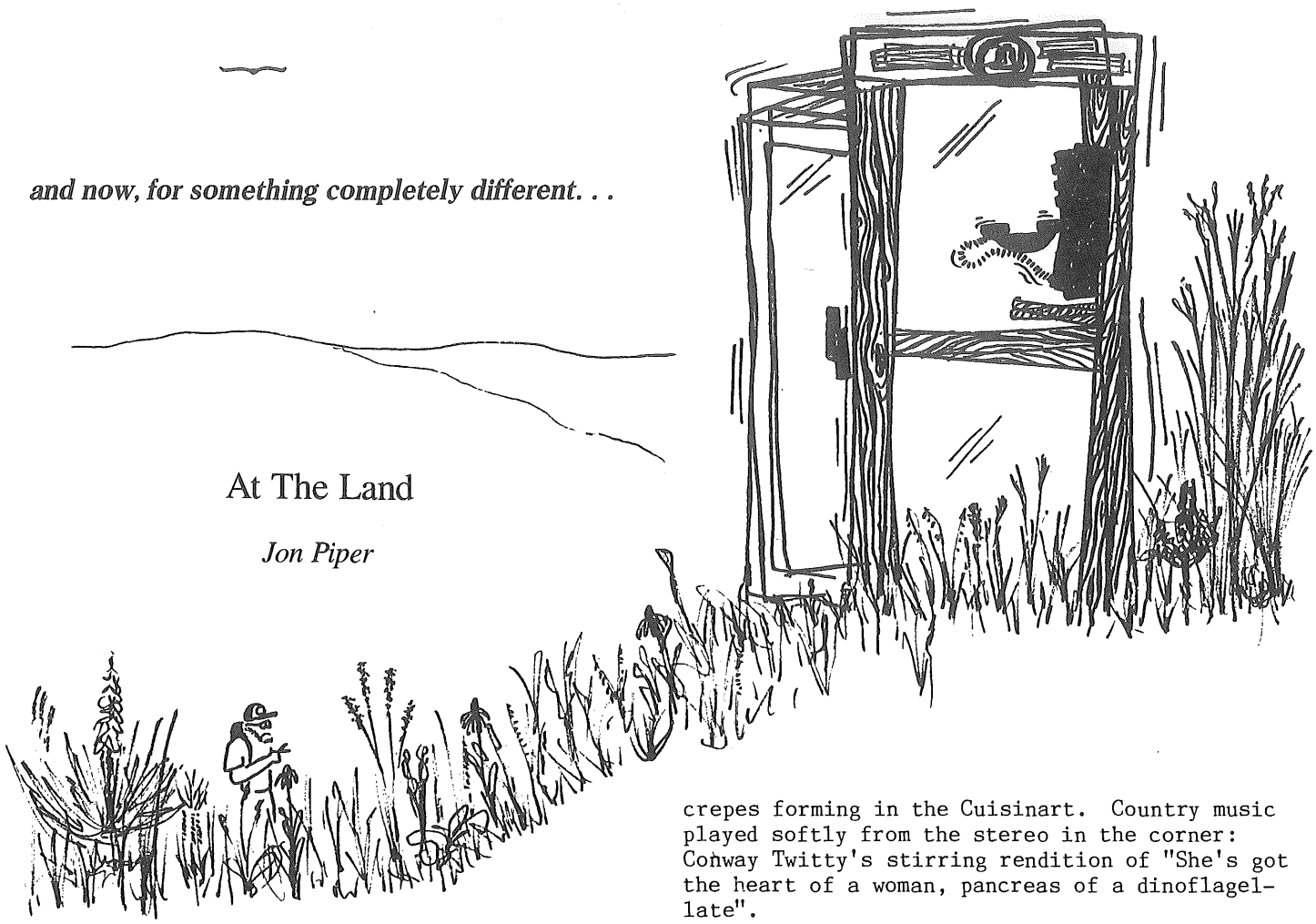
Prairie Festival

Dates for the annual spring Prairie Festival are May 27-28, 1989. A variety of outdoor activities, presentations, discussions and performances will be scheduled. The Land will send out invitations and programs early in April. Anyone not on The Land mailing list can receive an invitation by requesting it.



Beth Gibans, Karen Finley, Laura Benson and Gabriel Hegyes in research library where interns work on papers for presentation at Kansas State University.

and now, for something completely different. . .



At The Land

Jon Piper

The candy thermometer mounted to my kitchen window read "soft ball" as I mounted my Fuji Exterminator in the predawn twilight to begin the daily commute to The Land Institute. The fifty miles per hour headwind that confronted me on Ohio Street was like a mammoth Norelco blow drier with all options attached. But I had to progress faster than my tires were melting on the semi-fluid asphalt. It was going to be another warm day! As I rode, I used the peace and solitude of the morning to lay out mentally my explicit goals and objectives for the day. I remembered that early on I needed to meet with Wes concerning a long-range management strategy for our long rangeland.

The first tornadoes were just touching down as I ascended the hill by the river and pulled up to the office building. I dove for cover within the Krehbiel's old storm cellar, sharing my safe haven with thirty bushels of peppers and apples from The Land's Harvest market garden. After the storm, I emerged from the shelter, wiping fruit from my mouth and brushing branches from my clothes, and parked my bicycle within the executive lot. I began my quest for Wes.

As I entered the main office, I was greeted by the wonderful aromas of cherry blintzes and fresh espresso and by the homey sound of new crepes forming in the Cuisinart. Country music played softly from the stereo in the corner: Conway Twitty's stirring rendition of "She's got the heart of a woman, pancreas of a dinoflagellate".

"Good morning, Linda and Sharon. Have you seen Wes yet today?"

"Good morning. No, we haven't, but he may be over at the classroom building installing the solar-powered, desktop publishing equipment."

I decided to pass through the new greenhouse on my way to the classroom. One of the interns, Sunshine Delightful, a former blissed-out New Ager, was watering in the middle room, Paul Winter's Canyon Suite screaming from the headphones of her Sony Walkperson.

"Hi, Sun. What are you up to?"

"This is the latest approach to enterprise income. I call it `prairie-in-a-pot'. Each of these 2 inch plastic pots contains a full complement of tallgrass prairie plants: a diversity of native grasses, legumes, and composites. We intend to sell them to urbanites who appreciate prairie, but lack the backyard space to establish their own."

"Great," I said, "But what if a person wants to sample the entire prairie bioregion, from tallgrass to midgrass to shortgrass prairie ecosystems?"

"Well, then they can purchase one of these 4 inch pots."

I left, wishing her well in the project, and hastened toward the Herbary in my renewed search for Wes. There, I nearly bumped into Colorado intern Duke Aspen, who was staring serenely into

the horizon. I told him about Sunshine's exciting project for both raising revenue and heightening prairie awareness.

"That's nothing", he responded, "let me tell you about my vision."

Duke then recounted an elaborate scheme to draw in the countless interstate travelers stranded in Salina each winter on their way to Colorado. His plan involved creating a ski area on the quarter section, using native stone to build slopes.

"Just think. Nothing between the Appalachians and the Rockies until Zow!, Prairie Mountain!"

"Isn't that an oxymoron?", I countered.

"Hey, if you don't like an idea, just say so. You needn't be insulting."

I left Duke musing and dreaming, and continued on to the classroom. As I entered, I could tell by the lively discussion that the philosophical underpinnings of the day's work were still being debated.

"But why mow the lawns when a small herd of goats could do the same job sustainably and more cheaply?"

"You don't understand. That's not gasoline in those mowers, it's transition fuel. Thus, the faster we use it up, the sooner we usher in a sustainable future."

"So, I guess I should cancel the cete of badgers I ordered for garden preparation and buy another rototiller?"

"There are bur oaks emerging from the composting toilet again."

"Yeah, we ran out of sawdust and had to forage for acorns and sticks."

"You're no doubt familiar with the ecological principle, `You can never do only one thing'?"

"Yes. So?"

"So, there is no reason why you can't push a mower, weed the Herbary, peruse *Utne Reader*, and write a *Land Report* article while walking between buildings."

"Hey, you dropped a couple of seeds."

"Thanks very much. You just doubled the maximilian sunflower yield."

A small crew was eagerly leaving the room, tools in hand.

"Are you going to weed the 72 acres?", I asked.

"No, only 43 of them."

"Have you seen Wes?"

"Try the quarter section. He may be fixing fence where the cattle got out."

Then they were gone.

I returned to the office building, intending to gather some highly technical equipment before heading out to sample the prairie. (Indeed, if it weren't for brown paper bags, kindergarten scissors, and magic markers my research effort would be considerably less sophisticated.) As I pushed open the front door, my feet were caught and I fell helplessly into a knee-high pile of computer print-outs all over the floor.

"Another mass mailing?", I asked Sharon.

"Yes. This time we're sending appeals to all North Americans having the letters `r' or `l' in their surnames."

"Well, I certainly don't envy you this time of year. I remember the last mailing list: Europeans born after 1911. By the way, if anyone needs me I'll be out on the prairie."

The prairie was serene and calming, although the grasses were restless. A dickcissel astride an old gaura stem was singing excitedly as we gathered data. I was considering how to include him in a nested ANOVA when the phone rang. I picked up the receiver, thankful that we had had the foresight to install this line out here.

"Hello," said a voice. "I'm surveying alternative organizations and I wonder if you could tell me how your institute differs from others working toward a just, humane, and sustainable society?"

"Well, for one thing, we're the only organization working for a sustainable future that holds a prom night."

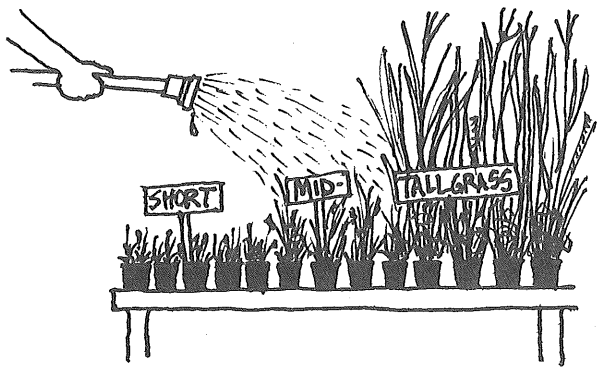
I answered a few more questions, hung up, then returned to the study. As I looked to the west, I noticed for the first time the thick black clouds whose approach the cold north wind had signaled. Dreading the likely hailstorm on the way home, we gathered our materials and headed in.

Someone had switched to a public radio station featuring an afternoon of Texas sea shanties.

"Gonna go a-whaling ho, a-whaling, my muchachos."

Sharon and Linda, having finished the mailing, were nailing the last pieces of plywood over their windows as I donned protective gear for the ride north. In the gathering darkness, I reflected on the events of the day. All in all, it had been spent productively and meaningfully. We had even had some fun. Wes, it turned out, was attending an international conference on sustainable liability insurance for the New Age in Palermo, Italy. I would speak with him when he returned. My appreciation for The Land's long-term perspective was renewed.

The bitter, 40 mph north wind nearly overwhelmed me as I turned onto Ohio Street. I was glad that my yellow and green Land Institute long underwear was well insulated.



Paula Bramel-Cox: Sorghum Breeder

Jennifer Delisle

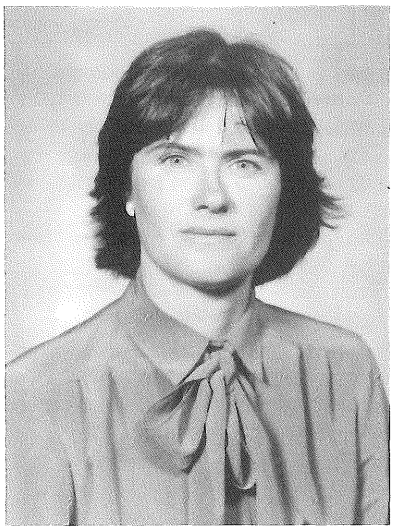
At Kansas State University, Paula Bramel-Cox is one of a few researchers investigating agricultural alternatives. She grew up on a conventional farm in Illinois, attended Iowa State University and is intimately familiar with the problems facing farmers today. Paula and her husband Stan did their doctoral research in plant breeding at ICRISAT, the International Crops Research Institute for the Semi-Arid Tropics, in southern India. After several years in India they returned to the U.S. to settle in Manhattan, Kansas, where Paula is an assistant professor of agronomy.

As the sorghum breeder at Kansas State, Paula addresses the needs of sorghum growers in Kansas. At the same time, her work is guided by the principles of sustainability. Due to her concern for the environment and the plight of farmers, she encourages other agricultural researchers to look at the long-term effects of our current agricultural system. Paula spent an afternoon with me discussing her projects and the philosophy behind them.

Paula studies no-input approaches to sorghum production. Her work has three main objectives: (1) to evaluate the use of hybrids versus varieties under drought conditions, (2) to integrate genetic resistance and biological control to manage greenbug populations and (3) to investigate the possibility of developing a perennial grain sorghum.

Paula's approach to sorghum breeding is as unconventional as her objectives. In conventional breeding, the aim is to maximize yield at the expense of local adaptation. Through this breeding for high yield, the genetic base of the grain sorghum grown in this country has been greatly reduced. Most sorghum breeding material traces back to about ten parents. But the world collection of sorghum contains about 30,000 accessions. Paula is utilizing not only this vast source of exotic germplasm, but also wild species of sorghum which contain a store of potentially useful genetic variation. Paula feels that her position in a public institution gives her more opportunity to carry on this type of research, although she has been criticized for not achieving quick results.

Most of the sorghum breeders in this country aim to develop high-yielding hybrids. Hybrids are bred for uniform optimal environments, which are gained through inputs such as fertilizers, irrigation and pesticides. Since the introduction of sorghum hybrids in 1956, they have gained wide popularity. By 1957, 80% of the sorghum grown in this country was from hybrid seed. Indeed the only reason it was not 100% was that there wasn't enough seed available.



Paula Bramel-Cox

The necessity of using hybrid sorghums was never evaluated, but once they were marketed, development of more locally-adapted varieties stopped. With sorghum, a predominantly self-pollinated species, it is relatively easy for farmers to save their own seed by setting aside a portion of their crop for next year's seed. This encourages the development of locally adapted varieties.

Foreign students in U.S. institutions are often encouraged to put their research efforts into developing hybrids. They are told that genetic material from their own country is no good. They take back material which is adapted for high yield under high input conditions. Farmers in developing countries often cannot afford to purchase these inputs (fertilizer, pesticides). When they have a good year they may be able to buy hybrid seed. But they'll save seed harvested from this hybrid crop for use in a poor year when they can't afford to buy new seed. The seed they save produces a very low-yielding crop. Paula believes that a more stable approach to crop improvement would be to train foreign students to help farmers develop their own genetic material rather than rely on seed companies.

Breeding for adaptation to environmental constraints is the driving philosophy behind Paula's work. Most crop breeding is done for broad adaptation, gained by reducing the variability of the environment, usually through the addition of inputs. This makes conditions more homogeneous so that a few hybrid lines can be grown over a large region. In a reduced-input system, selection for narrow adaptation to the local environment is necessary. Part of Paula's project involves developing the germplasm base from which drought-tolerant varieties of sorghum can be bred. Such varieties are defined by their ability to produce high yields under dry conditions. They also must be defined by their adaptedness to a particular region. A variety which

is known to be drought-tolerant in Africa probably won't display that quality in the U.S. because it is unadapted for many other environmental characteristics. For a drought tolerant variety to be accepted by U.S. farmers, it must yield well under dryland conditions but also respond to higher moisture levels. The drought tolerant varieties available now offer an advantage only under water-stress conditions. When sufficient moisture is available, they yield less than standard varieties. Thus a farmer will usually plant the higher yielding types and hope for enough rainfall.

