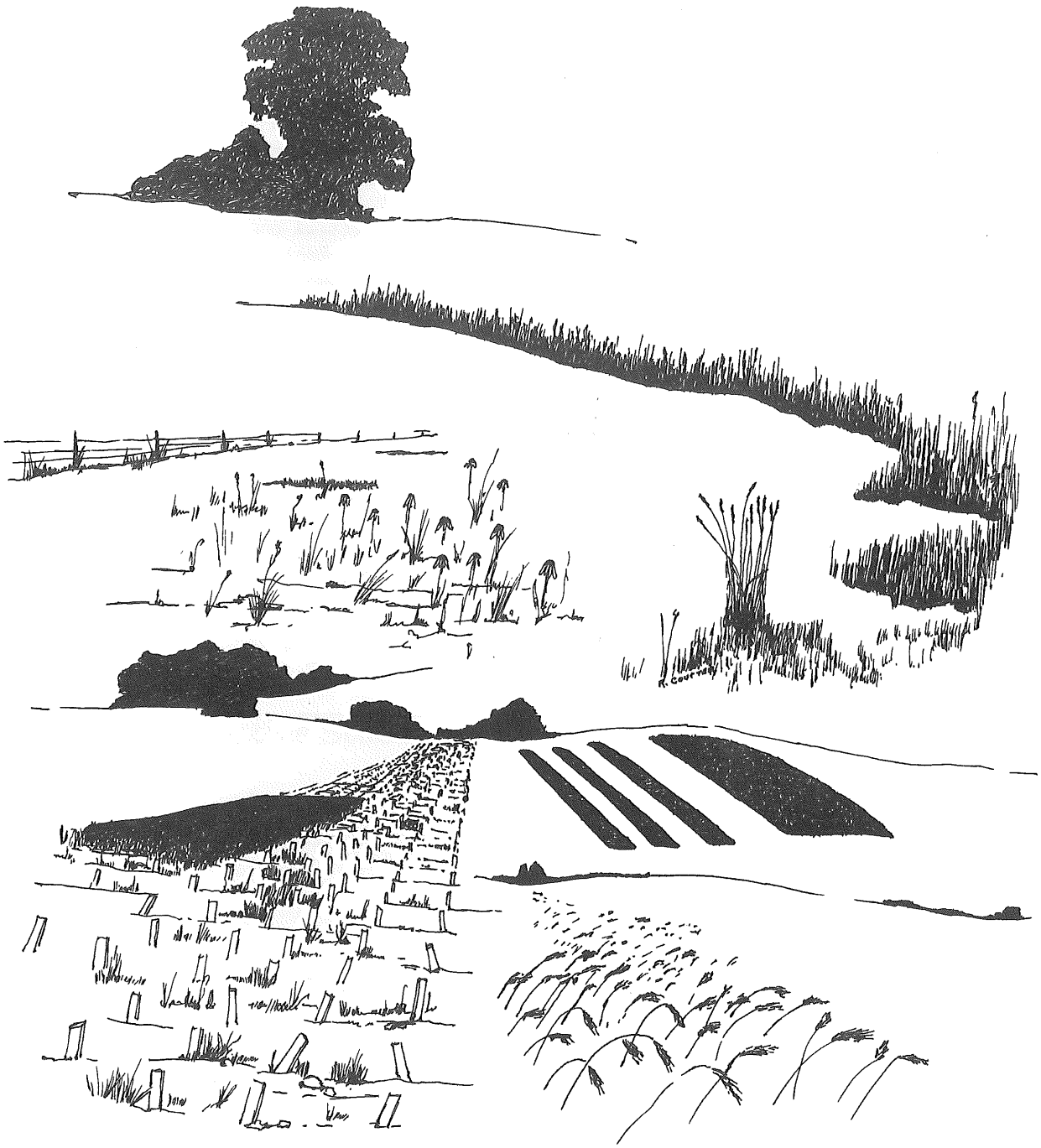


THE LAND REPORT

Number 16 Summer 1982

The Land Institute

Contents

Summer 1982

SKETCHES:
Barry Moir (21, 27) Marvin Pauls (22, 24)
Marie Rasch (28- cover design for manual)
PHOTOGRAPHS: Dana Jackson, Dana McCain, Margo Thompson, Terry Evans.

At The Land----------

The Land Term: A New Program

Beginning in February 1983, The Land will change its calendar. For thirteen semesters (including Fall 1982), our program coincided with the calendars of most colleges and universities. Students could attend the fall semester from September through December, then return to their home universities or stay on for a second semester running from February through May. Students could also choose to be in The Land program for the spring semester only.

There are three sessions under the new calendar. All new students must begin in February and attend both the Spring Growing Session and the Fall Harvest Session. Regular students may leave for the summer and return in the fall, but agricultural interns will attend a summer session and be paid to work at The Land. No new students can begin in the Fall of 1983; they must wait until February 1984.

The main advantage of this new calendar is that the agricultural research projects will make more sense. Students have been preparing seed beds, planting and weeding in the spring, yet do not see the plants mature or know the results of the harvest. In the fall, students have been

The Land Report

is published three times a year by

THE LAND INSTITUTE
RT. 3
SALINA, KANSAS 67401

Editor.....Dana Jackson
Arts Associate.....Terry Evans
Circulation Manager..Linda Okeson
Printed by Arrow Printing Co. Inc.

Contributing to No. 16: Marty Bender, Den Berry, Terry Evans, Lynn Hirschberg, Dana Jackson, Wes Jackson, Barry Moir, Marvin Pauls, Mari Peterson, Walter Pickett, Jan Ryan, Stu Slote, Joan Stone, Margo Thompson.

SUBSCRIPTION RATE: $5.00

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

helping harvest and clean seed without having had any experience with the experiments.

The longer term, an equivalent of two, 15 week sessions and a 13 week summer session, will also give students with projects in energy, shelter or waste management a longer period of good weather for working outside.

A grant from the Jessie Smith Noyes Foundation has made it possible for The Land to offer agricultural internships. Students who are accepted as interns will receive tuition scholarships, plus be paid the minimum hourly wage for their labor in the summer. Interns will have the opportunity to help design and plant out experiments in the spring, tend them all summer, and harvest and record data for analysis in the fall. We hope each student will have publishable results. There will be no daily class sessions during the summer, but we will hold weekly seminars on ecological agriculture subjects.

Although more agricultural topics will be covered during the longer term, The Land will keep its emphasis on sustainable alternatives in energy, shelter and waste management. Readings and projects will continue in these areas. Assignments will also explore the ethical and spiritual values which can be the underpinning of a sustainable society, and the social and political structures which will enable such a society to evolve.

Basics for Prospective Students

--TUITION-- $1000 for each session. Any student who needs financial aid can receive a tuition grant; the amount depends upon how many students need grants as well as the total grant money available. Agricultural interns will receive full tuition scholarships for all three sessions.

--HOUSING-- Students generally share apartments or houses in Salina which they find on their own.

--FOOD-- Students are responsible for their own food. Lunches can be fixed in The Land kitchen. Potluck lunches are held in the Jackson house on Thursday. The Land's garden produce is shared. Fresh milk and eggs can be purchased.

--WORK-- Because students are at The Land from 8:45 A.M. until 5:00 P.M. and usually read assignments in the evenings, there is very little time to hold outside jobs.

--CREDIT-- Students can enroll at Kansas Wesleyan in Salina for a modest fee to get undergraduate credit. Graduate students can enroll at Emporia State University to receive credit for Land Institute study.

--ADMITTANCE -- The Land admits students of any race, color, national or ethnic origin. We recommend that applicants have completed at least one year of college. Agricultural interns should be upper level undergraduates or graduate students interested in sustainable agriculture.

--TO APPLY--

To be a student: Write a letter, in your best style, describing past academic and job experience, any involvement in environmental issues, major interests and goals for the future.

To be an agricultural intern: Write a letter, in your best style, as described above. Include a list of the science and math courses you have taken. Also, answer the three following questions: 1. How did you become interested in sustainable agriculture? 2. What works have you read in this area? 3. Do you want to work towards sustainable agriculture as a career, or is it too early for you to know?

--Send letters to Wes Jackson
The Land Institute
Rt. 3
Salina, Ks. 67401

1982 - 1983 Calendar

FALL SEMESTER 1982

Sept. 2	- First Day
Oct. 10	- Visitors' Day
Nov. 24-28	- Thanksgiving Vacation
Dec. 17	- Last Day

THE LAND TERM 1983

Growing Session

Feb. 14	- First Day
March 31-Ap. 3	- Easter Vacation
May 28-29	- Prairie Festival
May 30	- Last Day
June 6-Aug. 31	- SUMMER WORK FOR INTERNS

Harvest Session

Sept. 5	- First Day
Oct. 9	- Visitors' Day
Nov. 23-27	- Thanksgiving Vacation
Dec. 17	- END OF TERM

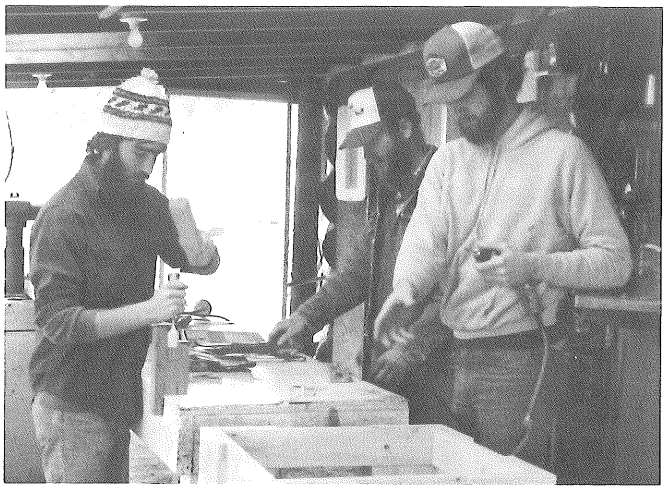
Marty, Lyn, Marie, Walter and Jan met regularly this spring as a class in agricultural ecology.

Working Hard this Spring

The educational program at The Land is designed for students to spend approximately half time on reading and discussion and half time doing physical work. Generally, students can be found in the classroom in the mornings, and outside in the afternoons working on individual projects, maintenance and construction, and field work. If rain is forecast for the afternoon, we sometimes switch the schedule. During the spring semester of 1982, students at The Land were confronted by an enormous amount of physical work to be done, and their accomplishments were impressive.

Many tasks were associated with the agricultural research. Students faced the challenge of starting new plots in part of a plowed-up wheat field on the 160 acres purchased in March. This meant many tedious hours helping plant breeder Walter Pickett plant the 4000 accessions of perennial grasses, and then hoeing and weeding the seedlings. They also helped research associate Marty Bender start his new experimental plots and do the necessary planting, mowing and weeding in the Herbary. Before warm spring weather which brought all the field work, the students cleaned seed from last fall's harvest, assisted Marty in germination studies, and burned sections of pasture on the new land with Wes. Jan Ryan needed additional labor on her tree project, so students also planted and watered new trees in the shelterbelt area. (See the Alternatives in Agriculture section for articles about these agricultural research projects.)

Besides work associated with agricultural research, there were the regular cleaning and maintenance jobs to be done. Keeping the classroom, kitchen, shop and greenhouse tidy was made difficult by all the mud this spring. In addition to maintaining wood in the woodpiles for daily use in four wood-burning stoves, the students sawed up a mountain of oak pallets and stacked the wood along the corral fence. They repaired the apparatus for lifting the greenhouse shutters, and several took turns climbing the tower to fix the Jacobs wind generator.



Stu, Marvin and Den working on the table saw.

Working in groups or teams, Land students also improved existing facilities. These construction projects are not described in student articles as they were activities over and above the projects students chose individually. They tore out the ramp and concrete sidewalk at the front of the building and built stairs and a boardwalk out to the driveway. Barry made a stepping stone walk north of the saw shed out of the broken pieces of concrete, and he seeded the torn-up areas to grass. Margo, Stu, Barry and Marvin all worked on the active solar heating system and installed two fans. Den, Marvin and Stu built a table and mounted the skill saw underneath it so it could be used as a

Lynn, Marty, Dana, Jan and Barry burning the brome strips.

Jan, Lyn, Stu, Margo and Marvin tearing down the hay bale house.

table saw. Sawhorses were needed, so Den built them. Nora used a router to cut out letters for a large wooden Land Institute sign and others helped her erect it at the edge of the driveway by the road. Everyone helped tear down the hay bale house, pull nails and stack the wood for future construction projects. Lyn took care of the bees; Dana helped in the garden. These are just examples, not an inventory of all the work done.

During the last two weeks of the semester, all the students and staff prepared for the Prairie Festival. Mowing, weeding, cleaning, making signs and putting them up, moving equipment from the barnyard, building outhouses, etc. kept everyone busy. Each year these jobs increase in number as we try to accommodate more people and offer more activities than the year before.

Sweat, sunburn, blisters, poison ivy and sore muscles accompanied the physical effort by spring semester students. So did a sense of personal satisfaction and a camaraderie within the group sharing hard tasks and completing them.

Barry, Marvin, Jan, Marie, Stu, Nora, Mari and Den take an afternoon break.

Visitors' Day

October 10 is the date set for the annual Fall Visitors' Day. This Sunday afternoon program will feature small group tours of The Land led by students. Tours will begin on the hour at 1:00 P.M., 2:00 P.M. and 3:00 P.M. and take approximately 45 minutes. Those who do not wish to take the tours are welcome to walk over the premises and read the signs describing the research and student projects.

At 3:00 P.M., visitors who are interested are invited to discuss with Dana and Wes Jackson and other staff and students the topic: "Surviving the 80's: Working for Saner Energy, Environmental and Agricultural Policies." The gains made in the 70's seem to be eroding fast, and individuals and institutions such as The Land Institute have a responsibility to resist the "strength through exhaustion" policies by offering alternatives. Visitors will be invited to express their concerns and offer suggestions. Ideas about what The Land could or should be doing will be welcomed. The discussion will take place in one or in several groups, depending upon how many people wish to take part.

Board of Directors

When The Land Institute incorporated in 1976, the first Board of Directors became actively involved in its development. The interest and advice of subsequent board members has continued to benefit The Land, although in recent years not as much has been asked of them. The purchase of 160 acres in March 1982 began another period of active involvement for the Board.