Paula's commitment to working within a given environmental context is seen in her approach to managing greenbugs, a type of aphid, which are a major pest of young sorghum plants. Here she believes we need to rethink our definition of resistance. Genetic manipulation has long been considered the key to non-chemical pest control; once genetic resistance is gained, we have assumed that plants will remain resistant. But the greenbug story proves this can be no more of a long-term solution than insecticides. Complete resistance to greenbugs puts heavy selection pressure on the insects to adapt, and over time the plants can become highly susceptible. Up until 1968, this insect was only a pest of small grains in the cool fall and spring. Then, through either migration or mutation, the greenbugs became better adapted to the conditions under which sorghum is grown. This highly adapted greenbug, called Biotype C, quickly spread throughout the country. A sorghum line was developed which was resistant to this Biotype C greenbug. Eighty percent of the sorghum grown in the U.S. contained this one source of resistance. Then in 1979 another adapted greenbug known as Biotype E appeared. Within one year, 100% of the greenbugs seen in Kansas were this type. Now only 30% of the sorghum grown is resistant to Biotype E greenbugs. Thus it becomes obvious that genetic manipulation alone is not the answer to pest control.

Paula is attempting to discover what level of plant resistance is necessary in order to give predators time to get established on sorghum. There are three effective predators of sorghum pests; lacewings, lady beetles and a parasitic wasp, *Lysiphlebus testaceipes*. If the plants can resist severe damage just long enough for the predators to get established, the greenbug populations can be maintained at an acceptable level. This contributes to a more stable system which is self-sustaining in that both pests and predators can exist in balance.

Another aspect of Paula's research involves investigating the possibility of developing a perennial grain sorghum. This project is a cooperative effort between Paula and The Land Institute. Seed would not need to be planted every year, thus reducing traction requirements. Soil moisture would be retained better and pest control would be gained through the natural interactions of pests and their predators.

This perennial crop would be developed by crossing annual cultivated grain sorghum, *Sorghum bicolor*, with its weedy perennial relative, *S. halepense*, commonly known as Johnson grass. *S. bicolor* is diploid with twenty chromosomes. It has a compact head with good seed set and large seed which are non-shattering. *S. halepense* is tetraploid with forty chromosomes. It has a loose head type with small seed which shatter readily. To make fertile crosses between these two species, tetraploid *S. bicolor* lines are needed. Paula is working on developing new tetraploid lines to be used in this work, which is being carried out at The Land Institute.

While *S. bicolor* is weakly perennial in the tropics, it is not winter-hardy in the temperate zone. *S. halepense* is winter-hardy due to its aggressive production of rhizomes, which are underground stems. Through this breeding program we hope to be able to transfer rhizome production to cultivated sorghum, giving us an agronomically desirable type which is winter-hardy.

At The Land Institute we have made initial crosses between the two sorghum species. The plants in the F1 generation contain 50% cultivated genes and display too much of a weedy character to be agronomically desirable. In order to increase the percentage of cultivated genes, we are crossing the F1 plants back to the cultivated parent. In breeding terms this is called backcrossing. This year we made the first round of backcrosses to the cultivated parent. These plants contain 75% cultivated genes and will be crossed again with *S. bicolor* to produce the next generation of backcrosses which will contain 87.5% cultivated genes. These populations with differing percentages of cultivated genes will be used to assess the best level of backcrossing to transfer the over-wintering trait.

Problems could arise from the potentially weedy nature of the *S. bicolor-S. halepense* crosses. Concerns when crossing a cultivated and weed species arise from two areas: the weediness of the crosses due to extensive rhizome production and seed dispersal, and the potential for transfer of genes into annual cultivated sorghum through uncontrolled pollinations. These problems will be dealt with as we proceed with this long-term project.

Paula feels there is too much research emphasis on developing short-term solutions to agricultural problems. These solutions usually are based on the addition of inputs which raise production costs. Paula believes that inputs applied to crops in the U.S. could be reduced considerably simply by switching from corn to sorghum. Corn is a high-input crop requiring weekly irrigation and heavy pesticide application. Sorghum, on the other hand, requires as few as three irrigations per growing season and has few pests. The problem is that sorghum commands a price averaging 15% lower than corn which is not made up for by the reduced costs of inputs. Traditionally people in the U.S. have believed that livestock "did better" when fed corn, even though all tests show that the two grains are about equal in nutritional value.

The environmental and economic realities of high-input agriculture cannot be ignored indefinitely. Changes will have to come about. But as Paula points out, "The overall implications (of changing our agricultural system) are greater than anyone cares to admit." The questions which need to be addressed are not only environmental, but also social and philosophical. We need to deal with these issues through a more integrated, whole-system view. People from a wide range of backgrounds need to contribute to the free flow of information and ideas. Then agriculture in the future will benefit both rural and urban dwellers, as well as the environment. ◁

Jake Vail amongst Illinois bundleflower seedlings. Sorghum in background.

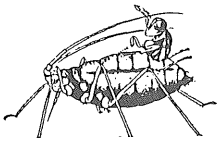
In the Greenhouse

Mary Handley

We suspect that at least one of our species, Illinois bundleflower, is daylength sensitive, because the seedlings which we planted in September slowed their growth as the days became shorter. John Thelander strung lights on a timing system over the plants to give a little more light in the evening and early morning. With many horticultural plants like poinsettia and chrysanthemum, this is all it takes to convince the plants it is still summer so they'll keep growing.

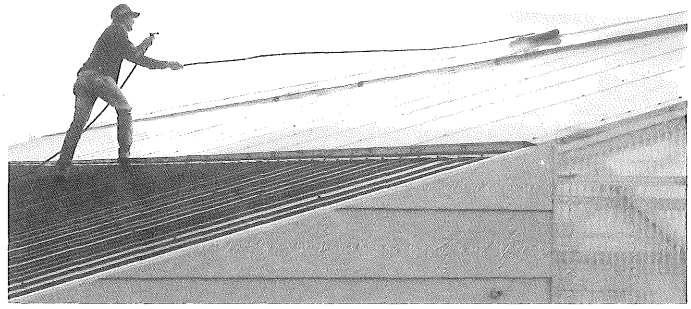
One of the most interesting developments in our greenhouse this fall has been the appearance of a natural population of Brachonid wasps, which are very effective aphid parasites. This tiny wasp, less than one fourth inch in length, lays eggs within the body of an aphid. As the larva grows it consumes the internal tissues of the aphid and then cuts a slit in the underside of the aphid "shell" to attach it firmly to the leaf. The mature larva spins a cocoon inside the aphid, which now resembles a swollen, papery aphid and is called a mummy. When mature, the adult wasp cuts a perfectly round hole in the top of the mummy, crawls out, and flies away to mate and lay eggs in more aphids.

I had observed these "mummies" in very small numbers during the summer, but when the temperatures became cooler this fall, they began increasing rapidly. The parasitized aphids do not behave any differently from normal ones until the wasp larva has nearly consumed them entirely. This means that it takes some patience and trust to watch apparently healthy aphids eating the plants and not do anything. It has been very satisfying to see this parasite establish itself (I didn't do a thing to get it started) and I have renewed enthusiasm for the no-pesticide approach in the greenhouse.



With the summer heat finally behind us, John Thelander hosed off the whitewash on the outside of the greenhouse glazing (see photo at right). Then it was time to prepare for winter.

Paul Rasch, on loan for the summer to The Land's Harvest, began to work on the greenhouse construction again. For several weeks when the days were warm and the nights cold, we ran two forced air heaters at night in the sorghum room. Paul completed the wood furnace installation and plumbing with intern help right before Thanksgiving. The furnace heats water that circulates through small black tubes under the benchtops or on the floor so that the plant roots will be warm. Paul is also installing a propane furnace as a back-up or auxilliary heating system. Staff members have been taking turns stoking the wood burning furnace each evening and in the early morning. ◁



John Thelander removes whitewash from greenhouse roof.

Paul Rasch explains operation of wood-burning furnace.

Plant/Soil Interactions Studied

Karen Finley

The dense, red and orange-hued grasses we see waving on the prairie in the low-angled light of these autumn afternoons reach more deeply below the surface of the land than they do above it, extending tangled masses of roots and rhizomes into a dark and generous world. How do these perennial grasses and forbs interact with the soil?

The patterns of growth of these plants, as well as their times of flowering and seed set, vary both with species and soil conditions. This year in Salina, prairie parsley and buffalo vetch flowered early in April; buffalo grass and junegrass flowered in June. Big and little bluestem flowered in August, while goldenrod and the asters flowered in September. The divergence of periods of growth and reproduction by different species is one way that they have responded to the limited resources of their environment, including the moisture and nutrients within the soil, which are most likely to be required by plants during those times.

Likewise, prairie species have diverged from one another morphologically, using space differently above and below the soil surface. In contrast to the spreading, fibrous root systems of grasses such as little bluestem and eastern gamagrass, some prairie forbs (a grouping which refers to non-woody, non-grass species) such as Illinois bundleflower, butterfly milkweed and evening primrose have thick, fleshy "taproots" which reach down through the dense sod formed by the grasses near the soil surface.

Prairie plants depend upon relationships with the animals, bacteria, and fungi living in the soil. Earthworms, insects, and even badgers play a vital role in the deposition of nutrients and in the decomposition of dead organic material, while soil bacteria and fungi help in making soil resources both chemically and physically available to the plants.

One of two experiments established last spring in the 72 acre field on Ohio street is aimed at investigating the dynamics among three of the species we are working with and the soil of that field. The experiment will be maintained for the course of approximately five years and is designed to help us understand the patterns of moisture and nutrient use of each species. By determining the patterns of each species' interaction with the soil environment and correlating this information with observable, above-ground patterns of the plants' growth, we hope to come to understand the relative demands of the plants on limited soil resources over a single season and over a span of several years. The major function of the experiment is to provide basic information that we can apply towards a subsequent experiment in which these species will be planted together in a mixture. This will enable us to address two of the basic questions which guide our research: first, to what extent can we expect a polyculture of perennial species to maintain its own fertility? and second, could we expect a compatibility between species in a perennial polyculture that would have advantages over a perennial monoculture?

With this aim, this spring we established three 70 square meter plots of each species, seeding Leymus in early March and Illinois bundleflower in mid-April, and transplanting parts of eastern gamagrass from the field of accessions near the classroom. Over the course of the year, the plots have been monitored weekly for changes in soil moisture with the use of gypsum block sensors and a meter. The meter measures the change in electrical resistance within the porous gypsum block caused by fluctuation in soil moisture.

Once a month, samples were taken from the plots and analyzed at the Kansas State University soils lab for amounts of nitrogen, potassium, phosphorus, magnesium, calcium, organic matter, and pH. We took both soil moisture and nutrient data from three different depths in the soil in order to give us a more "three dimensional" picture of how each plant species interacts with the soil.

So far we have seen interesting differences in the patterns of calcium and nitrogen levels in the soil under the three species and have watched soil moisture levels change differently over time and space between plots. We spent the month of December compiling these observations for presentation in the Research Report to be available next spring.

Caton Gauthier and Karen Finley take soil samples.

Like other experiments here at the Land Institute, this one will require several years of data taking before we have the information we need. Both of the grasses in the experiment do not flower until the second year of growth. It will be interesting to see if the patterns we observed are unique to the first year, and to observe what patterns emerge as the plants become larger and exert a greater influence on the soil environment.

LOW-INPUT AGRICULTURE *is a term that has recently entered the lexicon of agricultural jargon. Though an input could be anything a farmer does or uses or adds to a field to grow a crop, the meaning is narrower in the context of* ***low****-input. Generally, users of the term refer to lowering the costs of farming by using less of something, most commonly a chemical input like nitrogen fertilizer. There are environmental connotations also. In relation to the term "sustainable agriculture," low-input means lowering the negative environmental impact of farming practices. The growing concern about nitrates leaching into groundwater is the driving force for lower inputs of nitrogen fertilizer.*

Plants must have nitrogen to grow. In developing farming methods based on lower inputs of nitrogen fertilizer, we first must understand how the nitrogen cycle works. Laura Benson gives us the basics in this article. --The Editor

A Nitrogen Cycle Primer

Laura Benson

Six elements compose ninety-five percent of all living things: carbon, oxygen, nitrogen, hydrogen, phosphorus, and sulfur.[1] Our existence depends, in part, on the efficient cycling of these elements through minerals, water, air, and living tissue. People in agriculture have been especially fascinated by the nitrogen cycle. There is a compelling economic incentive to understand the patterns of nitrogen flow in a farmer's field: crop yields are often limited by nitrogen availability. Figure 1 shows cereal grain yields plotted against the use of nitrogen fertilizer in more developed countries and less developed countries.[2]

No one can question that nitrogen management is an important aspect of producing food. However, the best way to go about nitrogen management is very much in question. The need for an informed evaluation of topics such as synthetic fertilizer use, feedlot waste disposal, and the trend of farmers to eliminate livestock in favor of cash grain cropping, brings us to the processes of the nitrogen cycle.[3]

The planet earth is not faced with a nitrogen shortage. The air around us is about 78% nitrogen in the form of N_2 or elemental nitrogen. In this form, two nitrogen atoms are held together by a very strong triple bond. Because the nitrogen atoms are held so tightly to each other, plants and animals cannot use them directly to make proteins. The only way we can get the nitrogen our bodies need is through the plant and

animal proteins in our diets.

The process of breaking the strong nitrogen bonds is called fixation. In the atmosphere, lightning and ultraviolet radiation occasionally fix nitrogen. (See figure 2.) When N_2 is split by lightning, new bonds made with oxygen or ozone create nitrogen oxide (NOx) compounds. Nitrogen oxide compounds and ammonia (NH_3) in the atmosphere can be brought to the soil by rain. The annual amount of nitrogen supplied by precipitation is usually four to seven pounds per acre in temperate zones.[4] While this source of nitrogen is noteworthy, relatively more nitrogen is added to agricultural fields by crop residues, animal manure, biological fixation, and the application of synthetic fertilizer.

Synthetic fertilizer is manufactured by combining N_2 and hydrogen gas at high pressure and temperature. This industrial reaction, known as the Haber-Bosch process, splits the nitrogen bond and produces ammonia (NH_3), which can be converted to various fertilizer products such as anhydrous ammonia, liquid ammonia, $(NH_4)2SO_4$, or urea. The application of these fertilizers is a major path for atmospheric nitrogen to enter agricultural fields in a usable form. But it is not the only way.

Several biological systems incorporate the nitrogen from N_2 into living tissue. Elemental nitrogen (N_2) can be fixed by soil microbes like cyanobacteria, azotobacter, and clostridium. Actinomycetes and rhizobia living inside plants also carry out biological nitrogen fixation. The global quantity of nitrogen fixed each year is estimated at 175 million metric tons, which exceeds synthetic fertilizer production.[5] The most famous and intensively studied biological fixation is that of rhizobia bacteria living inside the roots of legumes. Although there were no extension agents in ancient Rome, the poet Virgil (19-70 B.C.) espoused the values of planting legumes in rotation with cereal crops:

> Or, changing the season, you will sow there yellow wheat, whence before you have taken up the joyful pulse, with rustling pods, or the vetch's slender offspring and the bitter lupine's stalks, and rustling grove.[6]

During the twentieth century we found out that the boost of soil fertility attributed to legumes is due to nitrogen fixation. Rhizobia bacteria are able to convert N_2 to ammonia inside legume roots that have specialized structures called nodules, small, callus-like bubbles on the roots.

The nitrogen fixed by the rhizobia is incorporated into plant proteins and the rhizobia gets sugars to satisfy their respiration needs in return. The amount of nitrogen fixed by a legume crop varies widely with cultivars and growing conditions, but on average a crop of alfalfa will produce 50 to 450 lb/A of nitrogen in a year.[7] Legumes add nitrogen to the soil in part by secretions from their roots and from dead root tissue sloughing off and decaying. The largest nitrogen gain is made when the legume crop is plowed down as a green manure and it decays to become part of the soil's organic matter.

Ninety to ninety-five percent of the soil's non-fertilizer nitrogen is unavailable for plant use or "immobilized" in organic matter. The soil's organic fraction is formed from the decay of crop residues, animals, microbes, and their waste products.

During the process of decomposition, a series of reactions known as mineralization occurs as microbes release ammonium in the soil. While some plants take up large quantities of ammonium, the majority of the nitrogen used by field crops is in another form, nitrate (NO_3-). Soil bacteria do the job of changing ammonium to nitrate in a reaction called nitrification.

Nitrate is essential for crop growth, but if it is not taken up by plants, its life in the soil may be very short. Negatively charged colloids dominate in most soils. Ammonium has a positive charge and so it is attracted to the exposed anions in the soil. Nitrate (NO_3-) is negatively charged and will not be held by soil, but moves freely with the soil's water. If nitrates move out of the rooting zone into the water table, the process is called leaching. In addition to leaching from the field, nitrate may be lost through the process of denitrification. If conditions are anaerobic (without oxygen) the soil bacteria will use nitrate for respiration,

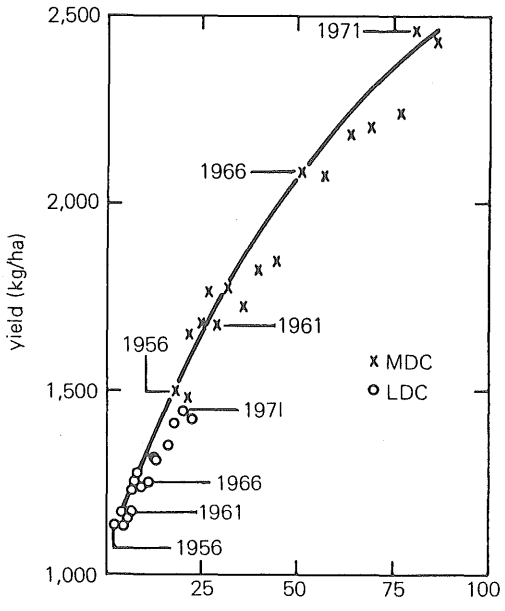


Figure 1 The relation between the use of nitrogen fertilizers and the yield of cereal grains from 1956 to 1971 in more developed countries (MDC) and less developed countries (LDC). Although yields leveled off late in this period, they were generally proportional to the amount of fertilizer applied per hectare. (From R.W.F. Hardy, 1975.)

converting it to gasses such as NO, N_2O, and N_2. Ammonium in the soil solution may also be lost to the atmosphere through volatilization to ammonia gas. In clay soils, there is also the possibility that ammonium may bind tightly to clay particles and only become accessible for nitrification and crop uptake at very slow rates.

Even a brief overview of the nitrogen cycle shows that nitrogen is a very mobile element. When processes of the cycle carry fertilizer nitrogen away from agricultural fields, it is an economic loss to the grower. Between leaching, volatilization, and immobilization, only fifty to sixty percent of the synthetic fertilizer applied can be expected to be used by a crop in one field season. The loss of nitrogen from agriculture has also become a sensitive ecological and political topic. A current bill in Iowa levies a 75 cent-per-ton tax on anhydrous ammonia to support research on farming practices that will keep agricultural chemicals out of ground water.[8] The concern in Iowa is nitrate leaching into water used for animal and human consumption. Nitrate is poisonous to humans and animals because it interferes with the ability of the blood's hemoglobin to carry oxygen. The federal government has set the safe drinking water standard for nitrates to be no more than ten parts per million.

In general, the problem of nitrate leaching occurs when farmers apply more than the crop can take up. Fall applications of fertilizer tend to cause more nitrate leaching than spring applications. If all the fertilizer for a crop is applied in one field operation, there is a greater chance of leaching than if the nitrogen is applied several times in smaller doses. It's also possible to apply nitrification inhibitors like 2-chloro-6 (trichloromethyl) pyridine, trade name N-Serve. Nitrification inhibitors help keep fertilizer in the form of ammonium because they are toxic to the bacteria which begin nitrification in the soil.

There are some problems to implementing these solutions. Split applications of fertilizer cost more because of added labor and traction costs. Nitrification inhibitors don't work well on all soil types. Some people don't want to poison nitrifying bacteria in the first place.

And the problem of nitrate leaching goes beyond the application of synthetic fertilizer. Manure must be handled correctly or it too will cause nitrate leaching. If the ammonia nitrogen of the manure is converted to nitrate in excess of what the plants can take up, the nitrate is likely to leach. On small-scale, diversified farms, farmers cans spread manure over their

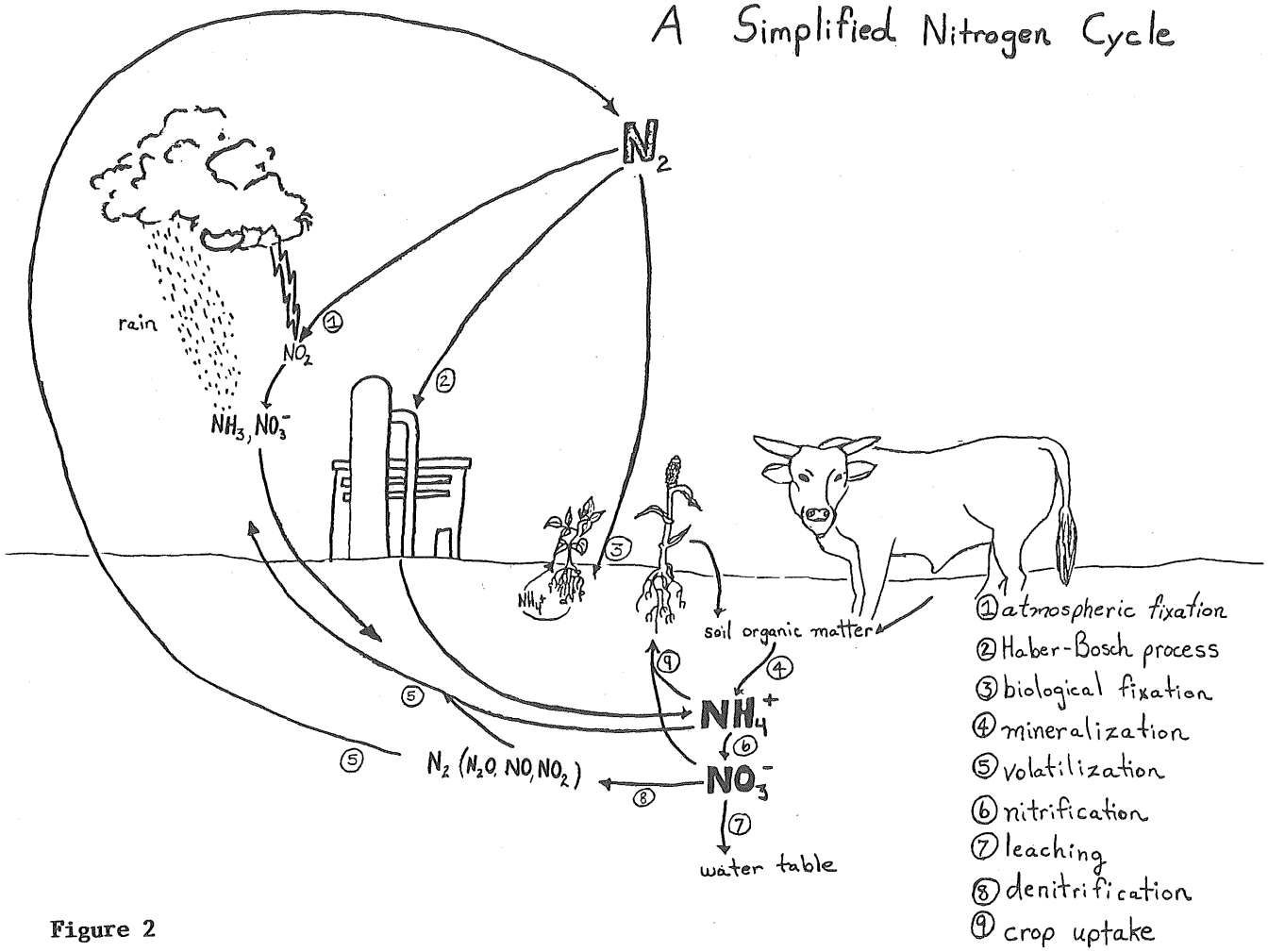


Figure 2

fields and avoid the use of synthetic fertilizers. But the current trend to concentrate the U.S. beef and pork industry in feed lots makes spreading manure over enough land to avoid nitrate leaching problematic. Composting the manure is one solution, but we should remember that the manure produced on a large feedlot is equivalent to the human wastes from a small city.

The U.S. used 11.4 million tons of nitrogen in the form of synthetic fertilizers in 1980 and our consumption is predicted to increase to 15 million tons by 1990.[9] How sustainable this trend will be is very much in question. Natural gas and petroleum currently supply the energy required to break the nitrogen bonds during the Haber-Bosch process. One third of the energy used to produce the U.S. corn crop is devoted to the manufacture, transport, and application of nitrogen fertilizer.[10] With oil prices as low as ten to fifteen dollars a barrel, few people worry about running out of oil. Nevertheless, it is necessary to recognize that our soil fertility, and thus our food supply, is increasingly dependent upon fossil fuels. The use of synthetic fertilizers is only sustainable for as long as fossil fuels are plentiful and affordable.

Perhaps we shouldn't hope it will last. Another long range impact of excessive fertilizer use is that nitrate may become nitrous oxide (N_2O) during denitrification. Nitrous oxide volatilizes into the atmosphere and moves to the stratosphere where it may participate in a reaction that destroys ozone, the gas layer that protects the earth from too much ultraviolet radiation. If this ozone shield were removed, the earth's surface would be warmed, with serious ecological consequences.[12]

Good nitrogen management requires an understanding of the flow of nitrogen through our air, soil, water, and crops. The data have shown that soil fertility and crop growth are intimately tied to nitrogen cycling. While it is easy to find nitrogen management literature that will help growers tailor their fertilizer inputs for maximum economic response, it is much more difficult to quantify the damage done when excessive nitrogen leaves the field. But we do know that nitrogen management has off-farm consequences. Our nation needs to seriously confront nitrate contamination in surface and ground water. We need to assess the damage of nitrous oxide production and the dependency of the food supply on fossil fuels.

I have never lived on a small, diversified farm and do not know what it is like to bale alfalfa hay or clean out the barn. From the computer terminal, I can only repeat the findings of other agricultural scientists. The elimination of hay crops and manure spreading as agricultural production separated into cash grain farming and livestock feedlot operations has increased soil degradation.[13] Our agriculture will need change and innovation before we can be proud of managing the nitrogen cycle. ◁

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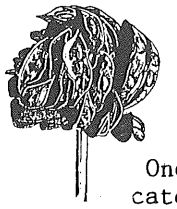
From the Back Cover--

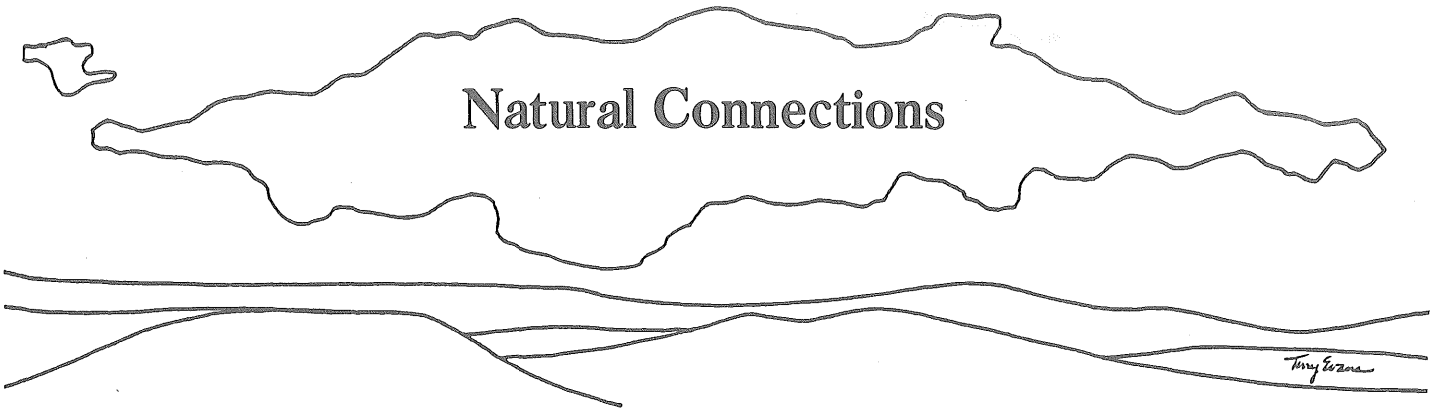


ILLINOIS BUNDLEFLOWER PODS

One important feature of a domesticated grain crop that distinguishes it from its wild relatives is resistance to seed shattering. Plants that retain their seed after they mature can more readily be harvested by humans. A germplasm accession of Illinois bundleflower from a collection made near Knoxville, Tennessee, has mature seed pods that are indehisent or nonshattering (see bundleflower on the left in the photo). The mature pods do not open as the seed matures, and the seed is retained on the plant longer than the normal shattering types with dehisent pods (see bundleflower on the right in the photo). In 1988, we identified several natural hybrids in our research plots between the nonshattering and shattering forms of Illinois bundleflower (see center of photo). These hybrids appeared intermediate between the parental types. We will continue to study these hybrids in the 1989 field season to begin breeding nonshattering cultivars of Illinois bundleflower.

LAND INSTITUTE RESEARCH REPORT
Back Issues Available

You can read more about specific experiments in the program to develop perennial grain crops by obtaining copies of the yearly research reports. To receive Numbers 3 (1986) and 4 (1987), send $5 to The Land Institute. The 1988 report will be available in the spring of 1989.



As December ended, we realized that we were ten inches below our average of 28 inches of precipitation a year in Salina. A dry spring in Kansas was followed by a dry summer and a dry fall. And since winter moisture, mostly in the form of snow, does not ordinarily contribute much to our precipitation average, we aren't expecting to make up much of the deficit this winter.