At the annual meeting on June 28, the Board decided that a committee should be formed to help develop long-range goals for the use of the land as it relates to research projects and other activities. The committee will present preliminary ideas and recommendations at the meeting of the full Board on October 9, 1982.

The Board met on an extraordinarily cold January 10 to discuss the acquisition of land. After serious deliberation, the members voted to organize a fund drive to raise money to purchase land, specifically the Sudendorf land across the road from The Land Institute They were delighted to learn at the annual meeting that $105,000 of the $112,000 asking price had been received in donations and the remainder was pledged to be given in the next fiscal year. The Board commended Wes Jackson for his success in raising the money. They gave a special "thank you" to John Simpson for doing all the legal work associated with the real estate transaction. Because of his background in rural real estate sales, Steve Burr was also very helpful during the process of buying the property.

On a day to day basis, in less official procedure, other board members make important contributions to The Land Institute. Terry Evans serves as our Arts Associate, helping with THE LAND REPORT, the student program, the Prairie Festival and other special projects. Ivy Marsh is The Land Institute's representative to the Consumer Information Board of the Kansas Corporation Commission, and her expertise on electric utility issues is a great resource. Dick Courter designed the logo for The Land in 1976 and has since created two cover designs for THE LAND REPORT. Karen Black has assisted us from her experience in journalism by writing news releases, as well as advising us as an attorney on certain business matters. Bernd Foerster, Dean of the College of Architecture and Design at Kansas State University, has made it possible for speakers scheduled at Kansas State, such as John Todd, Malcolm Wells, and Alan Gussow, to

Around the table: Wendell Berry, Den Berry, Terry Evans, Laura Jackson, Nora Kelleher, Lynn Hirschberg, Tanya Berry

also visit The Land. Gordon Maxwell introduced other board members to the ideas in Amory Lovins' Soft Energy Paths by reviewing the book at a board meeting, and he spent an afternoon discussing the medical problems associated with a nuclear disaster with interested Land students. Dwight Platt, an ecologist and prairie scholar, was a source of information and encouragement even before he became a member of the Board. He was one of the main speakers at our 1981 Prairie Festival.

The Land Institute also has an Honorary Board of Directors. Persons who are recognized for their leadership in the environmental/alternatives movement or their scholarship and published works in areas which The Land studies, are frequently engaged to speak at events sponsored by The Land. Individuals who have visited The Land, support our efforts, and who speak in public forums or work with our students, can be invited by the regular Board to become members of the Honorary Board. The first Honorary Board member was E. F. Schumacher who visited The Land in March, 1977. The most recent member is Donald Worster, the author of Nature's Economy and Dustbowl, and one of the main speakers at the 1982 Prairie Festival.

John Todd, Wes Jackson, Lynn Hirschberg, Walter Pickett and Marty Bender.

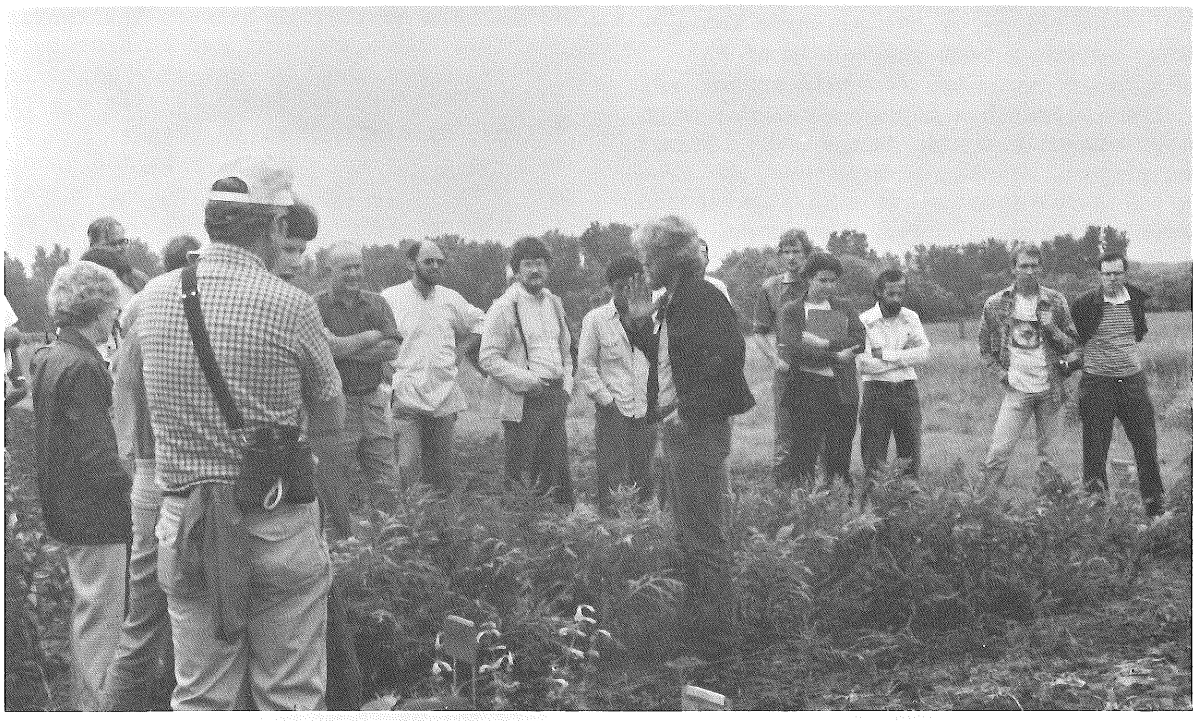
Three members of the Honorary Board of Directors visited The Land this spring. John Todd traveled to Kansas to lecture at Kansas State University, then came on to Salina. John has been very interested in the role of fire on the prairie and had hoped to help burn the native pastures on the new land. However, the wind was too strong and he did not get any firsthand experience. Amory and Hunter Lovins stopped by for lunch on their way from Colorado to New Hampshire where they taught at Dartmouth during the spring quarter. They told us about their new book, Brittle Power, and showed the plans for the solar house they hope to construct this summer. Wendell and Tanya Berry arrived on Friday before the Prairie Festival and shared a potluck lunch with everyone at The Land.

Resettling America

Prairie Festival '82

May 29-30

A Celebration of the Prairie Ecosystem and Prairie Folk



The Fourth Annual Prairie Festival began on Saturday morning, May 29, with Marty Bender leading a plant identification walk through the Herbary and nearby pastures. Over 200 people attended the afternoon sessions on Resettling the Prairie with the Prairie. Robert Ahrenhoerster (3rd from right in photo) of Prairie Seed Source in North Point, Wisconsin, gave a slide presentation on landscaping with prairie plants. Lloyd Hulbert, Director of the Konza Prairie, talked about fire on the prairie and showed slides. Wes Jackson, Marty Bender and Walter Pickett concluded the afternoon with a program on "The Prairie as a Standard for a Sustainable Agriculture," an introduction to agricultural research at The Land and a tour of experimental plots.

The Saturday evening program attracted an audience of about 350. People gathered in the Jackson barnyard at early dusk, when the settling-down sounds of birds and the coolness of a light breeze readies everyone for inspiration. They were not disappointed.

Providing the inspiration Saturday evening were the speakers, Donald Worster and Wendell Berry. Worster, a former Kansan, is a professor of American Studies at the University of Hawaii, currently working under a Guggenheim Fellowship at the Univ. of California, Berkeley, on a book about water development in the West. He is the author of Nature's Economy, used as a textbook at The Land, and Dustbowl: the Southern Plains in the 1930's. Wendell Berry, Kentucky farmer and conservationist, is the author of several novels and many books of essays and poems. His best-known book, The Unsettling of America, is used as a textbook at The Land.

Excerpts taken from the tapes of the Prairie Festival speeches follow. We realize that we do an injustice to Don and Wendell by printing only excerpts, as the speeches in their entirety were beautifully organized and artfully delivered. However, we think readers will appreciate the sections we have chosen.

Two Worlds of Water

Donald Worster

...Throughout the American West today there are two water regimes vying for the future. One is nature's way--rivers flowing across the land. The other is the regime of the man-made pump, which brings water up from the bowels of the earth or lifts it over high mountain ranges. Each of those regimes has consequences not only for the environment but also for society, for organizing people, shaping agriculture, and distributing political power.

...Children will soon or late, I suppose, discover a stream and cherish it all on their own, if a stream is in their vicinity; but they will remember it longer if adults they respect take it seriously too. For me that adult was my grandfather. He lived not far from us, nearer the levee than we, a retired farmer who had once raised corn along Cow Creek... It was this grandfather who one day took me over the levee and showed me, without really intending to, that there was more to Kansas than bicycles and crab grass.

...The last time I checked, Cow Creek still ran between its levees, and still had a few old men and women, stray dogs and children, to keep it company. But it is today becoming an anomaly in the plains--a stream that has been contained but not yet dammed, appropriated, turned out of its course and pumped into a ditch. Elsewhere the natural regime of rivers is coming to an end.

....Here is another scene to put next to Cow Creek for comparison...North of Bakersfield, in a country side greened up by orchards and grapes, an irrigation channel slashes straight from a mountain reservoir: the Friant Kern Canal. The name was given by the Bureau of Reclamation which built the canal in the 1940's to rescue Kern County farmers from underground water depletion. For 153 miles the canal runs south, cutting across the natural drainage of the valley, moving five thousand cubic feet of water per second to irrigate almost a million acres.

...In places like Cow Creek and Friant-Kern Canal, we can see the two water regimes contending for the future. The contrast between them is in part aesthetic--between indirectness, complexity, and a smell of mud in Kansas, and regularity, functionalism, and some might say sterility in California. There is also a profound ecological distinction to be noted: the difference between a diverse community in and along the river and a ruthless suppression of biological life in the new-age canal. But there is even more to the contrast, and it is this more I mainly want to dwell on. We are confronted in these rival waterscapes with very different sets of human possibilities: on the one hand, a world in which individuals and small communities retain a competence and an autonomy; on the other hand, in the world of completely managed water, a rising system of hierarchies and concentrated powers that make the important decisions. This political dimension to water is neither separate from nor more important than the aesthetic and ecological consequences; they are all inextricably tied together. Taken as one, they warn us that the fate of nature on earth, its beauty and diversity, is the fate of humans too.

There are profound political effects in store for us if we ever achieve unlimited water control. To appreciate that fact, we must now move to consider the underlying problem here: the pursuit of domination and its fallout... By domination we mean the rule or control by some superior power, a rule that is absolute, tyrannical, and despotic. To dominate is to assume the right to exercise a supreme determining influence over another being, to seek to change that other being beyond all recognition.

...until recently we have not thought about domination in terms of nature--in terms, for example, of what is implied by control of rivers and other natural living entities and systems. Now, however, there is good reason to extend our thinking: we have rather suddenly acquired the

Getting Along with Nature

Wendell Berry

For several years I've zigzagged across the line that separates culture and agriculture. Of course this is a fictional line--these lines can be drawn but they don't really exist. It's a line that neither agriculture or culture is ever altogether on one side of. Nevertheless, it's a useful line because it describes both a difference and a connection, and when you follow a line like that it becomes possible to think. Lately I've been wont to zigzag across another mostly fictitious line, the one that separates nature and agriculture, or nature and culture.

...Most conservationists now take for granted that humans thrive best in ecological health, and that the test or sign of this health is the survival of the diversity of wild creatures. We know too that we cannot imagine ourselves apart from those necessary survivals of our own wildness which we call our instinct. And we know that we cannot have a healthy agriculture apart from the teeming wilderness in the topsoil.

That "in wildness is the preservation of the world" may be a spiritual truth; it is also a practical fact. But we must not fail to consider the opposite proposition: that so long at least as humans are in the world, human culture is the preservation of wildness, which I think is equally and more demandingly true. If wildness is to survive, then we must preserve it. We must preserve it by public act, by law, by institutionalizing wilderness in some places. But such preservation is probably not enough.

Wes says that if we can't preserve our farmland (and we're not preserving it), we cannot preserve the wilderness. That said it is merely redundant to say that if we cannot preserve our cities (and we're not preserving them), we cannot preserve the wilderness.

...The probability is that nature and human culture, wildness and domesticity are not opposed, but are interdependent. Authentic experience of either will reveal our need for the other. A fact both lovely and hopeful is that a human economy and wildness can exist together...

...At the end of last July, while I was using a team of horses below a small triangular hillside pasture, bordered on two sides by trees, I was suddenly aware of broad wings close below me. It was a young Red-tailed Hawk, who flew up into a walnut tree. I mowed on to the turn and stopped the team. The hawk then glided to the ground not twenty feet away. I got off the mower, stood and watched, then spoke, and the hawk showed no fear. I could see every feather distinctly, claw and beak and eye, the creamy down of the breast. Only when I took a step toward him, separating myself from the team and the mower, did he fly. While I mowed three or four rounds, he stayed near, perched in trees or standing, erect and watchful on the ground. Once when I stopped to watch him, he was clearly watching me, stooping to see under the leaves that screened me from him. Again, when I could not find him, I stooped, saying to myself, "This is what he did to see me." And as I did so, I saw him.

Why had he come? To catch mice? Had he seen me scare one out of the grass? Or was it curiosity? A human, of course, cannot speak with authority of the motives of hawks. I'm aware of the possibility of explaining the episode merely by the hawk's youth and inexperience. And yet, it does not happen often or dependably to be approached so closely by a hawk of any age. I feel safe in making a couple of assumptions. The first is that the hawk came because of the conjunction of the small pasture and its wooded borders, of open hunting ground and the security of trees.

This is the phenomenon of edge or margin that we know to be a powerful attraction of a diversified landscape, both to wildlife and to humans. The human eye itself seems drawn to such margins, hungering for the difference made in the countryside by a hedgey fence row, stream or a grove of trees. And we know that these margins are biologically rich, the meeting of two kinds of habitats.

The other difference is also important here, the difference between a large pasture and a small one, or to use Wes's terms, the difference between a patch and a field... The pasture I was mowing was a patch, a small, intimate enclosure nowhere distant from its edges.