Surely we will have a wet spring. But what if it is as dry in 1989 as it was in 1988?

How to prepare for the next growing season has been on our minds. Will our well supply enough water for household use and the community garden too if it is dry again? Should we only order seeds of drought-resistant vegetables? Should we plant in raised beds, or in trenches to catch all the rainfall we can?

The perspective of Nancy Paddock is probably good to keep in mind as we struggle with these questions. With Nancy's permission, we are reprinting her editorial on the drought from the Fall 1988 issue of *The Land Stewardship Letter*, the publication of the Land Stewardship Project, Stillwater, Minnesota.

The Drought of 1988

Nancy Paddock

The drought reminds us of how vulnerable we are to the vagaries of climate and weather. Our life systems depend on delicate balance and timing. We need not only sun and rain to grow crops, but the right amount of sun and rain at the proper time. After a summer of brown grass, shrinking lakes and ponds and burnt crops, the rains fell on my Central Minnesota home. But too late. And too little. The lawns are green again, but much of the crop is lost. And farmers are suffering.

In our modern world, we live on the edge. We drive at speed limit on crowded freeways, assuming the perfect operation of our cars. We proceed as if we will always have an abundant and safe supply of food and water. We depend for our lives upon the proper functioning of our technology. And, for the most part, we farm as though ideal weather conditions will always prevail.

A popular bumpersticker reminds us, in no uncertain terms, that disaster happens in this world. We cannot continue to operate as though it does not. We cannot expect the world to be what we want it to be. In wonder and horror, we must accept it as it is.

So many of the disasters blamed on nature are worsened by our lack of adaptation to natural process. Condominiums erected too close to the sea erode away in high tide. Houses built on flood plains suffer the flood. Channelized rivers turn water that should have wandered through lush wetlands into dangerous torrents. Overgrazed rangeland and unprotected fields blow away in the winds of drought.

These are human, not simply natural disasters. For all of our horror and our sympathy with the victims, we must recognize that, too often, it is human ignorance or perhaps, innocence--a childlike trust that things will always be optimum--that gets us in trouble.

This is not to say that human foresight, good stewardship, could make the world disaster-proof. Or that those affected by the drought of 1988 are to be blamed for causing their own suffering. But the effects of the drought were worse on land that was unprotected by field windbreaks and contour strips and conservation tillage. Soil depleted of organic matter held less water, blew more readily.

Herein lies the very practical aspect of good stewardship, so often called idealistic and impractical. In good stewardship of land, idealism and practicality merge. In the long run, they are the same. For idealistic and practical reasons, we must protect what we so absolutely depend upon.

In a sense, our planet is shrinking, and we can no longer take nature for granted. We must prepare for the worst and, in wonder at the miracle of Creation, be thankful for the good we get. If we are wise and lucky, it will be enough.

PREPARATION FOR TAKE-OFF

Let it be as simple
as the bird's dream of itself.

Think of something
that comes often as breath
and hold it between earth and distance.

Know that the breeze has traced
every pattern possible in heaven.

Do not remember that the fuselage
is fragile as your own ribs, that
its skin is stretched taut as a fear.

Raise your face to the quadrants
of cirrus. Loosen the scarf
of wind at your throat.

Close your eyes.
Raise the first foot.

Ruth Moritz

"...The backpacker-pilgrim's step-by-step, breath-by-breath walk up a trail carrying all on the back, is so ancient a set of gestures as to trigger perennial images and a profound sense of body-mind joy.

Not just backpackers, of course. The same happens to those who sail in the ocean, kayak rivers, tend a garden, even sit on a meditation cushion. The point is in making intimate contact with wild world, wild self. *Sacred* refers to that which helps take us out of our little selves into the larger self of the whole universe.

Inspiration, exaltation, insight do not end, however, when one steps outside the doors of the church. The wilderness as a temple is only a beginning. That is: one should not dwell in the specialness of the extraordinary experience, not leave the political world behind to be in a state of heightened insight. The best purpose of such studies and backpack hikes is to be able to come back into the present world to see all the land about us, agricultural, suburban, urban, as part of the same giant realm of processes and beings---never totally ruined, never completely unnatural."

--From "Good, Wild, Sacred" by Gary Snyder in *Meeting the Expectations of the Land*, edited by Wes Jackson, Wendell Berry and Bruce Colman, North Point Press, San Francisco, 1984. pg. 205.

Jennifer Delisle, Jake Vail and Karen Finley sit on ledge above Horse Thief Canyon.

Marketing The Land's Harvest

Brad Burritt

None of our experiences in the first season of The Land's Harvest have stuck in our minds as firmly as our marketing experience. This aspect of our project excited and frustrated us the most, and it is the one that will shape the project's future.

As the season finished with the last broccoli harvest, we had sold produce through three retail arrangements and wholesaled to a number of restaurants and supermarkets and even another produce stand. Our best single outlet was at the Salina Farmers' Market. Although there sometimes weren't as many customers as we would have liked, they nearly always patronized our stand well on Saturday morning, often buying a total of $300 worth of fresh, unsprayed produce. The slowest days saw us bring in only $100, but they were usually toward the end of the season when we didn't have too much to offer, anyway. Other hits at the Market besides the ever-popular corn and cantaloupe were five-pound heads of Chinese cabbage, fresh spinach, green beans, fresh and dried flowers, broccoli and watermelons. All who tried our watermelons (Yes, a hybrid variety--Burpee's Sweet Favorite) said they were absolutely the best they had ever eaten.

We also retailed at a stand in front of Vita Villa, a health food store in Salina. It worked well since we served many customers who didn't shop at the farmers' market, that is until something terrible happened--we ran out of sweet corn! After that, people were only interested in the stand long enough to hear the bad news. The last retail sales we made were directly to friends and members of the Prairieland Food Cooperative.

Wholesaling was important to us in moving surpluses of produce that we couldn't retail. Ashton's supermarket bought from us fairly consistently and proved to be a good outlet for melons, tomatoes and bell peppers. Produce managers at Dillons stores are hamstrung by a commitment to their central warehouse, so they rarely bought local produce from anyone. The rest of our wholesale produce went to restaurants which often paid better than supermarkets and proved to be very consistent buyers for melons, tomatoes, peppers and broccoli.

Looking back on the season, our difficulties and successes of developing retail ventures seem typical of small vegetable farmers I've heard or read about. First a bit of background on retail versus wholesale marketing: Retailing, on the one hand, supposedly requires more time and resources to sell each unit of produce than wholesaling, but compensates by bringing a higher return on each unit. And while the cost of selling each unit in a wholesale market should be lower, the return on each unit is lower and therefore more produce must be sold to realize an equivalent profit.

In our circumstances this season, we found that retailing actually cost less per unit sold, except when we were able to move large numbers of melons through just a few wholesale outlets. Another advantage of retailing was our ability to promote our produce as being very fresh, local and unsprayed. However, in dealings with wholesale contacts, we were unable to have our peppers and broccoli labeled as "local" when stores were running specials on the California-grown equivalents of these vegetables and didn't want to change labeling and risk confusing their customers. The produce manager of one of these stores seemed willing to carry our broccoli alongside that from his warehouse until he actually saw it. I am convinced that he reneged because our broccoli was so much better looking and he feared he could not sell the store's.

Beside allowing us to better promote our organic produce, retailing also enabled us to educate the community regarding other work of The Land Institute. Once we engaged people in a discussion of organic production techniques, it was then easy to offer some ideas about our work with perennial polycultures and about our views on sustainable agriculture in general.

Next year The Land's Harvest will most certainly be smaller and more integrated into The Land Institute's whole farming operation. We may sell to a few wholesale outlets, but mainly we will focus on retailing. Since our retail sales accounted for only about half of total revenues this year, we will need to be creative in expanding retail markets in the future. One idea we've had is to publish a newsletter for potential and known customers to let them know what will be available. Another idea is to open a stand on the property where we are growing the vegetables.

Sara Goering and Danielle Carre at Farmers' Market.

Albert Howard — His Ecological View of Agriculture

Jake Vail

> The soil is the one indestructible, immutable asset that the nation possesses. It is the one resource that cannot be exhausted, that cannot be used up.[1]

We wince when we read this today, and shake our heads when we learn that it was the official line of the U.S. Bureau of Soils at the start of the century. Young British agronomist Albert Howard was breeding wheat in India at that time, observing how crops grown on rich soils were less susceptible to disease than those grown on depleted soil. His groundbreaking (perhaps an inappropriate adjective) work taught us that soil is not an inexhaustible resource possessed by nations, but is an integral part of the natural systems upon which agriculture is dependent. Today, when the problems of groundwater contamination, soil erosion, salinization, aquifer depletion, and fossil fuel dependence motivate us to develop more sustainable farming systems, Albert Howard's words of fifty years ago speak as strongly as ever.

IF we can find them.

I first saw mention of Howard in Wendell Berry's *Unsettling of America: Culture and Agriculture*; it was another two years before I located one of his works, and little more has turned up since. Last spring part of *An Agricultural Testament* was included in our readings here at The Land Institute, and I've been inspired to explore further.

Albert Howard spent a lifetime studying soil and agriculture in the field, shunning classrooms and laboratories, preferring instead to think that "pests must be looked upon as Nature's professors of agriculture."[2] As a young adult he attended London University and Cambridge, where he had the good fortune to study under Marshall Ward. Ward had been an assistant to Thomas Huxley, botanist and author of the memorable words, "A specialty ought not be a door between the specialist and the rest of life, but rather a window through which to view the spectacle of life as a whole." True to his professor's dictum, Ward "had one of those uncompartmented minds that could roam over the whole field of plant life and touch every branch of it... with fingers of genius."[3]

Under such guidance Howard won honors in botany and plant diseases, then took a position as Mycologist and Lecturer in Agricultural Science for the Imperial Department of Agriculture for the West Indies, where he specialized in the diseases of sugar cane and cacao and became interested in tropical agriculture. But, uncomfortable as a self-described "laboratory hermit, a specialist of specialists, intent on learning more and more about less and less," he returned after three years to England.[4] He worked on breeding hops as botanist to South-Eastern Agricultural College at Wye, then in 1905 was appointed Imperial Economic Botanist to the Government of India and stationed at the Agricultural Research Institute at Pusa, near Calcutta. That same year he married Gabrielle Matthaei.

For nineteen years in Pusa the Howards worked together on wheat breeding, new crops, and new growing techniques. Said the *London Times* of their research, "Seldom... has there been a more fruitful collaboration between husband and wife."[5] The Howards' open-mindedness and penchant for hands-on field work served them well.

> It was because he was honest enough and humble-minded enough to note what the Bihar peasants were doing, what the Baluchistan tribes man grew and how they grew it... that all who cultivated the earth's surface, of whatever caliber or education or station, became his instructors; he was able to learn from all because he wanted to learn from all.[6]

He could later boast,

> By 1910 I had learnt how to grow healthy crops, practically free from disease, without the slightest help from mycologists, entomologists, bacteriologists, agricultural chemists, statisticians, clearing-houses of information, artificial manures, spraying machines, insecticides, fungicides, germicides, and all the other expensive paraphernalia of the modern Experimental Station.[7]

In part, this position was necessary, as the resources mentioned were largely unavailable, but as Howard insisted, "The discovery of things that matter is three-fourths of the battle."[8] A survey of papers written during the years at Pusa, often coauthored by his wife, reveals what mattered to Howard. There are 56 papers, covering subjects such as soil erosion, drainage, soil aeration, irrigation, cross-fertilization, clover and clover hay, leguminous crops in desert agriculture, the influence of the environment on milling and baking qualities of wheat, sugar, oilseeds, tobacco, packing and transport of fruit, the influence of soil factors on disease resistance, and post-graduate training in agriculture. He also wrote two books, *Wheat in India* and *Crop Production in India*.

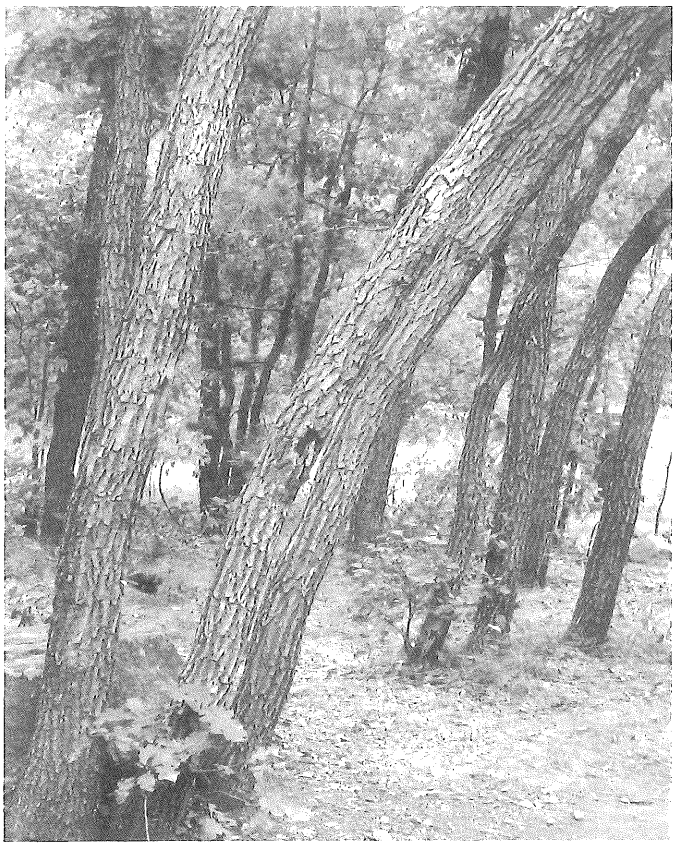
Perhaps even more relevant today than when written in 1924, the concluding section of *Crop Production in India* speaks of a passion second only to his fieldwork: methods of agricultural investigation and organization of research.

> The knowledge required by the investigator of crop-problems must obviously be considerable. On the scientific side, he must be well trained in all branches of botanical science, including morphology, anatomy, physiology, pathology, systematic botany, ecology, and genetics. In addition, he must have a sound knowledge of general science, in which chemistry and physics should be included. Such knowledge is essential because, in crop problems, it is not the plant alone that has to be studied but *the plant in relation to its environment*. [9](italics his).

As the institute at Pusa grew, Albert Howard again felt the stifling effects of bureaucracy, so in 1924 he transferred to the new Indore Institute of Plant Industry. There he was allotted 300 acres on which he was free to experiment as he wished. Right off he noticed the practice of using dried manure for fuel and the cost of this to the land. This inspired his work on the development of the Indore Method for the manufacture of humus from vegetable and animal wastes, which subsequently gained him worldwide recognition and the moniker, "the father of organic gardening."[10]

As he saw it, his seven years at Indore accomplished but two things: "The obsolete character of the present-day organization of agricultural research was demonstrated, and a practical method of manufacturing humus was devised." But there was surely more than that. His experiences fueled a fire which burned from his retirement in 1931 to his death in 1947, out of which came his two most popular books, *An Agricultural Testament (1940) and Soil and Health* (originally *Farming and Gardening for Health or Disease*, 1947). Much of *An Agricultural Testament* deals with his experiences at Indore, stressing the importance of soil fertility, presenting to the general public the Indore Method of composting, and setting forth his philosophy, illustrated in the following quotations.

> ---The maintenance of the fertility of the soil is the first condition of any permanent system of agriculture.
> ---Artificial manures lead inevitably to artificial nutrition, artificial food, and finally to artificial men and women.
> ---In the years to come chemical manures will be considered as one of the greatest follies of the industrial epoch.
> ---Sometimes it is heard that all this (composting) will cost too much. The answer is provided by the dust-bowls of North America. The soil must have its manurial rights or farming dies.
> ---(Humus) is an important section of the livestock of the farm. Although this livestock can only be seen under the microscope, it requires just as much thought and care as the pigs which can be seen with the naked eye.
> ---Instead of breaking the subject into fragments and studying agriculture in piecemeal fashion by the analytical methods of science, appropriate only to the discovery of new facts, we must adopt a synthetic approach and look at the wheel of life as one great subject and not as if it were a patchwork of unrelated things.[12]



Forest photo by Harry Mason, 1976.

An Agricultural Testament created hardly a ripple in agricultural scientific circles, but was received enthusiastically in others, directly leading to what is today a major voice in alternative agriculture, the Rodale Research Center. Said J.I. Rodale, "In the reading of *An Agricultural Testament*, I was affected so profoundly that I could not rest until I had purchased a farm."[13] Louis Bromfield, founder of Malabar Farm, was also moved by Sir Albert's (he was knighted in 1934) words. In his book, *Out of the Earth*, he voiced his concerns about the narrow focus of modern agricultural practices: "The whole elemental and cosmic world of fungi, molds, bacteria, worm and root actions in breaking down and making available to plants (and consequently to animals and people) the essential minerals and elements has been very largely neglected or wholly overlooked save by a few men like Sir Albert Howard."[14] Bromfield was a Friend of the Land (see page 26 to learn more about this

inspired group of stewards) and his writings in their periodical, *The Land*, helped spread Sir Albert's ideas even as the nation's attention was focused on World War II.

> With the new knowledge of biochemistry that grew out of the war, science began to shift from understanding the land to manipulating it with chemicals. *The Land* counterattacked by inviting Sir Albert Howard, the great English soil expert, to lead the charge against chemical fertilizers. However, the allure of chemicals for a deeply depleted land was overwhelming.[15]

Now Island Press has published *From The Land*, a book of excerpts from *The Land* edited by Nancy Pittman. The allure of chemicals has unfortunately diminished little, and the original Friends of the Land faded out some thirty years ago, but the words of Sir Albert Howard and others who wrote for *The Land* live on. At the dedication of our new greenhouse last March, a modern Friend of the Land (Institute) quoted Howard to remind us that "Nature is the supreme farmer."[16]

That message reiterated by Wendell Berry underlies the work of The Land Institute. When devising the Indore Method of composting, two models inspired Howard: ancient agriculture he read of in F.H. King's 1911 book, *Farmers of Forty Centuries: Permanent Agriculture in China, Korea, and Japan*; and Nature, as seen in the forest. As Sir Albert describes it:

> Mother earth never attempts to farm without livestock; she always raises mixed crops; great pains are taken to preserve the soil and to prevent erosion; the mixed vegetable and animal wastes are converted into humus; there is no waste; the processes of growth and the processes of decay balance one another; ample provision is made to maintain large reserves of fertility; the greatest care is taken to store the rainfall; both plants and animals are left to protect themselves against disease.[17]

As he wrote, Sir Albert saw around the world the development and proliferation of modern agricultural practices which "omitted phases of the life cycle." He never labeled it so, but he was urging a more sustainable agriculture.

Echoing Sir Albert, Wes Jackson now calls for a marriage of ecology and agriculture to continue these explorations into sustainability, but where Howard used as an analog the ecosystem most familiar to him--the forest--we at The Land Institute use the prairie of the Great Plains.

Accepting the proposition that agriculture operates within nature, and realizing along with Sir Albert, Wes, and others that nature's emphasis is on preserving potential and not on short term production, leads not only to new farming systems but to new ways of viewing the world. Said Henry Wallace in V.I., No. 1 of *The Land*:

> It is useless to single out any one set... --the farmers, the bankers, the land speculators, the agricultural teacher or scientist--and blame one group or all of them for what has happened. We have all had a hand in it. It becomes us all to approach with a certain humility the truly terrifying consequences and the changed pattern of farming and living now required. Soil despoilation, or damage to water sources, or the desecration of landscape by unsightly signs and structures, is not brought about by deliberate malice of social thugs. It is done with no thought of harm. We wound our country and threaten its future by thoughtless actions which are in part a response to needs, but more particularly the product of an inherited way of thinking--not thinking-- about the land.[18]

Sir Albert Howard concludes his last work, *Soil and Health*, as though he were addressing Wallace directly.

> Does mankind possess the understanding to grasp the possibilities which this simple truth unfolds? If it does and if it has the audacity and the courage to tread the new road, then civilization will take a step forward and the Solar Age will replace this era of rapacity which is already entering into its twilight.[19] ◁

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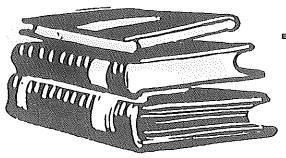
Books



If you are not acquainted with the offerings of Island Press, we encourage you to inspect its catalog, "Annual Environmental Sourcebook: 130 Books for Better Conservation and Management." One of its finest projects is a series of CONSERVATION CLASSICS. Except for *FROM THE LAND*, all are new editions of previously published books, books "when first published," says editor Nancy P. Pittman, "offered provocative alternatives which challenged established methods and patterns of development." The ideas and solutions proposed in these books are just as relevant and important today as when they were first written. The series includes:

BREAKING NEW GROUND by Gifford Pinchot, Introduction by George T. Frampton, Jr.;

PLOWMAN'S FOLLY and A SECOND LOOK by Edward H. Faulkner, Introduction by Paul Sears;

TREE CROPS: A PERMANENT AGRICULTURE by J. Russell Smith, Introduction by Wendell Berry;

GRASS PRODUCTIVITY by Andre Voisin, Introduction by Alan Savory;

DESERTS ON THE MARCH by Paul B. Sears, Introduction by Gus Speth;

FROM THE LAND, edited by Nancy P. Pittman, Introduction by Wes Jackson.

The introductions to these new editions have been written by "leaders of today's conservation movement" (with the exception of the remarkable Paul B. Sears, who was also a leader of yesterday's conservation movement).

Wes Jackson wrote the introduction to the collection of readings in *FROM THE LAND* with special enthusiasm. We reprint his introduction here by permission of Island Press. If anything needs to be added, it is that those copies of *The Land*, from which the content of the book was taken, have been a source of ideas and inspiration for this publication for twelve years, and we will be happy to have that heavy box of green magazines back in our possession at The Land Institute soon.

Introduction to *From the Land*

Wes Jackson

In the fall of 1976, when The Land Institute was just beginning, an old farmer from the area sold us his small but prized wind machine. He could not resist a visit to "see how the machine was doing," and as he surveyed our property, his eyes fell on the various projects being conducted by our college-age students. He asked if I knew about "that land magazine they used to put out." He seemed a bit surprised that I hadn't, and a few days later appeared with three or four issues of *THE LAND*, dating back to the early 1940s.

I read them immediately, almost without stopping, and became eager to read the other issues as well. When I contacted Kansas State University, the librarian informed me that they had thrown out their collection. Nearly a year later, a rare book dealer I had called here in Kansas informed me that he had located a nearly complete set that could be mine for around $150. I sent him a check immediately, and once they arrived, they became prized possessions. I read them all, almost cover to cover, and became much interested in that old organization, Friends of the Land, which had sponsored their publication.

This "society devoted to the conservation of soil, rain and man" had its beginnings at an improbable time, around 1940. Numerous wounds of the Depression were still open all around us. There was war in Europe and in the Pacific. It would appear that there was little time to be concerned with land use or land conservation. Family farms were being lost and rural communities were shrinking rapidly. In spite of these obstacles, Friends of the Land got underway with a passion and its membership grew.

A primary objective of the organization was to support the newly established Soil Conservation Service (SCS). Hugh Hammond Bennett, the founding chief of the SCS, was at the first meeting. Think of it! This was a peoples' organization to help the government conserve land, people, and community, uncynical in their belief in their ability to influence their government.

At the first organizational meeting, a farmer-banker from Missouri summarized in a dozen words why he had come: "If you get an absorption of water, you prevent erosion of soil." Stuart Chase reminded all that "we are creatures of the earth and so are part of all our prairies, mountains, rivers, and clouds. Unless we feel this dependence we may know all the calculus and all the Talmud, but we have not learned the first lesson of living on this earth."

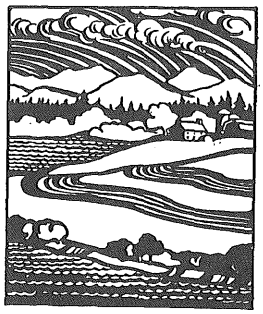
Kate and Russell Lord were the moving forces behind the publication of *THE LAND*. And they did something very unusual. At this first meeting, Paul Sears reported that "there were artists present." The Lords knew a valuable source when they saw it. Ranging from the artist to the farmer to the scientist, they solicited the finest in fiction, poetry, essays, illustrations, and anecdotes. Liberty Hyde Bailey, the great Cornell University scientist of many talents; Gifford Pinchot, first head of the Forest Service; "Ding" Darling, cartoonist for conserva-

tion; Aldo Leopold, author of the best land ethic statement ever written; and Louis Bromfield, the well-known author of *Malabar Farm*, were among the contributors. Contributions came from far, wide, and deep, for the leaders of the organization believed *THE LAND* should be written "from the ground up and not from Washington down." They stuck to that idea to the end.

Sadly, the end did come. In the mid-1950s, Friends of the Land merged with the Izaak Walton League and publication of *THE LAND* ceased. It may have been alive in the mind of the rural housewife who, on winter evenings with her children grown and gone to the city, might have pulled down an issue to read her only published poem and maybe an essay or two before turning out the light. It also may have remained alive in the minds of such old farmers as the one who sold us the wind machine, for he was a Jeffersonian at heart, although I doubt he ever used such language to describe himself. He sensed from just looking at our fledgling operation that we would be interested in those old issues. He had spotted an ally. He knew that the writers of *The Land*, like himself, were people with affection for the land, for their communities, for their country, and as you will see, for their world. They lived at a time in which their way of life was going and going fast, for this was the great transition period in agriculture, the "unsettling of America." All were not eloquent, but all were passionate. All were not accurate in their analyses of the various problems and solutions. But they all had given their hearts and their minds to the importance of good farming, good citizenship, and, I will say, right livelihood.

Ever since my initial immersion in *THE LAND*, when I have talked with older farmers or conservationists, I often have asked them if they knew of the magazine. Many did, and their eyes would light up as though they had recognized an old friend. And almost always, a sadness would fall across their faces as they juxtaposed the reality of the modern agricultural world with the hopes and aspirations that filled *THE LAND* for fifteen years or so.

For years, I have wanted to do something to rescue this fine old magazine from its undeserved oblivion. When the people at Island Press told me of their Conservation Classics series, I insisted that they consider an anthology of the best of *THE LAND*. They expressed interest, and on my next trip to Washington, D.C., I lugged the entire set with me. At the airline counter I refused to allow the heavy, well-packed box to be checked as luggage. At the offices of Island Press I made clear to the staff the care and attention I hoped these quarterlies would receive.



FRIENDS OF THE LAND

Our major libraries probably will continue to send complete sets of *THE LAND* to the shredder, since we seem unable to appreciate so much of our necessary and important past. But now at least we have a chance in this anthology, *FROM THE LAND*, to sample some of the best writing to come out of this most tragic era in the history of American agriculture. ◁

Address for Island Press Catalogue:
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Handbook on How to Make $100,000 Farming 25 Acres

By Booker T. Whatley and the editors of NEW FARM MAGAZINE
Published by the Regenerative Agriculture Association, Emmaus, Pennsylvania. $17.95

Reviewed by *Brad Burritt*

If he and his book hadn't caused such a stir, and if I weren't so interested in small farms, I probably wouldn't have picked up *Booker T. Whatley's Handbook on How to Make $100,000 Farming 25 Acres*. (It's actually co-edited by the editors of NEW FARM MAGAZINE.) But despite its shady title, this book is a wealth of practical ideas and information for anyone wanting to make a go of farming a diversified, ten to two hundred acre farm or anyone interested in the survival and future of these farms.

A retired black horticulturist, Whatley received his doctorate at Rutgers and spent many years breeding new vegetable varieties at Tuskegee Institute. Becoming dissatisfied with the USDA's and the land grants' lack of help to small farmers, he formulated his small farm plan and even embraced many organic growing techniques and philosophies.

The plan Whatley puts forth will supposedly work in any part of the country, but only as long as the would-be-successful farmer obeys "'the guru's 10 commandments" and sets up a farm that shalt:

1. provide year-round, daily cash flow,
2. be a pick-your-own operation,
3. have a guaranteed market with a clientele membership club,
4. provide year-round, full-time employment,
5. be located on a hard-surfaced road within a radius of 40 miles of a population center of at least 50,000, with well-drained soil and an excellent source of water,
6. produce only what thy clients demand--and nothing else!
7. shun middlemen and middlewomen like the plague, for they are a curse unto thee,
8. consist of compatible, complementary crop

components that earn a minimum of $3,000 per acre annually,
9. be 'weatherproof', at least as far as is possible, with both drip and sprinkler irrigation.
10. be covered by a minimum of $250,000 worth ($1 million is better) of liability insurance.

While most of these rules are straight forward, the one requiring the formation of a clientele membership club (CMC) meeds more explanation. The CMC is a group of customers recruited by the farmer, and the members pay an annual fee (usually around $25) for the privilege of harvesting their own produce at about 60% of retail supermarket prices. While this arrangement can guarantee a market, it also requires the farmer to sell the farm as an "experience" to keep the clients subscribing year after year. The farmer must also be personable and sell himself or herself, preferably as a version of Old McDonald. The CMC concept is the heart of Whatley's philosophy. It limits the applicability of his plan, yet offers an opportunity for the right type of farmer with the right type of farm in the right place.

As one might guess, this book recommends adding value to any possible product, working with unique crops and using unusual advertizing angles and gimmicks. Examples of adding value are squeezing cider from apples, spinning yarn from wool and making cheese from goats milk. Elk for hunting, watercress from a spring and pecans custom-shaken from clients' own rented trees are some novel crops mentioned. Wood, another novel crop, already grows on many farms, but usually it isn't utilized for profit. And it can be very profitable. Some big furniture-grade hardwood trees can bring over $1000 apiece. Farmers can often get top dollars for very ordinary crops by promoting them with creative advertising, such as luring people onto an apple farm by tethering a thirteen foot high apple-shaped balloon high over an orchard.

Importantly, this book also stresses the promotion of contamination-free produce. The term "contamination- free" in Whatley's usage means food grown with few or no pesticides or growth hormones in the case of livestock.

Once the reader gets the drift of Whatley's CMC idea and peruses the pages of novel crop and marketing suggestions (many of which are just reprinted from NEW FARM), there is still some good information concerning the more practical matters of running a small diversified farm. One chapter gives advice on what equipment a farmer might need and how to get it. One author tells how he made good deals shopping at auctions and relates that while auction prices are now much lower than a few years ago, the equipment is in worse shape due to the owners' financial predicaments that led to the sales. Other chapters describe alternatives to pesticides in weed, insect and disease control; and appendices tell where to get New Zealand-style fencing, seeds, berry plants, and fruit and nut trees.