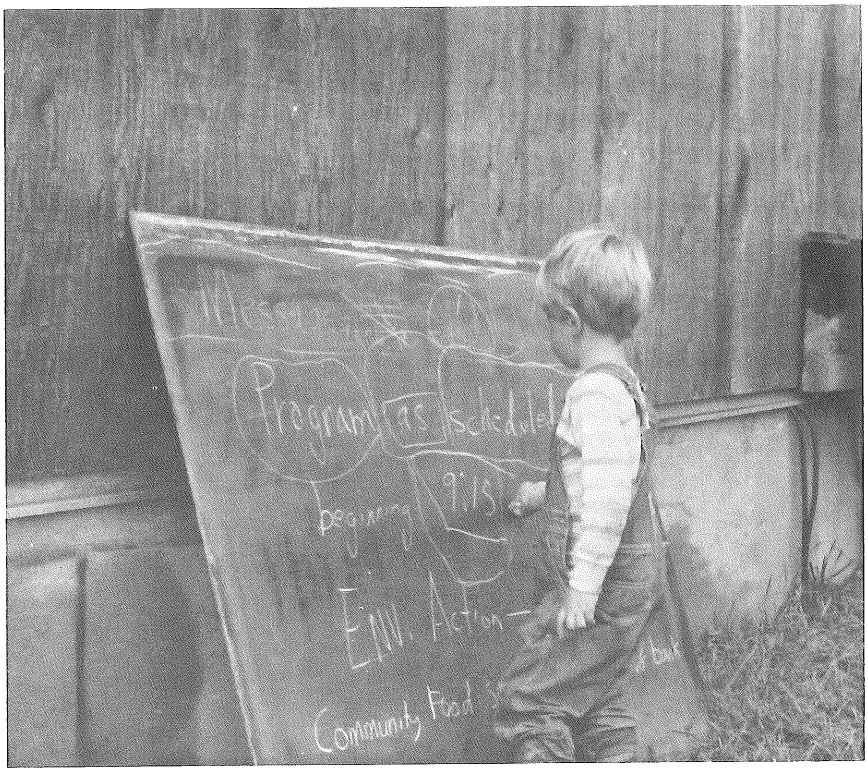
My second assumption is that the hawk was emboldened to come so near because though he obviously recognized me as a man, I was there with the team of horses with whom he familiarly and confidently shared the world. I'm saying, in other words this little visit between the hawk and me happened because of the kind and scale of my farm. My way of farming and my technology allowed it to happen. If I'd been driving a tractor in a hundred acre corn field, it would not have happened.

In some circles I would certainly be asked whether one can or should be serious about such an encounter, if it has any value. And though I cannot produce any hard evidence, I would unhesitatingly answer, yes. Such encounters involve another margin, that between domestic and wild which attracts us irresistibly. They are among the best rewards of outdoor work; they are among the reasons for loving to farm.

...These meetings of the human and the natural estate, the domestic and the wild, occur, invisibly of course, in any well-farmed field, and are mutually beneficial. The wilderness of a

Thunder awakened the campers Sunday morning. The early morning bird walk turned into a sky and cloud watch. There was time for many to put up their tents and move cars to higher ground before the rain began to fall. Those who took refuge in the classroom found a pot of coffee, plenty to read in the library, nice folks to talk to, and even some toys for the children. The storm was brief, and although it was still too wet for the worship service and tours scheduled at 8:00 A.M., by 9:15 the program commenced as planned. During the morning there was always some uncertainty as to where we were on the schedule, but the participants were friendly, patient folk, mostly just thankful that it wasn't still raining.

The north side of the building served as a message center and bulletin board. A large chart listed the presentations and tours which one could choose to attend on Sunday morning. Most of these related to the theme of the festival, "RESETTLING AMERICA," as we considered what aspects of land ownership, community organization, and technology would help resettle America. At 9:00 A.M. there was a caucus on enviromental action chaired by Diane Tegtmeier, a garden tour and a tour of solar projects. Presentations on "Who Owns the Land" by Mary Fund and Elise Watkins and "Community Food Systems" by Kelly Kindscher of the Kansas Rural Center were given at 10:00. Keith Christianson, College of Architecture and Design at K. State, gave a slide presentation on earth-sheltered houses to a large, interested audience.



Ricky Shafer, son of Glenn and Terry Shafer

At 11:00, participants could hear a talk on land trusts by Steve Burr of the National Parks and Conservation Association, one on "Art in Community," by Arts Associate at The Land, Terry Evans, and discuss "Visions for Sustainable Communities" with Mari Peterson and Diane Tegtmeier of Energy for Rural Self-Reliance. Maure Weigel of Smoky Hills Audubon showed slides and talked about the Prairie Raptors, although by this time we were hopelessly off schedule and his time was cut short. A special wind energy tour was added by popular demand during this part of the schedule.

Children could find special events on the schedule for them also. There were games at 9:00, a Nature Walk at 10:00 directed by former students Dennis and Annie Ronsse, and a performance by storyteller Ron Gaure at 12:00.

Terry Evans in gallery displaying her photographs

Annie Ronssee and children after the nature walk

At noon everyone had an opportunity to choose a group discussion with Donald Worster, the Sat. evening speaker; Gary Coates, faculty member of the College of Architecture and Design at K. State and author of Resettling America: Energy, Ecology and Community; and David Orr, Director of the Meadowcreek Project in Fox, Arkansas. Amory and Hunter Lovins agreed at the last minute to take a group and show the plans for their solar house/research center to be built in Colorado. Wendell Berry, though excused from taking a group discussion, found that he and Tanya attracted groups for conversation wherever they were.

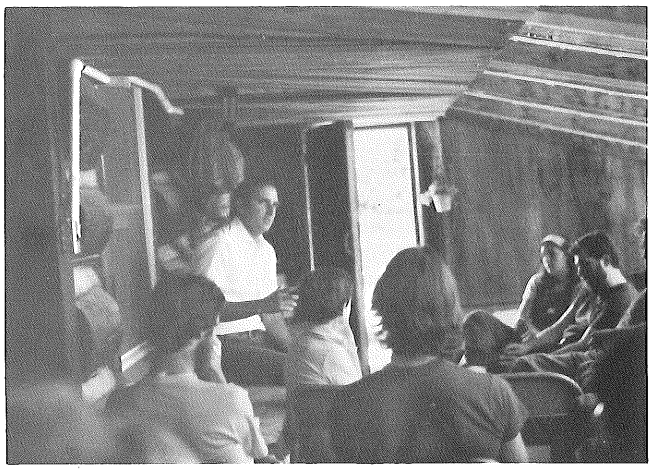
The potluck lunch began almost on time. Four lines of hungry persons could not consume all the food, and there were leftovers to put away before the afternoon program began at 3:00 P.M.

Wes Jackson acknowledged students and former students, then introduced members of the Board of Directors attending the festival. He gave special recognition to the Evans family (Dean, Sam and Terry) whose encouragement and financial support have been very important to The Land since 1976.

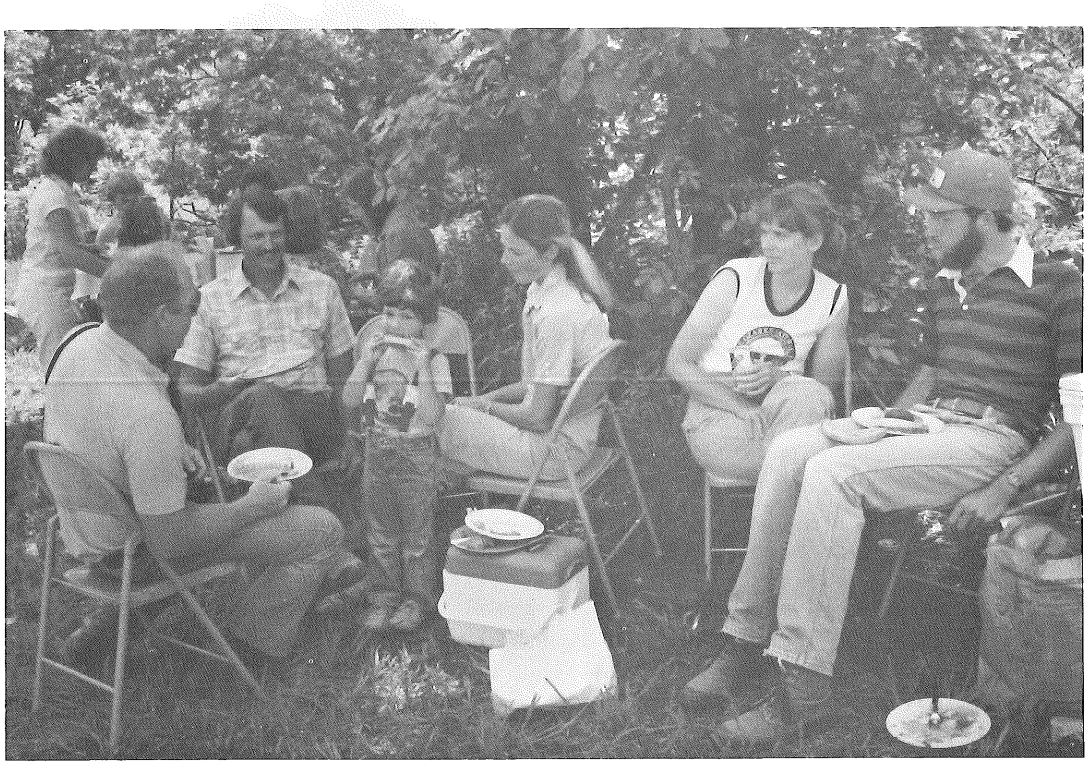
The poetry reading by Wendell Berry was the final event of the 1982 Prairie Festival. An appreciative audience sat together on that warm, beautiful afternoon, emotionally and intellectually engaged, concentrating on each phrase that Wendell read.

This account has described only the scheduled events on the program. Informal gatherings of people discussing environmental or energy issues, exchanging organic growing information, or just getting acquainted were equally important. It will all happen again on May 28-29, 1983 at our Fifth Annual Prairie Festival.

Amory Lovins



David Orr



Prairie Images

Terry Evans

"The trick is not to transcend things but to transform them. Not to degrade them or deny them - and that's what transcendence amounts to - but to reveal them more fully, to heighten their reality, to search for their latent significance." Tom Robbins

One evening I sat in Joan Stone's living room with Joan, her five "Grass Variation" dancers, her sound accompanist and her husband, and we discussed the gestures that various prairie grasses make in wind. It was of utmost importance to Joan to transpose the accurate gesture to her choreography.

Joan and her company, from Lawrence, Kansas, performed in Salina last March 23 at an event jointly sponsored by The Land Institute and the Salina Arts Commission. The program featured a dance about the grasses followed by a slide presentation of my prairie images. As they appeared on the screen, I was delighted to see that the photographic images of grass patterns echoed the movements of the dance just completed.

Grass Variations

Joan Stone

"Imitate us until you learn our dance," say the grasses.

* * *

New Haven, Connecticut -- my hometown -- rich/poor city!

Swamp grasses of Edgewood Park: I painted them as a child -- walked in their shadows to cool off in summer, getting my feet muddy -- looking for turtles, red-winged blackbirds -- killing mosquitoes -- learning obliquely nature's gestures -- years later to become dances.

I took many friends walking in Edgewood Park. One became my husband. The park gave us the spacious airy landscape we craved as city folk.

Seeing the swamp grasses in plumed autumn hats, I named them "the ladies." When they nodded, reached, and bowed -- I echoed -- nod, reach, and bow. Yale wanted to destroy them for a rowing course. I danced in protest.

Dusty grasses move heavily like lines of faded resigned workers.

* * *

In the hot sun my neighbor mows and mows -- and wants me to do the same. I sit in the shade and watch the tall grasses undulate. Strike down the weeds ordinance -- not the graceful grass that inspires a dance.

* * *

Poland, World War I: a starving boy whipped for stealing two stalks of wheat. My father still talks about "the fat landowner with his great long whip."

Green wheat running in the wind, mesmerizing as the sea.
Bold gold ribbons of wheat rustling, swaying -- not at all easy to dance.

"Vast wheatfields under troubled skies -- I did not need to go out of my way to express sadness and extreme loneliness." van Gogh

After 15 years of solo dancing I yearned to explore group forms. Grass Variations became a celebration of community.

What gestures, rhythms, spatial patterns can dancers glean from grasses? What motions do grass and human bodies have in common?

Gestures for torso and legs were harder to find than for head and arms.

Wind and rain rhythms: sometimes lulling, sometimes tormenting.

Spatial choreography: orderly rows, squares, diamonds, rectangles -- straggly clusters, patches -- bare spots, stray individuals.

Grass Variations for 5 dancers in 13 sections:
reach, root, lift and drop, rock and ricochet, undulate,
drift and cluster, fling and circle, point, run, pulse,
bend and sweep, ascend, advance and recede.

Even my dancers born in Kansas did not realize the power and beauty of the grasses until they danced about them.

* * *

"Study a blade of grass," says the Japanese artist, "then plants, seasons, animals, people. So life passes, too short to do all."

Alternatives in Agriculture

EDITOR'S NOTE: Previous LAND REPORTS have explained why the goal of agricultural research at The Land is to work toward a sustainable agriculture based on the model of the prairie, which is a perennial polyculture. Past issues have described the early experiments and the development of the Herbary. The agricultural research program has increased substantially in 1982 due to a two-year grant from Rodale Press, the recent acquisition of a quarter section of pasture and cultivated land, and the dedicated work of the students and staff this spring. The two articles which follow report on the new work being done. The first was written by Walter Pickett, a plant breeder employed as a research associate under the Rodale grant. The second is by Marty Bender, research associate since 1978. The agricultural research program is directed by Wes Jackson.

Breeding Perennial Grain Crops

Walter Pickett

Work to generate high seed-yielding perennials through selections and wide crosses has begun at The Land. There are two approaches toward breeding perennial grain crops that we are using: 1) the "perennialization" of the current, annual grain crops through wide crosses with wild, related perennials; and 2) selection for increased seed yield in wild perennials. For the first approach we have chosen to work with rye, wheat, sorghum, sunflowers and corn. Each crop readily crosses with perennial relatives, and such crosses should be marketable through present markets.

Rye is the simplest, and the results are predictable because domestic perennial ryes have been developed before in Russia, Germany, and the U. S., all before 1950. This was a time when fertilizer and fuel were both cheap. Furthermore, the rye was grown in monocultures. Under these three conditions, cheap fuel and fertilizer and monoculture, it wasn't competitive. We believe that a perennial rye could be a useful part of a polyculture system, especially under the realities of scarcer resources. So far we have been unsuccessful in locating seed from these lines, and we fear that they are extinct. Consequently, we are remaking the original crosses.

We crossed domestic winter rye (Secale cereale) with a wild, perennial rye (S. montanum) obtained from the USDA Plant Introduction Center in Beltsville, Maryland. The wild rye drops its seeds as they mature, an undesirable trait that is due to only one or two genes. Genes from domestic rye can easily be transferred to the perennial rye. In three generations we should have a perennial rye which holds its seed until harvest. The reports of the earlier breeders of perennial domestic rye say that yield will be low for a few more generations, but that yield will respond quickly to selection. Baking quality should be acceptable.

Even more work has been done with wheat. Wheat has been and continues to be crossed with many perennial grasses by wheat breeders in order to transfer genes for disease and insect resistance. The hybrids can be made fertile, and the hybrids can then be crossed with wheat, other grasses, or with other hybrids.

Unfortunately, most of the work has been done with spring wheat as one parent, so some resulting perennial wheats aren't reliably winter hardy. We have five perennial wheat varieties with which to work. Two are hybrids of wheat crossed with Agropyron species (wild perennials related to wheat) that have undergone selection for twenty-five years at the University of California. They are fairly productive and have fair baking quality. Two were received from the USDA Regional Plant Introduction Center at Pullman, Washington. They are Agropyron hybrids from Italy with unknown yield and baking quality. The fifth one is a cross between the primitive Timopheevi wheat and Tall Wheatgrass (Agropyron elongatum)made by Dr. Kimber at the University of Missouri. Yield and baking quality are untested, but probably poor. We are multiplying these five varieties and crossing them to obtain genetic variety from which we can select favorable traits.

In addition to the five perennial wheat varieties, we are making crosses to obtain more perennial wheat by crossing Agropyron species with domestic annual wheat and two primitive wheats: 1) Triticum monococcum, the first known wheat to be domesticated and 2) a hybrid between Triticum timopheevi, which crosses with many wild grasses more easily than do other wheats, and Triticum taushi, the species from which bread wheat got its gluten.

From time to time, wheat breeders have looked at perennial wheats. Only in the USSR was there a large effort, over several years, to produce and use a perennial wheat, and they apparently stopped trying before 1960. In addition to the problems perennial rye breeders had, the perennial wheat breeders were limited by the time necessary to make a cross manually. Today there are several methods of obtaining male-sterile wheat, acres at a time if necessary, and letting the wind make our crosses.

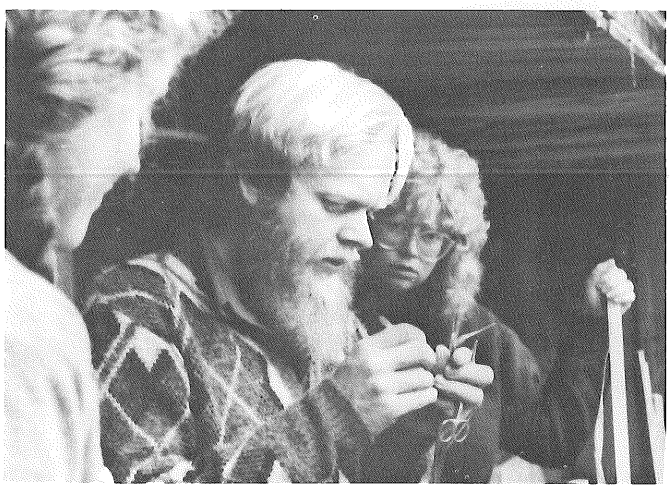
Sorghum, a perennial in the tropics, is being crossed with Johnsongrass to pick up winter hardiness so that we may have a harvestable perennial sorghum. We would still need to trans-

fer genes for larger seed, short stalk, vitamin A, low tannin content, and many other traits which make domestic sorghum superior to Johnsongrass.

Breeding a perennial sunflower crop is complicated by the large number of possible methods which can be used. 1) We could simply select for higher seed yield in the wild, perennial sunflowers, such as Maximillian sunflower. We began this last year and are employing what the breeders call recurrent selection. We are already growing out the offspring of sixty of last year's plants this year. 2) We could make hybrids between Maximillian sunflower and closely-related perennial sunflowers with the hope that hybrid vigor would counterbalance reduced fertility. 3) We could cross the domestic sunflower with wild perennials. The hybrids are difficult to make, and are nearly sterile, but sometimes they will give a few seeds when backcrossed to their parents. In this way we could combine the genes for large seeds with the genes for winter hardiness. Of course, the same crosses would also combine genes for small seeds with genes which make the plants annuals, so this might be a difficult route to follow. 4) We could cross the domestic sunflower with wild perennial sunflowers and stabilize the hybrid with a drug called colchicine which when applied generally restores fertility by doubling chromosome number. The problem with this method is that it will likely be more difficult later on to bring in other genes.

At this point, we are using all four methods. Populations resulting from methods 1, 2 and 3 could perhaps be combined later to give a new population with extreme hybrid vigor. Method 4 might yield quicker results, but make later improvement slightly more difficult. Method 4 might also more quickly give seeds big enough to tempt a human to snack on them.

A winter-hardy perennial corn will take us a while. Zea diploperennis, a wild perennial corn, survived winter in Tucson, Arizona, last year, but it hasn't survived a Kansas winter. So



Walter, teaching Nora and Dana how to emasculate wheat.

Walter, Lynn, Barry and Stu planting replicated yield trials.

we are crossing Z. diploperennis with Eastern Gamagrass to get winter-hardy hybrids. We will then backcross these hybrids to both parents. We are also inter-crossing accessions of pure Eastern Gamagrass, which has potential as a cereal, to bring together the desirable traits which now exist in different clones.

Several researchers have sent us seeds resulting from their work on corn-related crosses. Drs. Harlan and deWet of the University of Illinois, Champaign-Urbana, produced tripsacoid corn by crossing corn with Eastern Gamagrass and backcrossing with corn. They selected for eight generations to obtain a fairly fertile, intermediate, but variable, population. We have crossed this tripsacoid corn with Eastern Gamagrass and with Zea diploperennis and have already produced several seedlings of the latter cross.

Dr. Galinat of the University of Massachusetts Experiment Station, Waltham, sent us a three-way hybrid which combined all the genes of Z. diploperennis, domestic corn, and Eastern Gamagrass. He said that it produced no pollen, but had about 5% seed set when backcrossed to corn or (presumably) to Z. diploperennis. We hope to cross it with other hybrids.

As early as 1920 and as recently as 1963, various scientists have made wide crosses to "perennialize" the annual grain crops. Plants with good first year yields were obtained several times, but typically their yield would drop in the second year, and drop again in the third year. We are anticipating this problem, and we hope to use breeding methods and agronomic practices to avoid or at least to reduce this drop in yield. Usually, selection for seed yield in these perennial hybrids is done for the first year they yield. We're thinking that selection for seed yield needs to be most active in the second, third and fourth years so that plants which don't respond until later on have a chance to pass on their genes for high yield. Intercropping, or polyculture, might also reduce the drop in seed yield. Agronomic practices such as burning and controlled grazing could be used to stimulate seed stalk production, as recorded in the literature.

The other approach to breeding perennial grain crops is through selection for increased seed yield in wild perennials. The seeds of these wild perennials may or may not be edible or have some other useful property, which we can determine later. Our main concern now is to breed a high seed-yielding perennial and we don't care whether it is useful to humans or not. If we find that perennialism and high yield do go together, we think this should convince the land grant universities, who have the resources, to encourage others to begin an effort to develop perennial grain crops.

We have planted out about 4,000 accessions of wild perennial grasses from all over the world, which we obtained from the USDA Regional Plant Introduction Centers in Pullman, Washington, and Ames, Iowa. The genera are Bromus, Festuca, Lolium, Elymus, Agropyron and Sporobolus. All but the Sporobolus or dropseed genus are cool-season grasses. From our literature review, it appears that species of these genera hold the most promise for seed production. We intend to measure seed yield, as well as the components which contribute to yield. For example, one plant may have large seeds but few of them. Another may have many flowers but low seed set. Another may have good seed set, but small seeds. Hybrids between these plants would give various combinations of the parental traits. Then we will have the problem of identifying those few hybrids which combine the good traits. But that's in the future. So far, we're still counting flowers.

Another experiment is a replicated yield trial which compares the seed yield of several commercial varieties of the following cool-season grasses: Smooth Brome, a strain of Tall Fescue, Tall Wheatgrass and Intermediate Wheatgrass. The whole experiment will be something we can refer to later to see if we're making any progress. More important, it will show us how much environmental effect there is on the varieties in the experiment. Then we can calculate how big our experimental plots need to be, and how many we need. It should also tell us which of the grasses in the experiment has the highest yield.

Various accessions of wild legumes and sunflowers, from Marty's field collections and from the Plant Materials Center (Soil Conservation Service), are being studied for seed yield and for variation. If a species has a lot of variation, then there is promise for selection for high grain yield. The number of accessions collected for each species is as follows: Wild Senna (legume) - 42, Illinois Bundleflower (legume) - 32, Perennial Peavine (legume) - 4, Gray-headed Coneflower (sunflower) - 8, Maximillian Sunflower (sunflower) - 6, and Sawtooth Sunflower (sunflower) - 8.

Our present goal is to have one acre plots of winter-hardy, perennial rye, wheat, sorghum and sunflowers as soon as possible, perhaps in three years. Then we can start learning how to manage specific crops to maintain the yield while reducing soil loss and energy use.

Ecological Studies

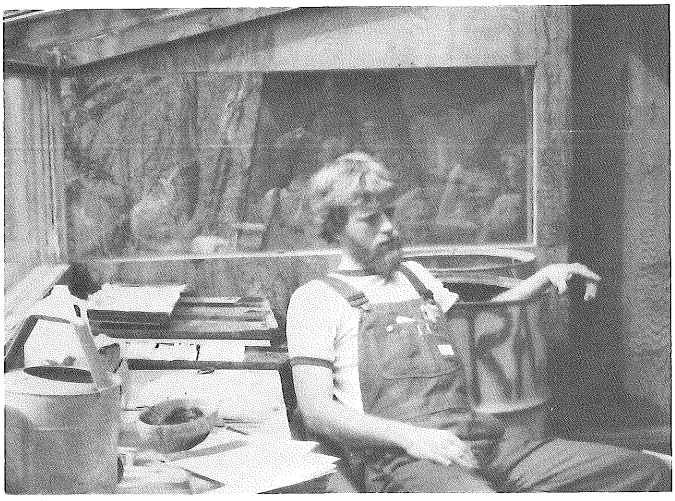
Marty Bender

Besides the new plant breeding program, several other areas of research have begun this spring. These fall under the general category of ecological studies. They involve burn experiments, weed competition studies, an insect inventory and nitrogen fixation investigations.

In early March we burned some plots on a terrace planted to smooth brome and mowed other plots. The object is to observe the effects of these two treatments on seed stalk production of this cool season grass. In April, we burned four areas in the native grass pasture (warm season grasses) on our newly-acquired quarter section of land. In each of these four locations, there are plots with burning schedules of one, two and four-year cycles. These will be burned in the spring and fall, but in dry years, during the summer. We will observe what effect these burning schedules have on the vegetational composition and on seed stalk production.

We are also investigating possible solutions to the problem of weeds. We already see two alternatives to herbicides and cultivation. One would be to select for seedling vigor, quick germination, strong vegetative growth, and do chemical analysis of root exudates to see if they are toxic to roots of competitors. The other alternative is to not weed certain breeding plots and let the weeds do the selection for us. We have chosen to use the second method on four promising perennial grain candidates: Wild Senna, Illinois Bundleflower, Maximillian Sunflower, and Sawtooth Sunflower.

We will be comparing genes for high seed yield made in weeded and unweeded plots. It might be that the ensemble of genes responsible for high yield in the weedy plots may be very different from combinations for high yield where there is minimal competition. This is important when thinking about the designs of polycultures or domestic ecosystems.



Marty Bender

The number of species established in the Herbary has doubled from 140 to 280 this spring. In February the seeds of 500 species, mostly from field collections and some from the Plant Materials Materials Center, were germinated in "rag dolls" in the solar greenhouse. We recorded germination rate and transplanted the seedlings to peat cups in the greenhouse. After about two weeks of hardening off outside, we planted the seedlings in the Herbary in late April. The Herbary is being used this summer for two research activities. Dr. Lawton Owen, an entomologist from Kansas Wesleyan, is recording the insects on the plants in the Herbary each week. Laura Jackson is helping Dr. Jim Mayo of Emporia State University test for nitrogen fixation in prairie species. Our extensive Herbary is an ideal place for collecting roots. It is common knowledge that legumes fix nitrogen from the air, but in the last decade, many non-legumes have been found fixing nitrogen. However, this will be the first time many of these prairie species have been checked.

The acquisition of 160 acres across the road has opened up many more research possibilities, just as the Herbary did. Interesting hard work lies ahead.

Woody Perennials

Jan Ryan

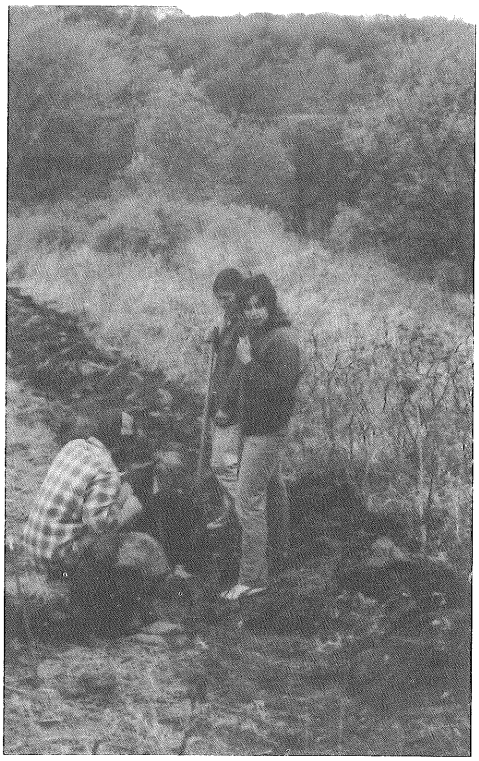
Spring tree planting at The Land started when Marty Bender and Wendell Wiebe planted the existing 400 tree shelterbelt in 1979. This spring I surveyed the shelterbelt to determine what had survived. The survival percentages were as follows: Honeylocust, 79%; Green Ash, 90%; Hackberry, 57%; Black Walnut, 5%; and Austrian Pine, 0%. The fatalities were possibly attributable to the hot, dry summer of 1980, with some additional stress imposed by rabbits, as their nibbling was evident.