As Whatley himself admits, few farms have been set up which closely follow his plan. And he doesn't know if any of these farms' sales approach the $100,000 figure touted in the title. But these things don't matter, says Whatley, because he is promoting a concept and not a rigid plan. If farmers aren't picking through his ideas and incorporating them as they see fit, he says, they won't be creative enough to benefit from his ideas anyway.

The farm described in the last chapter follows Whatley's plan all too closely. It is "the ultimate small farm" set up near Ann Arbor, Michigan, by Thomas Monahagn, Domino's Pizza tycoon and owner of the Detroit Tigers. Complete with a statue of Whatley at the entrance, the model farm is dedicated to saving 100,000 small farms by the year 2000, but after reading about it, I think it will probably only line Monahagn's (and perhaps Whatley's) pockets. I only recommend reading this chapter to see how an absurd project sprang from an otherwise good idea.

I think Whatley's book has much to contribute to developing sustainability in American agriculture and to the availability of healthy food. While many conventional obstructions to sustainability are manifested on a Whatley-style farm, such as a heavy dependence on tractor power, this type of farm employs sustainability-increasing practices like crop rotation and livestock integration. And though he never mentions draft animals except for hayrides, a Whatley-style farm would lend itself well to draft animal power, except the relatively small acreages might not be able to support draft animals and the high value crops. These farms can also increase the sustainability of cities (assuming they should be sustained) by clustering around them and shortening the distance produce must travel to reach consumers. Finally, if food prices rise due to expensive oil, ecological limitations or increased demand, pick-your-own farms far from population centers may flourish in their turn, too. ◁

Remembering: A Novel

North Point Press, San Francisco, 1988

By Wendell Berry

Reviewed by *Beth Gibans*

In his latest novel, Wendell Berry takes us back to Port William, Kentucky, and reminds us of the things worth remembering--the people, places, and values that provide the fabric for his characters' lives and an example for our own. Berry gives an eloquent account of Andy Catlett's bout with the middle-aged blues. And it is exactly because Andy has something to remember--a rich history of family, community, and a treasured relationship to the land--that he is able to pull himself out of his depression and seek the present and future with a renewed vigor.

Andy, the son of Bess and Wheeler Catlett, lives on a farm in Port William with his wife, Flora, and his two children. He has recently lost his hand in a harvesting accident. Blaming himself for the injury, he is self-absorbed and self-pitying, hurting others to protect his hurt. "At the edge of his anger at everything else was always his anger at himself. He was ashamed of himself. He had betrayed his hand." Conscious of his desperate state, he is still unable to change his behavior. He can only show his love for his family through his anger.

We are introduced to Andy while he is in San Francisco,after having attended a conference on "The Future of the American Food System" in the Midwest. We follow Andy's thoughts through his wandering and daydreaming along the streets of San Francisco. His reflections take us back through several generations of ancestors in Port William and up to the day before his latest argument with Flora.

Andy recalls how irritable and disagreeable he has been with his family, especially Flora. The content of his and Flora's arguments has changed since his accident. Before, their quarrels "... were about duality: they were two longing to be one, or one dividing relentlessly into two. " But now they quarrel exhaustingly, Andy doing all he can to "keep his anger and his distrust, the real subjects of the quarrel, in the dark or in disguise." Andy resents and mistrusts Flora because she is so capable of reading him and seeing the truth.

> "Do you know what you need?" she said to him one day... "Forgiveness. And I want to forgive you. All of us do. And you need more than ours. But you must forgive yourself."

He knew she told the truth and it made him furious.

We see Flora as a strong, patient and understanding character, implicitly a fortress in the family and in Andy's personal life.

Yet it is less Flora's strength of character than the recollection of his ancestors and his childhood that moves Andy. He recounts the initiation of his grandfather's long friendship with Elton Penn, his family's good friend and neighbor, and his grandparents' eleven year courtship. He remembers the collective work days, when family and neighbors would pitch in to help in the fields. He recalls the moments of complete satisfaction and pride derived from good work and good friends, and he savors these memories. Andy contemplates the importance of choice in his making and feels an obligation to honor that choosing by actively living out the expectations and traditions passed on to him. "That he is who he is and no one else is the result of a long choosing, chosen and chosen again."

And it is this choosing and membership, a recurrent theme in Berry's works, that instills meaning and urgency into his life. In his journey back to home and life,

> ... He makes his way among them in the hold of a direction now, stepping, alone and among strangers, in the first steps of a long journey, that, by nightfall, will bring him back where he cannot step but where he has stepped before, where people of his lineage and history have stepped for a hundred and seventy-five years or more in an indecipherable pattern of entrances, minds into minds, minds into place, places into minds: the worn and wasted, sorrowsalted ground, familiar to him as if both known and dreamed, that owns him in a membership that he did not make, but has chosen, and that is death and life and hope to him. He is hurrying."

He hurries with the same vigor that drove him to commit himself to preserving the integrity of traditional agriculture. He recalls how on an assignment as a journalist for *Scientific Farming*, he was supposed to profile a large-scale modern corn farmer, who was more an ulcer-ridden businessman than a steward of the land. Andy is more impressed by an Amish farmer, Isaac Troyer, whom he encounters incidentally, than by the agribusinessman counterpart. In his visit to Isaac's farm, he is reminded of his father and the farming community in Port William. This memory compels him to argue with his boss to feature Isaac Troyer as a model farmer.

> He was arguing his father's argument. He was arguing for the cattle coming to the spring in the cool of the day, for the man with his hand on his boy's shoulder, saying, "Look. See what it is. Always remember." He was arguing for his grandparents, for the Coulters and the Penns and the Rowanberrys. And now he had seen that hope and dream again in Isaac Troyer and his people, who had understood it better and longer, and had gauged the threat to it more accurately, than anybody in Port William.

Andy's remembering brings about his rededication to all that he holds dear. The reader expects this rededication and when it happens feels that it's about time Andy snapped out of it and now can get on with life. I found myself trying to sympathize with Andy, to be understanding of his situation, but eventually aligned with Flora, whom I didn't learn much about but would have liked to.

Remembering, in spite of an obvious story line, is a graceful reminder not to forget what really matters. ◁

The Chalice and the Blade:
Our History, Our Future

by Riane Eisler

Harper & Row, San Francisco, 1988
paperback, $9.95

Reviewed by *Dana Jackson*

Riane Eisler was a child in Austria during Hitler's takeover and fled with her parents, first to Cuba, then to the United States. This early experience left her with questions such as: "Why is our world so full of man's infamous inhumanity to man--and to woman? How can human beings be so brutal to their own kind? What is it that chronically tilts us toward cruelty rather than kindness, toward war rather than peace, toward destruction rather than actualization?"

The Chalice and the Blade is her ambitious answer to these questions. Riane Eisler weaves together evidence from art, archaeology, religion, social science, and history into a new story of our cultural origins. Humans have not always been at war, and there has not always been a "battle of the sexes." Evidence of peaceful cultures, unrecognized until recently, gives us hope that a better future is possible. She calls these early cultures "partnership societies."

The opposite of a partnership society is a dominator society, popularly called a patriarchy or matriarchy and characterized by ranking one sex over the other. In a partnership society, social relations are based on linking, and diversity is equated with neither inferiority nor superiority.

The author's theory is that partnership cultures, "worshipping the life-generating and nurturing powers of the universe--symbolized by the ancient chalice or grail--" existed in the prehistory of Western civilization. They were conquered by invaders from peripheral areas of the globe who worshiped "the lethal power of the blade, the power to take rather than give life." There followed a major shift in the direction of our cultural evolution, away from social relationships based on partnership and into patterns of domination.

The blade has been a male symbol because men have fought wars. Nuclear missiles, which threaten to put an end to our culture, are blades. But, as Eisler points out, "The underlying problem is not men as a sex. The root of the problem lies in a social system in which the power of the Blade is idealized--in which both men and women are taught to equate true masculinity with violence and dominance and to see men who do not conform to this ideal as "too soft" or "effeminate."

But Riane Eisler insists that there was a time when the Blade did not define masculinity. Her evidence makes fascinating reading.

She points out that in the study of anthropology, the interpretation of art and artifacts has always been colored by the assumptions of the investigators. They looked for male-dominated, hunter-warrior societies--and found them. For example, in the Paleolithic caves there were stick and line forms painted on the walls and engraved in bone or stone objects. Scholars assumed them to be weapons: arrows, barbs or spears. But these "weapons" were not hitting their targets in the drawings! Under closer scrutiny, they decided the "masculine objects" were actually representations of trees, branches, or plants. Realizing that Paleolithic art was not just an illustration of males engaged in hunting, scholars began to find life-giving symbols associated with females in central positions of excavated chambers.

After World War II, archaeologist James Mellaart of the British Institute of Archaeology directed the excavation of two neolithic sites, Catal Huyuk and Hacilar (inhabited from 5700 to 5000 B.C.E.) in Turkey. Here female symbols similar to those in the Paleolithic caves, as well as goddess figurines and shrines, were found everywhere. Neolithic sites spanning a wide geographical area revealed more evidence of goddess worship. With radiocarbon dating, scholars have agreed that the first signs of the agricultural revolution began about 9000 to 8000 B.C.E.. and it was firmly established by around 6000 B.C.E. The arts and crafts of these early agricultural societies did not idealize armed might in the form of "noble warriors." Instead, symbols of nature (serpents, butterflies, fish, birds, flowing waters) were connected with the worship of the giver of life, the great goddess.

So--the social arrangement was a matriarchy? No.

Then it must have been a patriarchy with fertility cults? No.

Riane Eisler maintains that the archaeological data suggest remarkably equalitarian societies. Neither men nor women were suppressed and subordinated. Though the feminine principle seems to be primary, male imagery can be found in Neolithic art. Linking rather than ranking seems to have been important.

The story of civilization on the island of Crete beginning about 6000 B.C.E. is Eisler's strongest evidence for partnership societies.

Nicolas Platon, who in 1980 had been excavating the ancient civilization for fifty years, found the remains of a technologically advanced and socially complex society with an exceptional artistic tradition. As Platon puts it, this was a society in which "the whole of life was pervaded by an ardent faith in the goddess Nature, the source of all creation and harmony." The island's economy was basically agrarian, but shipping and trade on the Mediterranean is evident. Though there was a ruling class, the standard of living of peasants seems to have been fairly high. There were extensive public works: drainage systems, viaducts, paved roads, roadside shelters, water pipes, and fountains.

The author does not claim that Crete was a utopia. She admits that weapons existed, but in contrast to other civilizations, Cretan art does not idealize violence or warfare. The goddess's symbol, a double axe, was shaped like the hoe axes used to clear land for the planting of crops. It was also a stylization of the butterfly, a symbol of transformation and rebirth.

So what happened to these peaceful, partnership societies? First, natural catastrophes such as earthquakes and volcanoes on the island of Crete contributed to their decline. More important, nomadic bands on the fringes of human-inhabited territories, aided by the application of metallurgy in weapon-making, began to invade the agrarian societies about 5000 B.C.E. These "Kurgan" people swarmed down on the continent from the Asiatic and European northeast with their male gods of war and conquered the agrarian societies. In another region, nomadic invaders called Hebrews, historically a warring people ruled by a caste of warrior priests and worshiping an angry god of war and mountains, also invaded Canaan. The Kurgans and Hebrews had in common a dominator model of social organization, "a social system in which male dominance, male violence, and a generally hierarchic and authoritarian social structure was the norm."

Remnants of goddess worship survived as folk practices within the growing male-dominant cultures, but priests and armies kept them suppressed. The author describes the rerouting of western culture right up to our century, guided particularly by the Hebrew tradition. She is careful to acknowledge that the Bible contains important ethical precepts and spiritual truths, but concludes, "Nonetheless, interlaced with what is humane and uplifting, much of what we find in the Judeo-Christian Bible is a network of myths and laws designed to impose, maintain, and perpetuate a dominator system of social and economical organization." Men dominated women; fathers and husbands held women and children as property.

The Biblical passages cited as illustrations are shocking. In the Book of Judges, chapter 19, a father offers his virgin daughter and his guest's concubine to a drunken mob rather than turn over to them his male guest whom they seek for some grievance. The guest gave them his concubine "and they knew her and abused her all night." Then she crawled back to the threshold of the house in the morning and died, and the man loaded her body on his ass and went home. This kind of rape and violence was accepted.

The teachings of Jesus challenged the Jewish dominator system. Jesus openly included women among his companions. He would not condone the customary stoning to death of women who were accused of adultery. Jesus taught values generally considered feminine: gentleness, compassion, "turning the other cheek," and loving our neighbors (even our enemies). His teachings were "gylanic" (*gy from gyne*--Greek word for woman, and *an from andros*--Greek word for man) and they threatened the hierarchy of priests.

By following the teachings of Jesus, Western civilization might have moved toward the partnership model of social organization, but the "androcratic" (refers to social system being ruled by male force or threat of force) influences of the Roman Empire and the Jewish tradition were too strong. Though there is evidence that women followers of Jesus played an important role in the very early Christian church, by the end of the second century, such writings as the letter of Timothy, "Let a woman learn in silence with all submissiveness. I permit no woman to teach or have authority over men," expressed the reality of Christianity. By the middle ages, the Christian Church went beyond subordinating and silencing women to burning them at the stake for being witches. In the 20th century, the Roman Catholic Church and several Protestant sects still deny women the right to administer church bodies or teach or celebrate central rites, save in very special or circumscribed situations.

The Age of Reason, the enlightenment, might have brought about a cultural transformation that ended the violence and control of one half of humanity over the other. But "rational" man continued in the nineteenth and twentieth centuries to oppress and exploit his fellow humans. In the exercise of his power, he began to desecrate and destroy the planet. The author maintains that it is not human nature that now drives us toward ecological disaster or nuclear suicide, but a dominator model of society in an age of high technology.

The Chalice and the Blade challenges us to continue the unfinished cultural transformation of the enlightenment, because if we do not abandon the androcratic system, our global environmental and social problems, fueled by human population growth, cannot be solved.

Once that is said, the author cannot leave the reader in despair. Riane Eisler devotes the last chapter to illustrating what readers want to believe, that women and men all over the world are now challenging the male-dominator/female-dominated human relations model, that they are questioning the basic assumption that both male dominance and the male violence of warfare are inevitable. Transformation is possible.

The author describes shifts in thinking that are hopeful, from the new perspectives of the human psyche, to new science and spirituality to new politics and economics, drawing especially on the writings of futurists. In her description of what the transformation to a partnership society would be like, the dreams of the feminist, peace, ecology, and human potential movements all come together. Eisler knows the vision is sketchy and announces that she will explore the transformation in depth in two future books.

Among books exploring the conflict between male and female culture, this one stands out because it does not provoke blame and anger. It does promote dramatic change in our social structure which is sure to be unsettling to many men and women. And replacing domination with partnership makes such simple good sense that people are bound to ignore it. ◁

Last summer, Dr. Lee Altenberg of the Zoology Department at Duke University wrote us about the Rumanian industrialization nightmare and sent the photocopy of Rumanian currency his brother had brought back from Rumania in 1985. He suggested that we research a story abut what is going on there for THE LAND REPORT. Since Gabriel Hegyes' roots are in Hungary, I asked him to do this story. He found, as Lee suggested, the absolute antithesis of what The Land Institute has advocated in rural development.