We ordered trees from the Extension Office to fill in the vacancies, and they arrived in early April. With two days of student effort, we planted 100 Cottonwoods, 50 Black Walnuts, 50 Austrian Pine, and 50 Black Locusts. The trees were caged to help prevent damage by rabbits, and mulched with hay to conserve water.

We also planted trees on The Land's newly-acquired 160 acre research farm. On a slope in the southwest portion of the quarter section, Marie Rasch and I planted eleven trees from the International Tree Crops Institute in Gravel Switch, Kentucky. These trees include two Black Walnut seedlings, four grafted Honeylocusts, and five "super-fast" growing Black Locusts. Desirable for their food-producing quality, the Black Walnuts are pedigreed varieties. The two varieties of Honeylocust are high in sugar content (Calhoun, 38.9%, and Millwood, 36%). The Black Locust is noted for its ability to fix nitrogen. This small grove may provide both food and timber in the future, as well as information.

The herbary has been a garden of herbaceous perennials, but this spring we added woody perennials in the form of a small nursery of trees and shrubs. Started from seed, these 53 accessions of 46 different species are mostly native to the Great Plains, and their seeds were collected by Marty on various outings.

My first task before planting was to do some reading on the dormancies of these seeds. Since they were stored in the barn through the winter, we hoped the cold temperatures had taken care of breaking any internal dormancy. Some seeds, however, also have a seed-coat dormancy



Stu, Lynn and Margo help Jan plant trees.

that requires special treatment. Many of the nursery techniques require sophisticated equipment and chemicals that we did not have for scarification (roughening up the seed coat to make germination easier). As we were anxious to get the seeds in the ground, some general guidelines were followed, and two basic treatments were set up. One was an acid bath using dilute sulfuric acid (H_2SO_4), and the other, mechanical scarification with sandpaper. Some seeds were also left untreated as a means of control. Nora Kelleher and Stu Slote helped with both the treatment and the planting of seeds.

The plantings in this nursery can serve a variety of functions. Although many are considered "minor" fruits, they will provide human

food, as well as food for animals, especially birds. Others can provide bee forage, timber or soil improvement through nitrogen fixation. From this nursery stock, seedlings can be transplanted to other areas to increase the overall density and enhance the landscape.

Although agricultural researchers at The Land have concentrated on seed-producing, herbaceous perennials, we have not ignored the food and fuel potential of woody perennials. The shelterbelt, the grove of trees on the research farm, and our nursery of trees and shrubs will provide future students the opportunity to learn and contribute to our search for sustainable alternatives in agriculture.

Organic Orcharding: A Grove of Trees to Live In

by Gene Logsdon
Rodale Press, Inc., 1981
415 pages, numerous illustrations.*

REVIEWED BY *Jan Ryan*

Before encountering Gene Logsdon's new book Organic Orcharding, the extent of my knowledge about biological management in an orchard consisted of IPM (Integrated Pest Management). I knew that its practice was becoming more widely accepted, and that this attention has contributed to some noteworthy successes in the field. But while IPM attempts to harness as many biological controls as possible, these efforts are applied to an environment that is biologically "unnatural." Conventional orchards are mostly large, commercial productions characterized by monoculture.

The intent of Organic Orcharding is not to reconstruct commercial orcharding into an appropriately diverse ecosystem (although this is certainly desirable in the long run), but rather to introduce diversity, along with the ecological benefits it offers, to a much more manageable level, the home grove.

"A Grove of Trees to Live In" is distinguishable from a conventional orchard in some important ways that make organic orcharding a feasible undertaking. In modeling a grove after nature's example, the woodland, the orchardist's objective is to let nature do as much of the work as possible. The more complex the environment, the greater the number of biological interactions to maintain a necessary ecological balance.

Diversifying an orchard can be accomplished by planting not only different kinds of trees (the use of trees for fuel, nuts, syrups and oils is discussed), but also different varieties. Furthermore, by incorporating "wild areas" into the landscape through the planting of native species, or perhaps a hedge, one can make use of the food and cover they provide to invite beneficial animals and insects to assist with pest control.

An added benefit of having variety in an orchard is a more continuous harvest of goods throughout the season. Another advantage is a more even work load as the various trees require different care and are ready for harvest at different times.

In addition to what's in an orchard and how it is structured, the success of organic orcharding is closely linked to the overall "health" of the grove. An obvious part of this is paying attention to basic requirements such as water and nutrients. But it is Logsdon's contention that a permanent grove of trees is essentially self-fertilizing. The book does, however, stress the benefits of mulching for water conservation and slow nutrient release. Also emphasized is the choice of where to put a grove, considering, 1) past land use and its effect on the condition of the soil, 2) vegetation in and around the area, and 3) drainage.

Another important concept in organic orcharding is regionalism. One aspect of this is getting familiar with what grows where you live. This is important not only for the possible inclusion of native species into a tree plan, but also in recognizing the environmental adaptations of species, both wild and domesticated. Logsdon writes, "...trees die from fungal or insect attack only if something has upset the ecological balance that formerly protected that particular species, or if a particular species is introduced into a region where it did not evolve and, therefore, is not biologically acclimated to that region." To aid in the selection of what to grow, this book provides information on the suitability of specific trees to the different climatic zones. Using existing vegetation as a guide, however, is more specific, because of the microvariation that can occur within these zones.

Even though the composition of a grove of trees may be carefully thought out, dealing with pests on some level is inevitable. Logsdon

*Illustrations in this article were taken from Organic Orcharding.

has divided pests into three categories for the home orchardist: 1) serious (trees are killed), 2) harmful to fruit, and 3) minor. The first of these, for all practical purposes, can be avoided by observation of the "rules" of regionalism and diversity mentioned earlier. The second and third categories relate directly to one of the major themes of the book, which is that the most serious constraint to biological orcharding is not biology, but rather, economics. In other words, while damaged fruit cannot usually be afforded by the commercial grower, certain losses can be tolerated by the home-grove owner because benefits lie not in the success of a single product, but with the "totality of the environment." The variety of functions that each tree provides legitimizes their inclusion into the whole. A good example of this philosophy is an idea proposed by the author for the planting of sour cherries. The strategy is to plant two varieties that mature at different times (he suggests Montmorency and Early Richmond) as an insurance against losing all to the larvae of the cherry fruit moths who lay their eggs at a relatively specific time. In the event that these pests are a problem, only one of the varieties is infected.

Another idea, which certainly had its place in the past, is making use of fruit that is less than perfect. If something is not marketable (perhaps marketing standards need questioning), it can be fed to animals, or eaten in a more processed form. This is not meant to undermine the goal of attaining quality produce (not many people buy the idea that worms in apples are merely supplemental protein), but to defy the notion that perfection is to be strived for at all costs.

Observation is essential in successful pest management, and the home grove provides ample opportunity for it. An organic orchardist must rely on a more intimate knowledge of her or his grove than a commercial grower who follows a regimented spray schedule. But instead of being more demanding, Logsdon contends that organic management requires less time than conventional commercial management. By using preventive measures when possible (like wrapping Tanglefoot around a tree trunk, and burying a ring of napthalene monthballs in the soil around the base to discourage egg laying by the Peach Tree Borer), and knowing when a treatment is most effective, unnecessary work and expense can be avoided. While many of the complex interactions of biological systems are as yet unknown, a reasonable amount of information on the life-cycles and habits of pests is available for practical application. This book provides such information on the most-likely-to-be-encountered pests, plus a range of methods for dealing with them, including mechanical deterrents like pheromone traps and various cultural techniques, natural predators, botanical treatments and dormant oil sprays.

Another section of this book is devoted to tree diseases. Various fungal, bacterial and viral diseases are dealt with along with some alternative controls and treatments. But the emphasis here is also on prevention, through making use of disease resistant varieties and the natural controls offered by regional and climatic adaptation. By understanding environmental factors, such as humidity, that favor certain diseases, the choice of what to grow or what not to grow can be an effective control.

The last section of Organic Orcharding is entitled "Enjoying the Harvest." The author describes the well-known and lesser-known varieties of tree fruits, plus, often neglected wild species. There is information not only on such essentials as disease and pest resistance, suitable growing areas, and planting, fruiting and propagation requirements, but also interesting bits of history, folklore and culinary hints. The various attributes and drawbacks (such as taste, for example) of individual varieties are explained from the personal experience of the author and other veteran orchardists.

This book is a much-needed addition to the literature on organic food production and self-sufficiency. It deals wonderfully with the skepticism that even convinced organic advocates can feel when talking about orcharding. Through the discussion of conventional orcharding and the nature of its problems, which is woven through the book, Logsdon convincingly argues that these problems need not prevent an organic home grove. I think that this book would be informative and enjoyable reading for anyone wanting to stop subsidizing chemical-dependent and energy-intensive food production, and experience the satisfaction and economy offered by a food-producing grove of trees.

Organic Farming Act of 1982

Dana Jackson

In spite of disinterest in the Department of Agriculture, organic farming is receiving some attention in the U. S. Congress. On June 10, the Family Farms Subcommittee of the House Agriculture Committee held hearings on the Organic Farming Act of 1982 introduced by Representative Jim Weaver of Oregon. On June 22 the Subcommittee passed the bill on to the full House Agriculture Committee.

The Organic Farming Act is a very modest proposal aimed primarily at providing more information to those who wish to make a transition to organic farming. It would require the Secretary of Agriculture to establish a network of volunteers to assist in making available information and advice on organic agriculture for family farms. They would work through the Cooperative Extension Service but receive no pay. The other section of the Act calls for six pilot projects to set up research programs in organic farming at six land-grant universities in different geographical regions of the U. S.

There was nothing in any of the testimony on June 10 to discredit organic farming. Even the top level USDA official who testified made no negative comments, yet he stated that the USDA did not support the bill and did not want it funded. He was obviously reflecting the attitude of Secretary Block, quoted in the Des Moines Register this spring as saying that organic farming research was "dead end" research and the USDA would not support it.

The advantage of lower production costs in organic farming was emphasized in the hearing. Richard Harwood testified that their studies show significantly lower input costs with only slightly lower productivity, or equivalent productivity. He described the conventional farmers, some of them with large acreage, who subscribe to NEW FARM because they want help lowering their costs. Garth Youngberg, the one person in USDA who works half-time on organic farming, said that the cost of fertilizer could possibly increase threefold in the next three or four years.

During the hearing, Rep. Jim Weaver questioned USDA officials about their attention to organic farming. While 200 people work on chemical agriculture (an estimate), only one person works halftime on organic agriculture, and he, Garth Youngberg, mostly answers letters from people reacting to the USDA Organic Farming Study done under Secretary Bergland in the former administration.

Dr. Warren Sahs, Assistant Director of the University of Nebraska Research Station testified that 100 out of 150 farmers who attended a Univ. of Nebraska field day on organic farming research were conventional farmers wanting to learn more. 500 have signed up for this year.

The USDA will not willingly begin to place financial resources and staff into organic farming research. Like other departments in the Reagan administration, Congress will have to drag them kicking and screaming into acting responsibly towards the environment. The Weaver bill is a pitifully modest approach, but it is all we have for the time being. You can support the Organic Farming Act of 1982 (H.R. 5618) by writing to your congressperson.

A Challenge to Conventional Agriculture

Conventional agriculture is in trouble. Many farmers are losing the battle to hang on to their equipment and land as interest rates remain high and crop prices low. The USDA says to reduce the number of acres planted, while the land grant universities work to develop higher producing varieties so American farmers can "feed the world." As small farmers are forced to sell out, agribusiness investors mine the soil and water for short-term profit or tax advantages. Serious soil erosion is reducing options for future generations.

What is the alternative to such a losing system? What would its parts look like? Sooner or later, farmers and consumers, and finally the universities and government will be asking these questions.

There are people exploring the concept of a sustainable agriculture, trying to envision what it could be, how it might operate. Under a grant to the Friends of the Earth, Wes Jackson called some of these people together for a caucus in Des Plaines, Illinois (near the Chicago airport), on June 20-21, 1982. The purpose of the meeting was to discuss the general question: What needs to be done to bring about a sustainable agriculture for the United States?

Fourteen of the invited participants attended this first meeting: Wes and Dana Jackson, Wendell and Tanya Berry, and Donald Worster (see Prairie Festival story about Wendell and Don); Gene Logsden, writer for NEW FARM and ORGANIC GARDENING; John Vogelsberg, organic farmer near Marysville, Kansas; Francis Moore Lappé, Director of the Institute for Food and Development Policy;

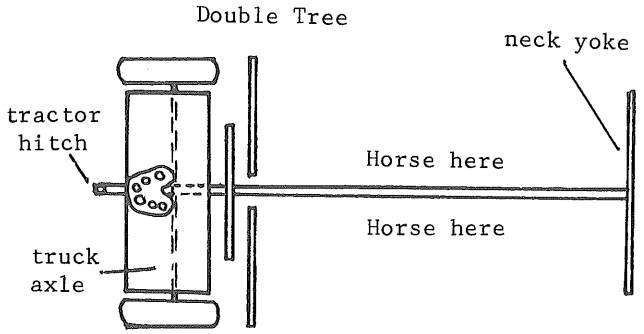
Marty Strange, Center for Rural Affairs; Jenny Gerard, Trust for Public Land; Jay Harris, environmental activist; Bruce Colman, Public Interest Editorial Services; Alan Gussow, President of the Friends of the Earth Foundation; and Robert Schaeffer, managing editor of NOT MAN APART.

The participants in this caucus concluded that a way to begin to bring about a sustainable agriculture is to bring it to the forefront of discussion by publishing a book about it. This collection of articles would present alternatives to conventional agriculture. It would be the affirmative resolution in a debate, a proposal for changes that the agricultural establishment could not ignore. Although articles would analyze what is wrong with the current system, the book must be more than a diatribe against industrial agriculture and land grant universities. It should focus attention on an ideal, a vision of sustainable agriculture which does not deplete soil or people.

Although such a book would cover many areas, such as energy, export policy, organizational structure (credit, finance, etc.), alternative crops, land ownership, marketing and distribution, etc., the unifying thread would be the importance of the soil resource. The main goal of industrial agriculture has always been higher production, even at the cost of losing soil and people from the land. In an alternative system that was truly sustainable, soil loss would not exceed biological replacement, and the equivalent of any nutrients exported from the land, as in the carcasses of animals, would be returned. It would also be run on a renewable energy source, the sun. Although this may be an unattainable ideal, it is no more unrealistic than the current "strength through exhaustion" paradigm of American agriculture.

Putting the Cart before the Horses

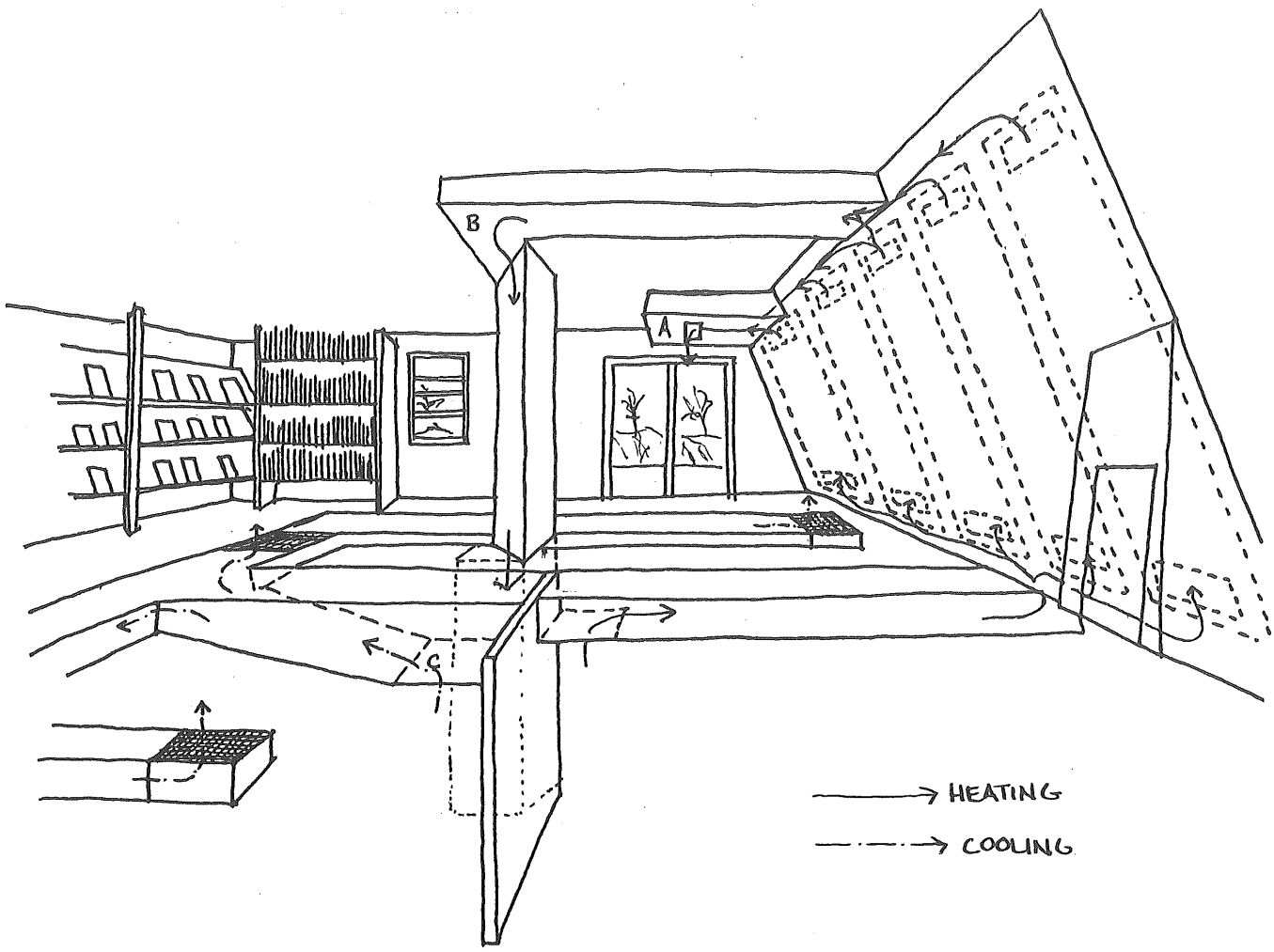
Den Berry



It seems to me that an Institute devoted to the search for sustainable alternatives should be using the most sustainable form of agricultural power known to man, the horse. There is no other producer of power that can till fields, create a large quantity of fertilizer, and produce a replacement for itself all at the same time. For these reasons, it is quite probable that in the near future there will be a team of horses at The Land Institute. Because I wanted to learn how to use a cutting torch and welder, I decided my project would be to make a fore cart for The Land.

The fore cart, or Amish tractor as it is often called, is a very simple device that makes it possible for the farmer to adopt short-tongued tractor machinery, such as manure spreaders, hay rakes, and even some three-point hitch and power take-off-driven implements to be pulled behind horses. The fore cart that I made used an early Fifties pickup truck front axle turned upside down, with a thirteen foot metal tongue welded to it in the center. After this was completed, I built a two foot by three foot platform where the axle and the tongue come together, then mounted a 1940's John Deere tractor seat on it. The final work was to make the necessary brackets in order to mount the double tree and breast yoke on the front of the cart and the tractor hitch on the back of the cart. If I had wished to accommodate three-point hitch equipment or even a power take-off, I could have mounted a three to five horsepower engine on the cart. This engine could run either a hydraulic pump for the three-point hitch or the power take-off directly.

The greatest benefit for me in building the fore cart was learning to use certain tools. Although I had used various drills, clamps, files, tape measures, squares, etc., many times before, I had to learn to use the cutting torch and welder. While I got on to the cutting torch fairly quickly and began to make clean cuts in the first couple of weeks, it took me quite a bit longer to begin to make acceptably strong welds. Most of them still don't look so good, but I think they will hold. I am glad to have learned something about using the cutting torch and welder and look forward to getting more experience with them in the future.



Heating and Cooling the Classroom

Margo Thompson

When we arrived at The Land last winter, it was not long before the history of the active solar collectors on the south wall of the classroom and the trials and tribulations of former students were recounted. From replacing the absorber plates to achieve greater air turbulence to experimenting with a variety of sealing methods for the glazing, it was evident that many students before us had diligently spent their afternoons improving and fine-tuning the site-built air collectors. So, we dutifully took our place in line and started on the next phase, which was to install the fans in the ductwork.

As is often the case with projects which are carried out over long periods of time by many different individuals, we made some changes in the initial design. Our heat load calculations indicated that all the heat supplied by the 300 square feet of collectors on a sunny day during midwinter months would be needed for the classroom and the office upstairs. So, instead of pulling warm air from the bottom of the collector and sending it to the first floor and through the rock pile, we decided to move the heated air from the top of the collector directly into the second floor classroom. An existing ceiling duct in the southeast corner of the room (point A) was the logical place to install the one-third horse, three-speed fan. A small door behind Wes's desk in the office (at the west end of the collector) can be opened to serve as a return to the collector. This not only facilitates the movement of warm air through the second floor but also encourages air to move along the entire length of the collector. In bypassing the numerous lengths of ductwork, we hope that more useful heat will be directly available to the classroom. Although it is likely that a second fan will be required (point B) to move excess heat downstairs during the fall and spring, we decided to test the performance of the collectors next winter before installing it.

With the energy of ten generations of Land students, the active heating system is finally ready to provide energy to the building. Of course, the obvious question might be, "With an energy balance and construction time such as

that, how could one ever realize an energy savings?" Indeed, when compared to the passive solar greenhouse and the battery shed, which not only heat themselves without fans, ducting, etc., but also provide pleasant work space and a winter haven for less cold-tolerant perennials, it is sometimes difficult to justify the existence of such a large active system.

WHY DIDN'T THE LAND BUILD A PASSIVE SOLAR BUILDING IN THE FIRST PLACE?

When the building was started in 1976, detailed information on the design and sizing of solar heating systems was scarce. Virtually all the information which did exist emphasized active systems. One could not find the multitude of articles and books about passive design which are available today. While the operation and maintenance of a passive system is generally less complicated than that of an active system, passive design and sizing can be more difficult to estimate. A mistake in sizing a passive system, especially to err on the side of overheating, can be difficult to correct. When Wes and Dana were make decisions about the design of this building, the choice of an active system was sensible, given existing information.

AN ENERGY SAVING AIR CONDITIONER

As temperatures in March began to climb into the 70's, spring fever was followed by recollections of the sweltering heat so typical of Kansas summers. Thoughts quickly turned from maximizing to minimizing solar gain. With the high temperatures and strong southerly winds, relief from Salina's summer heat is best achieved by closing the building to the 100°F outside air and pulling cooler air from the first floor through the upstairs. The same relatively constant ground temperature which aids in warming our earth-sheltered building during the winter can help to cool it in the summer. Since the first floor of the building is set only partially into the ground, its temperature will still follow the seasonal temperatures somewhat. Yet, even 80-85° air blowing through a room would be a welcome relief when the mercury outside is climbing over 100°F.* In order to increase the flow of this cooler air to the second floor, Barry installed a fan powered by the D.C. current from the Jacobs in the duct downstairs (point C). Although there are future plans to reduce the amount of glazing on the east and west walls and build sunshades for these windows, we hope this wind-powered, earth-tempered air conditioner will help to cool the upstairs office this summer.

Both the active heating and cooling systems seem to illustrate some of the fundamental values of The Land Institute. The primary guiding philosophy has been to achieve maximum performance and efficiency given the materials and experience at hand. The collectors were built entirely by students, primarily from local and recycled materials. Throughout the process of designing and building the active space heating system, the emphasis has been upon education. Expertise--not experts--is pursued through the initial research and actual hands-on experience of bringing the project to completion. Of course, some new materials are purchased and used at The Land; professional advice and help are also sought. The need for this would not be argued. The difficulty arises in deciding exactly where the lines should be drawn. When is the use of an energy-intensive product in an energy-conserving project justified? When does the time or skill required to carry out a job well warrant calling in an expert? As is often the case, it is not the value of either side but the edges which are hard to distinguish.

The experience acquired through working with the solar and wind systems cannot only be useful to the students but to the community as well. Although no one at The Land would recommend the active system precisely as it exists now, it can serve to demonstrate advantages and disadvantages of particular designs and methods. Perhaps, most importantly, it is a statement about what can be done at low cost by ordinary people with a little ingenuity and effort. With the lack of support for conservation and renewables at the governmental level, it will be individuals and small organizations such as The Land Institute which must provide others with encouragement and practical information gained from their experience.

If we had it to do again, we would not choose to cover almost the entire south wall with 300 square feet of active air collectors. The time taken to complete the system, combined with the potentially useful heat lost as air is forced through long ducts, make other options seem preferable. Yet, if we had attempted to rely primarily on a direct gain design, other problems would certainly have arisen. In any climate, it is difficult to get a high percentage of solar heating through only a direct gain design. During cloudy periods and at night, the solar gain is offset by the heat loss through the large expanses of glass; on sunny days, even in midwinter, overheating and uncomfortable glare are the major problems. Thermal mass, night insulation, and summer shading are essential if wide temperature swings are to be avoided. For our classroom building, it would not have been easy to integrate the necessary amounts of thermal storage without taking up needed space inside. Designing and accommodating an effective means of insulating and shading large amounts of glass would also have been difficult. If we could choose at this point, a combination of a better designed active air collector and direct gain would probably be the ideal. The windows could admit heat and light during the day; the active collectors could provide supplementary heat and store heat for use at night or during cloudy periods. Generally, it seems that a coupling of systems is the best way to get maximum heat gain with a minimum of design problems.

*Absolutely true on July 3, 1982!

Insulating Window Shutters

Barry Moir

By performing an energy conservation audit on the former battery shed, now a small office, the spring 1982 class found that 20% of the total energy loss was by conduction through the two large south-facing windows. This is similar to what the average home loses through windows. Nora Kelleher and I constructed insulating window shutters which reduced conductive heat loss through the window by 15%.

The shutters were built from 3/4 inch thick poly-isocyanurate, foil-faced insulation sheets. Under the brand name Thermax or Celotex, they are available in 4 X 8 and 4 X 9 foot sheets in thicknesses from 1/2 to 2 inches. With one 4 X 9 foot sheet (cost $11.00) and a small roll of aluminum tape (about $3.00), Nora and I built several easily-handled shutters to fit the building's two south-facing windows. The tape was used to seal the edges, to prevent the foam insulation from drying out and to help protect the edges of the foam board from dents. Short tab handles made out of tape were added at one edge to facilitate installation and removal.

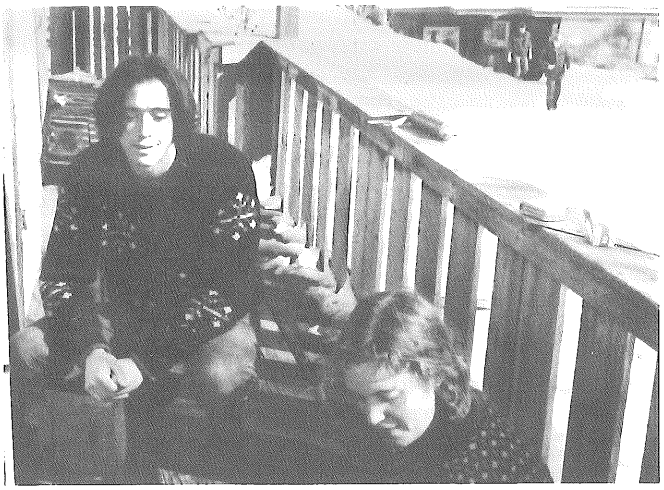
The shutters were based on a design in William Shurcliff's book, Thermal Shutters and Shades (Brick House, 1980). Shurcliff notes that rigid shutters do not have to be well fitted to the window frame or the glass itself, because small cracks around the edges do not significantly reduce the insulation's ability to retard conductive heat flow. We chose to retain the fashionable (a-la-disco) aluminum foil surface because a shiny surface can reflect heat energy back into the room and thus reduce radiative heat loss.