--The Editor

Rumania's Socialist Utopia

Gabriel Hegyes

Since 1981, fifty thousand Rumanians have relocated in Hungary. Twelve thousand refugees, mainly ethnic Hungarians from Transylvania, fled to their ancestral homeland in 1988 alone. Along with their meager belongings came accounts of conditions reminiscent of wartime: food shortages, power blackouts and forced relocations.

On June 28, 1988 the largest unofficial civilian gathering since the 1956 October uprising marched on the Rumanian Embassy in Budapest, Hungary, according to a June 29 dispatch by Reuters New Service. Participants openly displayed placards reading "Adolf Ceausescu" and "Europe without dictators." A smaller demonstration was reported in February. The Hungarian press reported similar expressions of support in Prague and Warsaw.

Rumania ignited this surprisingly public controversy among Warsaw Pact members when it announced that more than half of its thirteen thousand villages were to be torn down, and the uprooted populations concentrated into five hundred, concrete block "agro-industrial complexes." Although some consolidation has been occurring since 1978, this latest pronouncement raised fears that the razing of villages would soon accelerate. According to THE TIMES of London on June 28, President Ceausescu declared: "The number of villages must be halved...Those that remain must become the focus of new building programs...By 1995 all future agricultural and industrial centres targeted will be complete."

Hungarians impute nativist motives. Budapest announced that it had formally complained to Rumania about this plan, calling it "an unjustified measure" designed to dilute the culture of the large ethnic Hungarian minority living mainly in Transylvania (Hungarian territory before the First World War). The June 29 NEW YORK TIMES reported that Hungarian Playwright Istvan Csurka accused President Ceausescu of "cultural genocide." "We don't want Rumania back," he told journalists. "We just want human rights for minorities in Rumania."

Western diplomats agree with charges that the mass relocation of villagers would dilute the cultural identity of the estimated two and a half million Hungarians, the five hundred thousand ethnic Germans, as well as Saxons, Slavs and Serbs in Rumania. Villages in Transylvania have historically been distinctly ethnic in character. Hungarians fear that consolidating the population will further diminish the number of schools and classes using the Hungarian language.

MAGYAR IFJUSAG, the newspaper of Hungary's Communist Party youth organization, accused Rumania of threatening to dilute the Hungarian heritage. According to the NEW YORK TIMES of May 29, it decried the expected loss of "the native villages of grandparents, the monuments, the cemeteries where tombstones speak the ancestral language, the churches, where psalms are sung in the Hungarian language." THE TIMES, of London in a June 29, 1988 editorial entitled "Rumanian Horror Stories" (an allusion to Hollywood's stereotype of Transylvania as the home of vampires and werewolves) writes that there is reason to believe that the mass destruction of Hungarian cultural artifacts will happen, given President Ceausescu's past performance: much of historic central Bucharest was demolished in order to make way for a grand avenue for mass rallies.

The consolidation plan is considered a human rights issue in the United States as well. In February Rumania renounced most favored nation status with the U.S. rather than submit to human rights demands from the State Department that included protecting the rights of minorities. The NEW YORK TIMES, in a July 2 editorial, deplored the relocation plan.

Mr. Ceausescu's regime is an ecological renegade as well. Rumania is currently draining the Danube delta to make way for one of the agro-industrial complexes. According to Radio Free Europe, this alluvial region has marginal agricultural value, but Alex Hittle writes in the September issue of NOT MAN APART that it provides "Europe's largest reserve for rare plants, fish and birds."

One need not study the illustration of Rumanian currency reproduced here very long to imagine the real-life horror show of Rumania's socialist utopia.

Eastern Europe already has a woeful environmental record. According to the Friends of the Earth publication, NOT MAN APART, September 1988, only one percent of the surface water in Poland is safe to drink. Forty-nine percent may be unfit even for industrial use. A study conducted by the Czechoslovakian Academy of Sciences estimates acid rain damage to their forests at $1.5 billion. The magnitude of the problem has further strained international relations in the region. Yugoslavia, Bulgaria and Hungary have complained about the pollution of the Danube River by Rumanian factories. The River Tisza, Hungary's second important waterway (which flows

through the hometown of the author's mother), has also been fouled by Rumanian industry.

Warsaw Pact countries consume twice as much energy as the West to produce a dollar's worth of output, Hittle points out in NOT MAN APART. When the oil crisis hit in 1973, the region was largly insulated from the price shocks. Domestic coal and Soviet oil supplied most of their needs. This stable supply did not force them to consider efficiency the way the West did. Eastern Europe's command economies set prices independent from cartel-distorted market forces.

Much of this region's economic activity still centers around the traditional "rust belt" industries like coal, steel, chemicals and shipbuilding. Heavy debt to the West discourages these countries from investing in controlling emisions from these heavy polluting industries. The over reliance on high-sulphur brown coal to power power plants, factories and homes numbers East Germany, Czechoslovakia and Poland among the top twelve countries emitting sulphur dioxide. Dying forests stand beside dissolving monuments as testaments to the depradations of acid rain by more than one Warsaw Pact member.

High-tech and service industries are increasingly important in the West. The Eastern Bloc's well known inability to compete in those areas makes it even more difficult for Eastern Bloc countries to move out of their smokestack economies.

Rumania under Ceausecu remains a traditional, centrally-planned economy with the Stalinist fascination with central control and bigness. Neither the political experimentation underway in the Soviet Union, nor the free market dabblings for which Hungary is known, are likely as long as Nicolae Ceausescu remains in power.

The Rumanian plan to concentrate its rural population follows a decade-long record of domestic deprivation and oppression. Like most other countries of the Eastern bloc and Third World, Rumania borrowed heavily during the easy credit era of the 1970's. With borrowings in hand, Bucharest launched a drive to rapidly industrialize the traditionally agricultural economy. In 1968 alone, two hundred new industrial parks were built, according to the February issue of WORLD PRESS REVIEW. Refinery capacity was expanded beyond the needs for Rumanian production.

This push for economic independence and international autonomy sacrificed agricultural production. People needed previously in the fields were found working in factories instead. The diversion of labor and capital from agriculture shrank the food producing capacity of the nation.

Politically-induced industrialization fared badly, however. Rumanian exports competed poorly in the markets where they were introduced. Domestic oilfields could not meet demands; dependence on imported Soviet crude tripled. A two billion dollar canal built to shorten the shipping distance from the Danube River to the Black Sea was rarely used.

In 1981, the Ceausescu government decided that the eighteen billion dollars owed to Western creditors was an intolerable barrier to economic progress. By limiting imports, restricting energy use and increasing food exports, the regime cut that debt in half by the end of 1986. On August 22, MACLEANSs reported that Rumania stopped buying from abroad, started selling anything overseas it could to earn hard currency and arrived in this enviable position in just five years.

To repay the West by 1990, severe austerity measures were imposed to reduce the petroleum imported and increase the amount of agricultural products exported. Indoor temperatures may not exceed fifty-four degrees Fahrenheit (fifteen degrees Celcius). Reports trickling out of the country include newborn babies dying from the cold in hospital incubators. Lighting is limited to a forty watt bulb per room; no other electrical appliances are permitted. Communities that exceed their energy quotas are cut off for hours without warning. Three quarts of milk, eleven

Photocopy of Rumanian currency depicting socialist utopia.

The assumptions of concentration, standardization and centralization that have underpinned the industrial age control the thoughts and institutions of East and West alike.

ounces of butter, nine eggs and three pounds of chicken per month are rationed per person so that massive exports of food can continue.

And now Rumanians are being uprooted and concentrated into "modern" complexes to increase the output necessary to satisfy the timetable of conscientious debtors in Bucharest. These demands on the population have moved even the International Monetary Fund to ask that the regime relax its payment schedule.

Despite what is traditionally perceived as a completely different system, American agriculture in the industrial age has produced impacts upon rural society and the environment disconcertingly similar to the hardships described above. American farmers are certainly aware of these consequences of industrialization. Centrally-developed agricultural policies encouraged farmers to incur withering debt loads to gear up for anticipated, and long term, foreign demand. Land and production capacity concentrated into fewer hands than ever.

The rural Great Plains has been losing schools, churches, and businesses for decades, due in part to the "bigger is better" mentality of agricultural policy makers. The farming practices that looted top soil and poisoned groundwater were increasingly encouraged by production-oriented farm programs. The bust of the 1980's accelerated these trends as lenders demanded to be paid. People have had to move to larger towns in order to find work. Locally owned businesses are by-passed as customers shop in commerce and service centers. Whether a state promotes these "satellite communities" or a regime imposes agroindustrial complexes, the consequence is an involuntary relocation based on the necessities of a centrally-determined economic vision. If by auction in Republic, Kansas, or with bulldozers in Turda, Rumania, the grief of losing the place where one's history lies is the same.

The assumptions of concentration, standardization and centralization that have underpinned the industrial age control the thoughts and institutions of East and West alike. The measures of wealth, success and power loot life and land. Their institutions reflect the same faith in central control and coercion.

Too often the villainy of the extractive economy is attributed to capitalism. If anything, the last fifteen years have shown that market forces, although often distorted or sidetracked, can adjust to new circumstances more quickly than a centrally-controlled one. The

The industrial West may have a long way to go in establishing ecological sanity as a way of life, but Eastern Europe may never find the road.

industrial West may have a long way to go in establishing ecological sanity as a way of life, but Eastern Europe may never find the road.

The culture of pollution and destruction is made possible by the whole-scale acceptance of the assumptions of industrialism. Whether market-driven or centrally controlled, the forces of the industrial age give humanity, in most of the world, license to deplete finite resources at rates that will leave the future bereft. Maximizing present value provides the excuse to send our bill for cleaning up our messes to posterity. The authority of economic "realities" appeals for the extinction of history and culture in the name of progress. ◁

International Conference on Sustainable Development

About 150 people, many of them environmentalists from over 100 non-government organizations (NGOs) on five continents (including Wes Jackson of The Land Institute), attended a conference in Tabarka, Tunisia, from Novermber 29 to December 2, 1988. The conference, "Our Common Future -- Making it Happen," was organized by the Nairobi-based Environment Liaison Centre International and the Tunisian for the Protection of the Environment.

The meeting was built upon the international interest generated by *Our Common Future*, a report issued by the United Nations World Commission on Environment and Development. This report popularized "sustainable development," the concept that economic development must not degrade the long term stability of natural systems. The purpose of the conference was to identify ways in which the NGOs could best pursue the goal of sustainable development -- to help "make it happen."

Though hardly discussed in the United States, the U. N. report, often referred to as the the Brundtland Report (after the chair of the U.N. Commission, Gro Harlem Bruntland, the Prime Minister of Norway) has been widely read and discussed in nations of Europe, Asia and Africa.

The report has highlighted a new understanding of the word, "environment." As Barbara Eros from Canada put it: "There are no environment and development problems; there are only political and economic problems." Therefore, discussions over the four days concentrated on human and civil rights. For instance, it was agreed in a workshop on women's issues that legal impediments barring women from full access to resources must be abolished or truly sustainable development would be impossible.

Participants in a food security workshop agreed that the Green Revolution must be challenged in light of its economic, social, health and environmental costs. They wrote, "Agricultural systems should begin with traditional practical knowledge of the peasants, onto which any new advances should be grafted if necessary."

Conservation and Society

Dana Jackson

The specter of "big government" telling farmers how to farm--regulating farming practices as it regulates factory processes--haunts agriculture today. Fears of farmers that they could be supervised by the Environmental Protection Agency are fueled by rhetoric of agribusiness interests and large farm organizations. Those who profit from the sales of agricultural chemicals are worried that regulations or low-input farming methods will lower their profits. But fears are also spread from other surprising sources. In the last year I have heard soil district conservationists (SCS employees) on the defensive about the conservation compliance section of the 1985 farm bill. They carefully explained to farmers that it is the fault of environmentalists and the big city congressmen who passed the Food Security Act of 1985, not the Soil Conservation Service, that farmers must significantly decrease soil erosion on designated land in order to receive government crop subsidies. Also, in a meeting of the Soil and Water Conservation District Commissioners of the State of Iowa in Des Moines, which I attended as a speaker, I heard the President-elect of the national organization of district commissioners describe "the environmentalists in Washington" as enemies of farmers. To this assemblage of people who are dedicated to saving the soil of Iowa (they are elected and serve without pay), he described leaders in national environmental organizations as demagogues who won't be happy until big government controls everything farmers do.

Fortunately, there are a lot of farmers who are trying to understand the environmentalist point of view. The environmentalists, in turn, realize more sympathetically the economic problems of farmers. There is a potential now for cooperation which can be developed into a partnership of farmers and environmentalists in the drafting of the 1990 Farm Bill.

An important factor influencing the rapprochement between environmentalists and farmers is the fact of a new and powerful public interest in agriculture. There is an obvious increase in attention paid to farming practices by various segments of the public. No longer are fishermen and hunters and wilderness advocates the only citizen groups concerned about the environmental impacts of modern agriculture. There has been widespread discussion about "sustainable agriculture" among groups involved in saving the family farm and promoting economic development of rural communities. The National League of Women Voters expressed support for sustainable agriculture in their consensus on agriculture in a 1988 national study. Church groups in many denominations are discussing sustainable agriculture in relation to land stewardship.

Publicity about the high rates of soil loss in the early 1970s led to a renewed interest in soil conservation. More discussion about the extensive use of chemicals in agriculture created a wary public. Consumers are concerned about the safety of the food they buy, especially after a public health scare such as the one involving watermelons contaminated with the pesticide Temik. Elected city and county officials worry about public drinking water being unsafe as evidence of agricultural chemicals is increasingly found in ground water.

Public attention to the external costs (both environmental and social) associated with modern farming practices began to be expressed in the late 1960s and early 1970s through the activism of a variety of groups. William P. Browne in his book, *Private Interests, Public Policy and American Agriculture*, analyzes all the groups and organizations influencing the making of agricultural policy. In addition to describing producer lobbies, establishment farm organizations, and the agrarian protest groups, he outlines the emergence of what he calls the "Ex/Al" Lobby.[1] It actually began with the wilderness groups such as Sierra Club (founded 1892), National Audubon Society (1905), Nature Conservancy (1917) and National Wildlife Society (1936). Now it includes private groups organized in the 60's and 70's to promote awareness of agriculture's externalities (the unintended side effects of a wide variety of agricultural policies on rural communities and the environment) and groups promoting alternatives to public programs and agricultural activities. Some of these groups organized around issues of rural poverty and hunger. The Tax Reform Act of 1976 expanded permissible lobbying activities of non-profit organizations and this increased their visibility.

Browne says that despite the cooperation among members of the Ex/al lobby, "it functions like the other agricultural lobby, as a set of often vaguely related but heterogeneous interests."[2] Though this is true on the surface, I think the underlying commonalities are stronger than Browne recognizes. There is a conscious effort to draw connections, to understand how social, political, economic and environmental problems are all inter-related and affected by an ever increasing centralization in agriculture.