While unnecessary with the recent addition of movable sunshades to this building, in other applications, the shutter could reflect summer sun and keep it from overheating the room.

The greatest advantage of this shutter is that it is easily constructed with a yardstick, pencil, sharp knife and aluminum tape. In our installation, good planning enabled us to get four of the five panels out of one 4 X 9 sheet. The fifth panel was made of scraps taped together into one rigid piece.

By cutting five two feet by three feet panels to fit the two windows, we reduced the problems that storing and installing large shutters would create. In addition, smaller shutters allow part of the window to be open for light or ventilation.

The shutters are installed by simply pushing the panels up behind a groove along the top window frame and setting the bottom edge onto the window sill. The top groove was made by adding a one inch square piece of molding to the top of the window frame. This design is simple and low in cost because we avoid expensive hardware such as hinges, pulleys, and clamps. Although the shutters require active people to make them work, they are truly passive.



Nora Kelleher and Barry Moir

Our energy audit pointed to several other areas of significant heat loss in the battery shed. In time, these will also be corrected. However, in any building with large windows, as solar homes frequently have, window insulation is recommended. Shurcliff's book reviews in great detail hundreds of window insulating options, and the interested homeowner is sure to find one that fits her or his preferences and budget.

Adjustable Sunshades

Marvin Pauls and Stu Slote

The overheating of buildings can be a problem in Kansas from mid-February through mid-October. Our project was to provide a shading device for the recently retrofitted battery shed which is now a passive solar office. (See "A Passive Solar Facelift" by Jean Stramel, LAND REPORT #15).

Design parameters reflected the need for shading, stability against high winds, adequate support and aesthetics to complement the south face. We wanted our shades to be movable during the critical months (February, March and October-see the diagram), because some days shading is desired while other days it is not. We built two sunshades (37" X 54" and 37" X 75") to give the occupant the option of shading one window while allowing sunlight through the other.

The first step was to build triangular braces to support the sunshade. We ripped rough cedar 2 X 6's in half for the upright members and used rough cedar 2 X 4's for the top pieces. Marvin laid out the joints and then instructed us on how to cut and chisel them for a tight fit. Routing the grooves for the garage door track and installing it were next. The frames were then put together using lag screws.

Constructing the panels consisted of laying out 3/8" X 5½" X 18½" redwood slats on two 1 X 2 frames. We allowed approximately 3/16" spacing

between the slats for expansion of the wood and to make nice light patterns on the windows. The two panels were then hinged together to form a sunshade.

The rollers were attached to the front end of the shade and the pins to the back end. In order for the shade to fold up properly and rest against the building, the pin at the back end had to be placed lower than the centerline of the track. It is important to make sure the back end of the shade clears the building when it is being folded up.

Den Berry helped us attach the sunshade to the building. The shade is supported at each end by the triangular frames which in turn are attached to the building with lag screws.

A pulley system was added later to help raise and lower the shades. The shades can be held up at any point along the track, providing partial shading when desired. Anyone raising the shutters needs a stick to start each sunshade moving along the track.

We are very satisfied with the performance of the sunshades, although the larger shade sags a little due to its size. Also, "ears" were added on top of the east-west ends of the panels to prevent excess stress on the hinges.

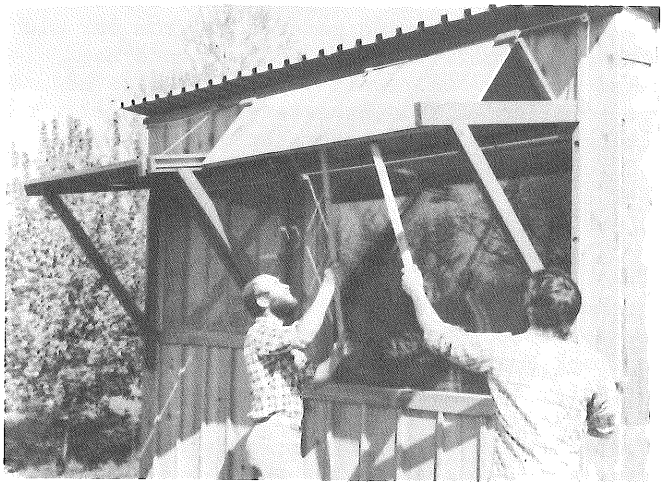
Total cost for both shades was just under $100.00. The cost for wood was about $60.00; the garage door track and accessories, $20.00. Miscellaneous items--screws, washers, hinges, rope and pulleys--accounted for the rest.

The sunshade project gave us a good opportunity to put the numbers in books to use. Being in touch with wood through the use of hand tools was personally satisfying. Now that the office can be protected from overheating, it is a more valuable work area for The Land Institute.

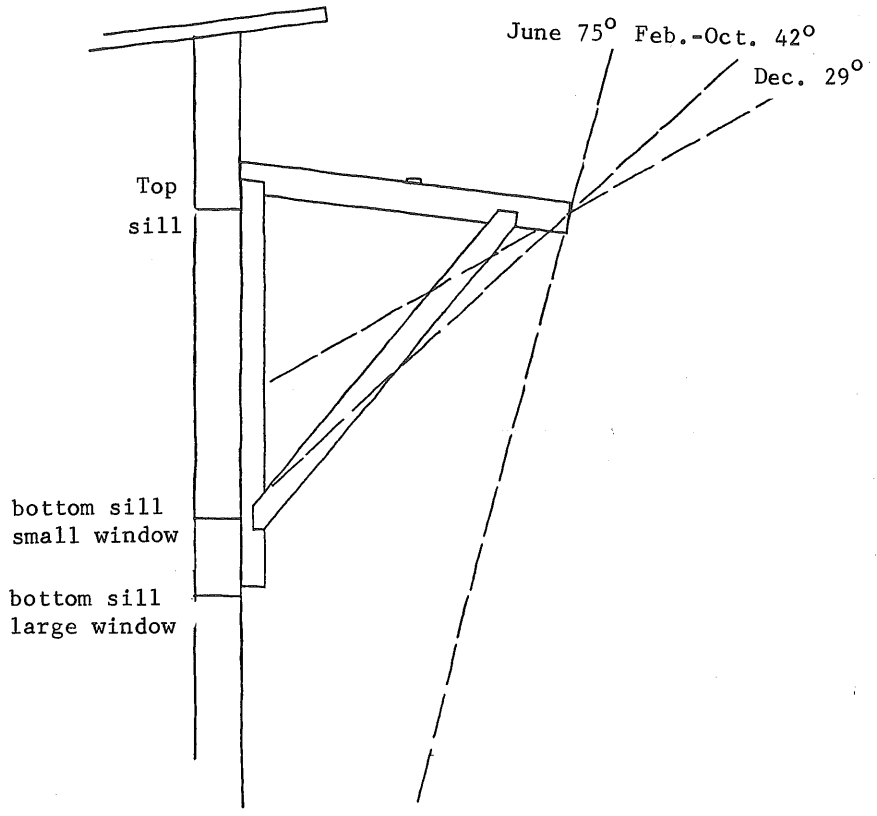
References:

Schwolsky, Rick, "Building It Right: Fixed Overhangs for Shading," Solar Age, December, 1981, pp. 57-58.

Shurcliff, William, Thermal Shades and Shutters, Brick House Publishing Co.



Marvin and Stu adjust completed sunshade.



Passive Kansas Solar

Before adjournment this year, the Kansas Legislature reduced the Kansas Energy Office staff from 23 to 6, eliminating the Solar Office and Research and Development Program. Funds to run the office were available; legislators chose to gut the office out of apathy and ignorance.

Under the leadership of Dave Martin, the office provided a wealth of services to individuals through the toll-free information number, publications, and a series of workshops for homeowners and farmers on small-scale solar technology. The office advised businesses and municipalities on how to save money with conservation and solar. Under Dave Martin's guidance, Capitol Concrete Products in Topeka made plans to build a solar industrial process heat system, and Osage City won a grant to build a 100 KW solar power plant. Kansans have now lost the services of the person who brought $5.5 million to the state in new solar technology.

Wind Energy: More than Meets the Sky

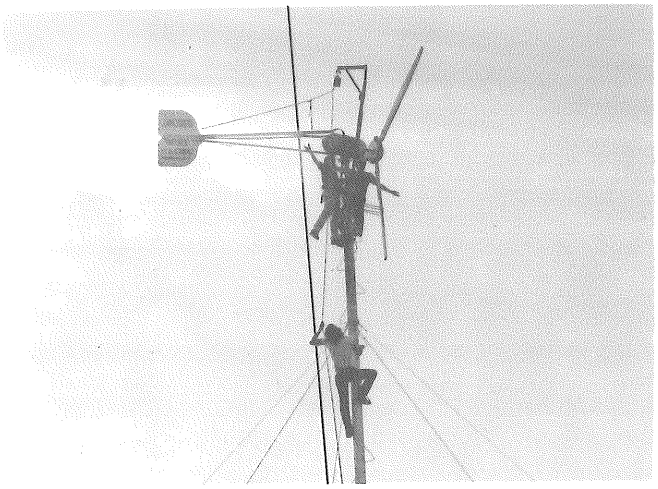
Margo Thompson

The ups and downs of the wind generators this semester gave several of us much experience. On one of the towers is a Jacobs wind machine, which has been referred to as the Cadillac of wind generators. Although it is a durable and reliable piece of equipment, it does need repair from time to time, just as any 30 to 40 year old Cadillac would. Over the years many students have learned about wind generators from our old Jacobs, but their relative inexperience has caused some of the repair jobs to perhaps become more complicated than necessary. The other wind machine, an induction generator produced and sold by Bircher Machine Shop in Kanapolis, Kansas under a franchise from The Lord's Power Company, has yet to prove itself.

The Land began with a Windcraft machine installed in December, 1980 by John Craft, who was then in partnership with Leo Bircher. When they dissolved their partnership, Bircher Machine Shop took over the maintenance of our machine. Last fall, Bircher installed an entirely new B.M.I. wind generator, but it has never performed satisfactorily. After being severly damaged by a wind storm this spring, the machine was repaired and set on the tower again. It still does not work dependably. Since John Craft began manufacturing the Windcraft independently, he has modified and improved the design, and it seems to be developing a good performance record.

Our experiences at The Land have led to some conclusions about wind systems. First, even with the state and federal tax credits, the expense of a wind system is prohibitive for most people. But there are many other things to consider beyond the initial cost. It is important to have an anemometer for this initial measurement, as well as to monitor the performance of the generator thereafter. It is also necessary for a person to think through his or her particular situation carefully in order to decide whether a D.C. (like our Jacobs) or an A.C. generator (an induction motor) is more appropriate. A D.C. generator requires storage batteries and either an inverter or conversion to D.C. appliances. An A.C. generator will run conventional appliances, but any excess electricity must either be converted to D.C. to be stored in batteries, or be sold back to the utility at a very low rate. A very important consideration must be to purchase a wind machine from a reliable company that can back its warranty with knowledgeable, competent service people. Finally, it is necessary to learn how the generator works and to watch and listen on a daily basis so as to spot minor problems before they become serious. Due to the extremely high cost, and the demands of the technology itself, it is difficult for people at The Land to unequivocably recommend wind systems as a viable alternative for the average individual at this point.

We do recommend that anyone in Kansas who is interested in installing a wind generator consult the KANSAS WIND ENERGY HANDBOOK, published by the Kansas Energy Office under the direction of David Martin. It is available from the Kansas Energy Office, 214 West 6th Street, Topeka, Kansas 66603.



Not a musical comedy! This crew is raising the Jacobs tail with the new gin pole.

John Craft, hired to help repair the Jacobs, paints the machine with Margo and Lynn.

Building a Gin Pole

Lynn Hirschberg

This spring during a climb up the Jacob's electric generator tower for a routine inspection, we noticed that a support bar in the tail was broken. We turned the generator out of the wind, detached the tail and lowered it to the ground. It was brought to the shop where Den Berry welded it back together.

From past experience and reading in M. Hackleman's The Homebuilt, Wind Generated

Electricity Handbook, we decided we needed a gin pole to get the tail back up the 45 foot tower.

A gin pole is simply a pole bolted to the tower approximately 10 feet below the apex and rising a few feet above the generator. With a pulley and a rope attached, very heavy parts can be lifted from the ground with relative ease, and with little fear of dropping them. The pulley's height permits a ground crew to hold parts in place near the generator while people on the tower can do the necessary fitting and bolting. Hackleman's book also shows block and tackle arrangements and trucks being used to lift generators to the tops of towers.

A two or three foot extension at the right angle to the top of the gin pole (parallel to the ground) is helpful as it makes it possible to lift out as well as up. Care should be taken in building this extension, as the joint bears a great amount of weight (upwards of 500 pounds).

Barry and I built the gin pole from salvaged 2" diameter pipe with an extension welded on and braced by a diagonal pipe. The eye for the pulley's hook was a loop of old rebar welded to the end of the extension.

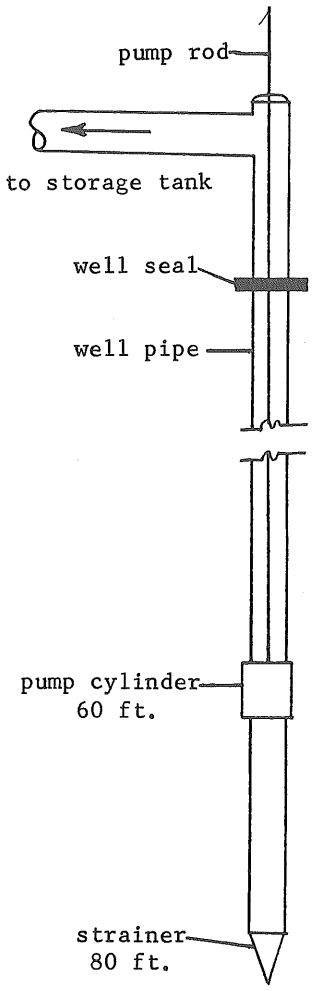
We had difficulty in deciding how to attach the gin pole to our round tower. In Hackleman's book, he shows gin poles bolted to one of the legs of the common three or four-legged towers. In our case, we chose to bolt a small platform to the tower with a circular bracket. From underneath, the platform is braced diagonally to the tower.