In the last decade, many of the issues the Ex/al groups address have gained broad legitimacy in national politics. But as Browne points out, the Ex/al groups can only promote their reform proposals when conditions ("policy windows") make them politically acceptable. The conservation provisions of the Food Security Act of 1985 fit into just such a window, which was primarily the

opportunity to cut subsidy costs by taking land out of production. (1) The conservation reserve program takes highly erodible land out of production and pays farmers to plant it to grass or trees and keep it that way for ten years. (2) The sodbuster and swampbuster provisions disqualified producers from participating in the farm program if they converted grassland or swamps to crop land after 1985. (3) The conservation compliance section required conservation plans for erodible land to be completed by January 1990 and implemented fully by January 1995 as a requirement for participation in farm programs.

The Ex/al lobby influenced another important piece of legislation passed as part of the 1985 Farm Bill, the Agricultural Productivity Act. Congress finally implemented this act by appropriating $3 million dollars for research on "low-input farming" in 1988, and $4.45 million in 1989. These funds represent the first tiny step towards the development of sustainable agriculture, tiny because the $4.45 million appropriated in 1989 is approximately one percent of the total federal investment in agricultural research.[3] But with these funds, land grant colleges and non-profit organizations, in cooperation with farmers, are looking into improved traditional methods of farming, such as building soil fertility with legumes in crop rotations thereby lowering the input of synthetic nitrogen fertilizer.

There is growing pressure on land grant universities by the public, environmental interests and farmers to develop more programs and research in sustainable agriculture. Some universities have responded positively, setting up special centers, instituting courses of study in sustainable agriculture and starting some research. In other cases, agriculture college deans are just mumbling phrases about sustainable agriculture, hoping this "fad" will go away before they are forced to change anything.

But it won't go away.

The American Seed Trade Association asked me to speak on the topic, "Conservation and Society" at their December Soybean Research Conference in Chicago. I was there to represent a viewpoint which the organizers believed should be heard by their members (not that they agreed with it). As part of the agricultural establishment, they see that the Ex/al lobby which helped pass the conservation provisions in the 1985 Farm Bill is still interested in agricultural issues and will probably be involved in the 1990 Farm Bill. They see a large population of non-farmers and non-agribusiness people getting into the act to influence farm policy and farming methods. They are trying to figure out what this means.

I told them that the public's interest in farming methods comes from serious lasting concerns. Many now suspect that the industrial agricultural system is dangerous to human health and the health of the land. They wonder if the long-term ability of the land to produce food for future generations is being destroyed by our push for high yields at the expense of the soil.

This is not the first time non-farmers have become involved in efforts to protect agricultural land. When the dust clouds rolled over Washington D.C. during the 1930's, farming practices came under national scrutiny and Congress established the Soil Conservation Service (SCS). The new agency's responsibility was not only to engineer terraces and waterways but also to educate the public about the conservation of water and soil. An amazing grassroots organization, the Friends of the Land, organized to help the SCS. The society dedicated to the conservation of soil, rain and man published a journal called *THE LAND* from 1940 to the late 1950's. (See page 26 in this publication). The magazine exhorted readers to respect the land and join in the process of healing the scars of am exploitative agriculture. The organization believed what Liberty Hyde Bailey, well-known Cornell University horticulturist, had written in *The Holy Earth* in 1915, "In the large sense, everyone one of us is a farmer, for the keeping of the earth is given to the human race."

THE LAND reported on SCS Conservation Field Days and Farm Transformation Days which were attended by huge crowds of people, many from the cities. The Autumn 1947 issue described one such day in Ohio which brought out 80,000 people!

This private organization which energized people to promote soil conservation died out in the 1950s. One reason for the loss of support seems to have been the perception that the job of saving soil was finished. Impressive increases in crop yield had occurred since the 1930s. The production increases were actually less related to stabilization of the soil and more related to the fact that marginal land had been retired from production and farmers were employing more fertilizer, pesticides, new varieties and irrigation. Farms continued to lose soil, but the success of high inputs creating high yields covered up the effects of soil loss. In the 1970s we were amazed to discover that United States' farmland was losing 25% more soil than it was when Congress established the SCS.[4] If biotechnology lives up to its promises, we may find its success masking increased soil loss in the coming decades.

If crop yields are up, and food is cheap and abundant, why are people, especially city people, worrying about soil loss?

One reason people care today is that we have learned something from the environmental movement. Since Earth Day in 1970, many people have internalized two simple ecological concepts: (1) You can never do only one thing and (2) everything is connected to everything else. With these in mind, we can see that some solutions are worse than the problems they address, especially in agriculture.

Rachel Carson's *Silent Spring* published in 1962 taught these principles by calling attention to the consequences of agricultural pesticides in the environment. Since the 1940s, chemical poisons had been produced and applied in agricul-

ture without question. If there was an insect pest, we found a chemical to kill it and sprayed our crops. Persistent pesticides such as DDT, chlordane, heptachlor, dieldrin, aldrin, etc. were essentially unregulated. Although the manufacturers of pesticides and university researchers did not want anyone to believe Rachel Carson's warnings about how dangerous pesticides were for all living things, twenty-six years later our society knows Rachel Carson was right. Consumers want fruits and vegetables that do not carry pesticide residues; farm workers want to be better protected where pesticides are used. Now we are concerned about the heavy use of herbicides (few were being manufactured when *Silent Spring* came out), especially when National Institute of Health data show a high incidence of non-Hodgkins lymphoma among farmers who have used the herbicide 2-4D extensively.[5]

We have more than doubled our use of pesticides since 1964, and the public is not adequately protected from their dispersal into the environment. Thousands of products representing over 600 active ingredients on the market were registered automatically when the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) was passed in 1972. Only seventeen of these chemicals have been tested and reregistered as the law requires. The National Academy of Sciences reports that full health information is lacking on ninety percent of the pesticides now on the market. Until 1988, when the EPA finally decided to cancel a registration for health and safety reasons, FIFRA's indemnity provision required EPA to buy out the chemical company's entire unused inventory. That has been changed, but the EPA must still pay for the disposal of chemicals removed from the market.[6] EPA regulations have been more considerate of the chemical companies than the public's health. Our government position seems to be that pesticides are innocent until proven guilty, and humans are experimental animals testing the effects of the pesticides.

But people in our society are not happy about being guinea pigs. They know that unprotected topsoil containing agricultural chemicals can be washed into streams. They know that residues of pesticides have been found in ground water, and although we cannot point to numbers of deaths per thousand as a result of the amounts in water, the presence of known carcinogens in any quantity causes anxiety. California's Safe Drinking Water and Toxic Enforcement Act of 1985, an initiative passed as Proposition 65, makes industry (including agriculture) responsible for demonstrating the safety of its waste products that could end up in ground water. This bill was passed because California voters felt that efforts to protect ground water were failing.

The state of Iowa has increased pesticide registration fees to chemical companies to help fund research that will reduce the quantity of agricultural chemicals used in farming and prevent those used from leaching into ground water.

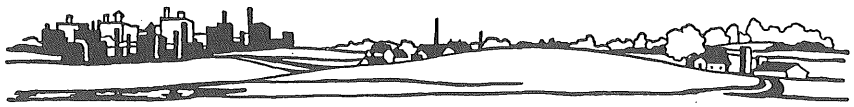
The Farm Bureau Insurance Company in Kansas recently advertised the availability of pollution liability insurance. While maintaining that fertilizers and pesticides are "an unavoidable" part of farming and "without them, most farmers simply couldn't survive," the company recognizes (though they denied it for years when wearing their farm organization hat) that they carry the danger of pollution to ground water--and the danger of lawsuits.

We disagree with The Farm Bureau's underlying assumption that fertilizers and pesticides are "unavoidable." Numerous, successful, profitable organic farms do operate in this country, and all are not small.

The transition from farming with chemicals to farming without them is not easy, Some farmers say they would like to stop using so many chemicals but cannot risk losing a crop because of their debts. Others point out that they cannot make changes in farming programs which would risk losing their crop base for the subsidy payments. They hope the low-input research will produce practical methods that they can adopt, but they must also be economical.

At the Chicago conference, one speaker was a progressive farmer (cattle and corn) with about 2000 acres in Indiana. His talk was entitled, "Conservation and Production: a Reasonable Compromise." He admitted that farming for high yields had caused abuse of the land and that the drive for high production had gone too far. In his own farming operation, he had changed his attitude toward pesticides, and his employees applied them more cautiously and safely. He served on a local water board in his county and was aware that good water quality mandated limitations on agricultural chemical use. His main pitch to the audience was that farmers should regulate themselves by carefully following recommended procedures in applying chemicals and by following good soil conservation practices, and thus avoid the need for government regulation. He too gave them the message that public concern about the environmental effects of agriculture was not going to go away. To avoid being regulated by the EPA, farmers must farm responsibly.

All large-scale farmers are not as conscientious. Essentially, there is a structural obstacle facing sustainable agriculture which comes from the patterns of land ownership and control. After all the foreclosures in the 1980s, much land that has been looked after by several generations of one family is now owned by investors such as insurance companies. A report by the Council for Agriculture, Science and Technology states that 60% of the farms in the United States are still owner operated.[7] However, talking about the number of farms does not

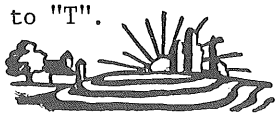


tell us much since the USDA considers very small land holdings to be farms. It is more revealing to talk about acreage. Marty Strange points out in his book *Family Farming: A New Economic Vision* that less than half the land in the Midwestern Corn Belt is owned by farmers, and seventy-five percent of the people who own farmland in the United States are not farmers.[8] Strange concludes that many of those who run the farms have no long term interest in conserving the land for future generations.

The Land Stewardship Project in Minnesota has been monitoring the treatment of land owned by insurance companies. Twelve insurance companies own 5.2 million acres of farm land in this country.[9] Travelers' Insurance Company alone owns a million acres. Too often the hired farm managers of insurance company farms have bulldozed out terraces, abandoned the rotations with alfalfa that dairy farmers followed for years, and planted their land in continuous corn, up and down the hills in straight rows. In Minnesota, I saw a county road next to an insurance company-owned field where an eighteen inch pipe in a culvert running under the road had to be replaced by one four feet in diameter so it could handle the increased runoff from the gullies in a corn field where terraces had been abandoned. County residents shared the cost of the large pipe in the culvert, even though the insurance company's farming practices caused the extra expense.

Five million acres is only a little more than one percent of total crop land in this country, so it may not seem significant. But much of it is valuable, though highly erodible, land in the Corn Belt. To those who live near the farms being abused by insurance companies, the amount of land is significant. When farms are only business investments, the soil is doomed. And many feel uneasy when agricultural land is not owned by people who want to take care of it for future generations.

The Land Stewardship Project has not been very successful in convincing the companies to stop soil erosion voluntarily. But the 1985 Farm Bill requires these insurance companies to build conservation structures on their erodible land in order to be eligible for subsidies in the farm program. It is doubtful though that they will ever be able to return the land to its prior condition. When the SCS issued final regulations for conservation compliance in February 1988, they were significantly weakened from those first recommended. Farmers complaining of an economic burden will be allowed to employ certain "alternative" conservation measures which will lessen soil loss, but not bring it down to even twice the tolerable level ("T").[10] And there has been further pressure to delay completion of conservation plans a year or two because of the economic burden on the "farmer." But surely insurance companies have the financial resources to bring soil loss down to "T".



Farm organizations and farmers should understand the impatience felt by citizens of this country. The conservation provisions in the Food Security Act were passed partly because citizens no longer were willing to subsidize farmers with poor conservation practices. Until this legislation, farmers could take advantage of government programs no matter how many tons per acre of soil their fields were losing, no matter how much silt flowed from their fields, no matter what quantity of agricultural chemicals leached into ground water. Taxpayers paying subsidies to farmers began to take an interest in how the money was being used; paying farmers to lose soil on marginal land and produce surpluses of grain simply did not make sense. They felt that farmers receiving tax subsidies should be accountable to citizens of this country in how they managed the land.

From the farmer's perspective, the economic system does not always reward good land stewardship. Those who have bought into the industrial system cannot change how they farm overnight. Agricultural policies will have to be adopted that help farmers make a transition to good stewardship. Environmentalists, in cooperation with other groups in the Ex/al lobby, will be looking at opportunities to promote sustainable agriculture in the next farm bill.

The proposals of Senator Wyche Fowler, (D-Georgia), Chairman of the Agriculture Subcommittee on Conservation and Forestry, will be under consideration when the 1990 Farm Bill starts making its way through the legislative process. These may not be the exact measures that should be passed, but they are a good place to begin in forging farm policy for the 1990s. He is suggesting federal financial incentives for farmers to try "low-input" agricultural practices. One important provision would protect farmers' crop bases which are used in determining subsidies if they plant legumes.

Fowler also proposes two measures to protect the environment. He would create a "tree buster" penalty (patterned after sodbuster and swampbuster provisions in the 1985 bill) which would deny all farm program benefits for producers who clear trees from lands for crop production. Another part of the proposal would require testing of water wells as a condition for participation in federal farm programs, and if wells are contaminated the producer would have to implement a government-approved plan for pesticide use.

The carrots and sticks in these provisions are the farm subsidy programs. The Bush administration has been looking at budget cuts in farm programs and has been promoting worldwide elimination of agricultural subsidies. If that happens and "the market" alone drives agriculture, the push for the highest yields and the highest efficiency of production in order to compete on the world market could result in a renewed desecration of crop land--and bring on more environmental regulation of agriculture.

But our society would be better off if we

converted to sustainable farming methods, which pose less of a threat to the environment, and require less government supervision. Citizen interest expressed through membership and involvement in the Ex/al groups will influence public policy in the direction of sustainable agriculture. In the long run, the land will be more productive, there will be more farmers on the land protecting it, people will be eat food that is safer and more nutritious, and farmers will be happier if they work with the public and conservationists to protect the natural resource base of agriculture. ◁

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Notices

Ann Zimmerman To Sing in Salina

Friends of The Land think of **Ann Zimmerman** the way they think of a barefoot walk in a cool spring creek; she's refreshing. When she sings her folksongs, her voice is sweet and clear. (Even when she's doing "The Bad Attitude Blues"!)

This year you can find spring early--the night of March 11, to be exact--when Ann gets folksy in Salina in a benefit for the Kansas Natural Resource Council. KNRC is the state's only environmental organization working full-time on Kansas issues, with a professional staff in Topeka.

Ann was an intern at The Land in 1984, and she has sung regularly at Prairie Festivals since. "Home-grown tomatoes, home-grown tomatoes! What would life be without home-grown tomatoes? Just two things that money can't buy, and that's true love and home-grown tomatoes!"

While at Harvard Law School, Ann did gigs around Boston. Now she's back in Kansas working for Legal Services in Wichita, and hoping to sing often for her Kansas friends and fans. The benefit concert's location hasn't been set yet. (You can write for more information to KNRC at 1516 Topeka Avenue, Topeka, Kansas 66612.) But mark your calendar **Saturday night, March 11, in Salina.**

February 9, 7:30 P.M. - Kansas State Univ. Student Union, Manhattan, Kansas. Hear Deb Jones, California Action Network, talk about her organization's lawsuit against California land grant universities for violating the Hatch Act in agricultural research. Sponsored by the American Ag. Movement with help from other organizations, including The Land Institute.

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