Once the platform was bolted on, we hoisted the gin pole with a rope and set it on the platform. Then we wrapped a chain around the pole and tower directly beneath the generator to hold the gin pole in place.

By using the gin pole, a crew of three easily raised and held the tail in position and attached it to the generator. After the last bolt was in, we lowered the gin pole to the ground, but left the platform attached as it provides a convenient stand for people working on the generator.

The gin pole we built was strong enough to lift the tail, but could not be used for the Jacob's generator which weighs over 200 pounds.

For a diagram and description of materials to make a gin pole, please refer to M. Hackleman's book, as the above is not meant to be a technical guide.



Restoring the Water Pumping Windmill

Lynn Hirschberg

Late in November of 1981, Jan Ryan and I undertook completing the restoration of the Aermotor windpumper that was begun by Dennis Ronsse. His account was written up in the summer 1981 LAND REPORT.

We were confronted by a windmill with a number of problems. Oil was leaking onto the blades, which, besides wasting oil, indicated a worn wheel bearing. The next problem was that the mill knocked at the bottom of each stroke (complete turn of the wheel). This problem is commonly diagnosed as the gradual wearing away of the seating where the mill attaches to the tower. This lowers the mill just enough to have the guide wheel, to which the pumprod is connected, hit the mill at the bottom of each stroke. Another problem was the bent tail which had apparently been a target for hunters and was full of holes. Finally, there was the puzzle of how to actually pump water with the thing. We needed a pump, pumprod, some pipe, and a way to elevate the water to a storage tank.

When we began our work, we found that there is little printed information on windmills for the novice. We decided to visit with people who worked on pumpers to fill in the gaps. We arranged a visit to Ruth and Les Michler of Beverly, Kansas. They have been selling the Michler windmill since its advent in 1978, and Les has been servicing windmills for twenty years. The design for the Michler mill was adapted from the Fairbury windmill and is machined at C and P Machine Shop in Salina.

The Michlers were the perfect people to visit for finding out the basics. Les and Ruth showed us some old Aermotor manuals and took us over to their shop where they assemble the Michler windmill. Seeing all of the parts really helped us visualize the problems of our own windmill and how to solve them.

In early spring of this year, Nora Kelleher, Margo Thompson and I returned to the Michlers to get more specifics on the problems as we understood them.

As it turned out, the bearing on the wheel shaft was worn, hence the

oil leak. This was probably due to the fact that the mill is over fifty years old. We decided it was not worth the time, money and bother to replace the bearing. As for the knocking, a spacer or split washer was needed to raise raise the mill the ¼" required for the guide wheel to clear the mill. It was a heavy and therefore a dangerous job, and the Michlers kindly offered to come to The Land with their boom truck to lift the mill and put in the spacers.

When the Michlers came, it was a great event. They lowered the mill and fan to the ground for close inspection. Everyone at The Land came by to have a look and listen to Les's explanations. By the time they went home, the mill was oiled, heightened and ready to be hooked up to a pump.

As luck would have it, there was a good pump cylinder that had been donated several years ago. Darrell Griffin of Krause Pump came out to help us decide what other parts we needed to complete the project. Some pump gaskets, a pumprod, filter and well pipe were needed.

Unfortunately, the 90 foot well had stood idle and uncovered since it was drilled nine years ago, so we had to clean it out. This can be done at quite a cost with compressed air or water pumped down the well to force the silt out. We opted for the cheaper, labor-intensive method employing what is known as a baler. It is a four foot long, three inch diameter pipe

Les Michler, Lynn Hirschberg and Nora Kelleher.

with a one-way valve at the bottom. This is lowered to the bottom, and upon impact, silt and sand enter and the valve closes. The baler is then lifted up and the silt emptied out. Dirty, smelly clothes and sore hands were two results of the task. A clean well was another.

The final task was to lower the pump cylinder down the well and hook it up to the windmill.

Now the Aermotor pumps water into a tank for livestock.

Kansas Energy

—a resource guide for community action

Mari Peterson

Last fall, Diane Tegtmeier and I dreamed of a simple, useful guide for Kansans about energy. Innocently enough, this little creation mushroomed into a monstrous project. Fortunately, many people contributed their time and skills, artistry and wisdom to this resource guide, making the project less formidable and more refined.

Now the end is in sight. KANSAS ENERGY: A RESOURCE GUIDE FOR COMMUNITY ACTION will be available for distribution in mid-August. There are three volumes: Volume I, "The Energy Transition," Volume II, "Kansas Energy Directory," and Volume III, "Community Workbook."

The preparation of this Resource Guide was a cooperative venture. The Center for Renewable Resources provided the initial operating grant to Energy for Rural Self-Reliance (ERS) and the Kansas Natural Resource Council (KNRC). Gary Kannenberg of KNRC and Diane Tegtmeier and Jim Fedfern of ERS were funded by this grant to do their research and writing. Funding for my contribution to the Resource Guide came from a Noyes Foundation grant secured by The Land Institute, where I held the position of Energy Research Associate during my work on the publication. Marie Rasch, a student at The Land designed the manual cover and did all the graphics, layout and paste-up as her student project. Several other students and staff members helped at certain critical points, which we greatly appreciated.

Volume I, "The Energy Transition," explains in detail the current status of conventional energy supplies, demand, and ownership in Kansas. Even though we may have some energy resources left, our control over them and the economic benefits we derive from their value is not as great as we sometimes imagine.

The detrimental impact of dependence on conventional energy sources is even more dramatic at a county level. In Volume I, a section called "Local Energy Contrasts" describes the large dollar outflow associated with conventional energy purchases for Harvey and Wabaunsee Counties.

The financial stability of communities will partly depend on how well they manage their energy consumption. To make wise decisions, communities will need information about how they use energy. To plan, they will need to know how much energy is used in growing crops, running factories, heating homes, and so on. Both Harvey and Wabaunsee Counties have done a study of their energy use, and the results are summarized in "Local Energy Contrasts." (For other counties that wish to do the same, worksheets for gathering energy data are available in Volume III.) The comparison of Harvey and Wabaunsee Counties shows the great variation in energy use from one county to the next.

Many objective studies conclude that conservation is the most cost-effective strategy to pursue right now. In addition, compared to traditional energy sources, a greater percentage of the money spent on conservation stays in the communities and in the state. In Volume I, there is a section entitled "The Conservation Options" which overviews possibilities for the residential, commercial/institutional, industrial, and transportation sectors. Programs that are available (or were available through the Kansas Energy Office) are briefly described. Communities, businesses, and institutions that have successfully improved the efficiency with which they use energy are highlighted.

The final section in Volume I is on "The Renewable Energy Options," with information on solar, industrial process heat, wind, biomass, and agricultural alternatives. The solar and research and development programs of the Kansas Energy Office were serving a vital role in promoting these alternatives in the state before they were recently axed. The Solar Office was in the midst of developing a series of construction workshops to promote solar space and water heating collectors, greenhouses and grain dryers. The Solar Office was successful in bringing a national pilot project for a small-scale, solar-powered, electrical generation facility to the state. Osage City was just awarded this project in June.

This section also reviews the potential for wind energy and biomass energy in Kansas, including the obstacles that are currently holding their development back. Some consideration of alternative agricultural practices that save energy follows the discussion of wind and biomass.

Volume II is called the "Kansas Energy Directory." It will serve as a "yellow pages" to people who want to find energy professionals to help them, such as solar businesses, passive solar architects, energy auditors, wind machine representatives, and alcohol fuels professionals. There is a list of the energy programs of state agencies, community action agencies, and substate offices. Renewable energy and conservation organizations, and educational programs at Kansas schools are listed for people who want more information on tax credits and consumer protection.

Volume III is called the "Community Workbook." This begins by suggesting how to organize citizen-based community energy projects. A model organizational process is described which moves from the development of a vision statement to the determination of goals and objectives, to the analysis of means to achieve the objectives. There are suggestions on how to work with volunteers to promote community-wide participation.

Financing is crucial to any project. Volume III describes both funding mechanisms (extending loans, revolving loans, municipal solar utilities, etc.) and funding sources.

Another key element to a successful project is good publicity. The "Media/Publicity" section discusses strategies for small towns and larger cities. There is an emphasis on both the non-media and media contacts, with special remarks on interviews, news releases, news conferences, and other aspects of working with the media.

Many serious energy projects eventually require political action. In Volume III, political action techniques for dealing with local governments, state legislatures, and regulatory commissions are reviewed. Information is presented about the Kansas legislative process, lobbying, and utility rate hearings.

Following this information in Volume III is a list of technical resources, including people, organizations, or publications that can further assist in the areas described above.

The final portion of Volume III is devoted to the worksheets which will enable communities to gather end-use energy data for the residential, commercial, industrial, agricultural, mining and construction, and transportation sectors of the community. These are designed for use by lay people. Following the worksheets is a discussion of a methodology for projecting energy use into the future. This is not in a worksheet format.

From this description of Kansas Energy: A Resource Guide for Community Action, it is clear that we did not have one specific target audience in mind for all three volumes. If you are interested in one or more of the three volumes, you may send your request to Energy for Rural Self-Reliance, 5130 Mission Road, Shawnee Mission, KS 66205. The requested volumes will be mailed to you free of charge, as supplies last.

Asking the Right Questions

Dana Jackson

On June 9, seven members of the Ogallala Working Group of the Missouri Basin-Great Plains Caucus met at The Land Institute to discuss the High Plains Ogallala Aquifer Regional Study. In 1976, Congress directed the Secretary of Commerce, in cooperation with the Army Corps of Engineers, appropriate federal, state and local agencies and the private sector to study "the depletion of the natural resources of those regions of the states of Colorado, Kansas, Nebraska, New Mexico, Oklahoma, and Texas presently utilizing the declining water resources of the Ogallala aquifer, and to develop plans to increase water supplies in the area and report thereon to Congress, together with any recommendations for further Congressional action."

The governors of the states met as the High Plains Study Council in November, 1976, and in September, 1978, chose Camp, Dresser and McKee, Inc., (in association with Arthur D. Little, Black and Veatch and others) as the general contractor for the study. Each state was also to perform part of the study, and the Army Corps of Engineers was assigned to conduct water import studies. The draft report was released in February, 1982, but the final study will not be presented to Congress until January, 1983.

In the LAND REPORT #12 we described the results of the $775,000 Army Corps of Engineers' inquiry on the feasibility of transporting water from out of state rivers to recharge the Ogallala Aquifer. These interbasin transfers were found to be enormously expensive. For example, the annual pumping and maintenance cost for delivering water from the Missouri River in St. Joseph to Dodge City, Kansas, would be $272 per acre foot minimum, and that would not include the costs of distributing the water from terminal storage points to the farms.

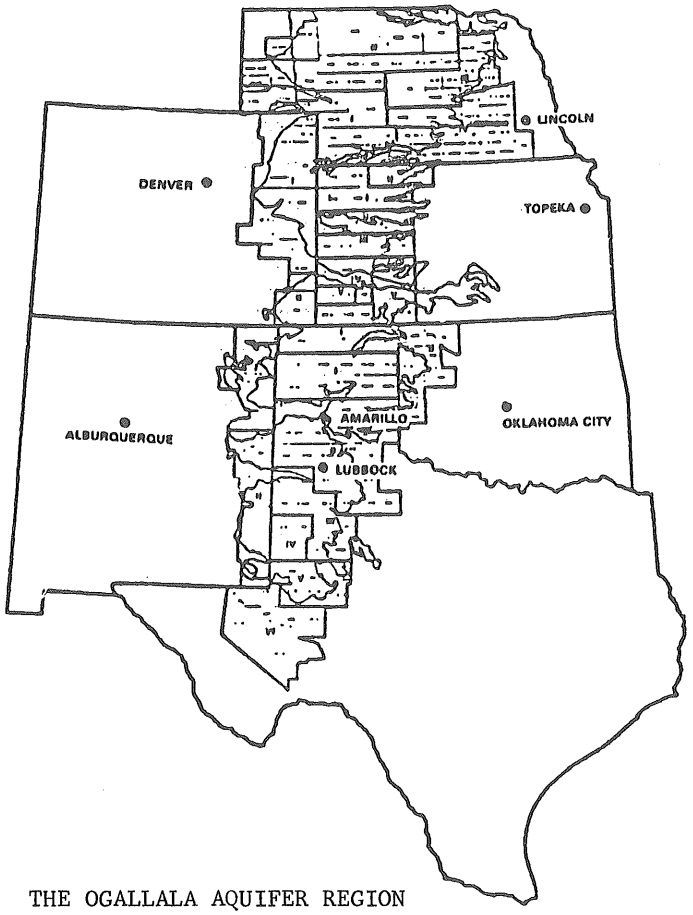
The draft report of the High Plains Study did not recommend that any of the interbasin projects be constructed, but it did recommend a continuation, expansion and refinement of state water transport feasibility and planning studies. So the Army Corps will continue to prepare expensive engineering fantasies at the taxpayers' expense.

The study group which met at The Land in June included Marty Strange of the Nebraska Center for Rural Affairs; Bob Warrick of the Nebraska Sierra Club; Father Leonard Kayser, South Dakota, Catholic Rural Life; Ned Fritz, Texas Sierra Club; Steve Burr, Salina, National Parks and Conservation Association; Ron Henricks, Kansas Natural Resources Council; and Wes and Dana Jackson of The Land Institute.

Marty Strange assessed the economic assumptions used in the High Plains-Ogallala Aquifer Study. He pointed out first that Congress asked the wrong question when it authorized the study. They asked, "What can we do to sustain irrigation on the Great Plains?" instead of "What are the resources on the Great Plains and how could they best be used on a long-term basis to support a sustainable agriculture?" Congress also assumed that the role of agriculture in this country is to bail out the rest of a sagging economy by providing agricultural commodities for export to balance what we pay for imported oil. This means that export policy dictates resource policy on the Great Plains. It also assumes that the rest of the world wants what the U.S. wants them to want, and this demand for our commodities will make prices rise.

Ron Henricks discussed the assumptions about energy in the study. The impact of rising energy prices was not considered very important because the study assumed commodity prices would increase to offset energy costs. Henricks also pointed out that Black and Veatch had used energy price forecasts that were unrealistically low. However, in order to justify the continuation of irrigation on the High Plains, high commodity prices and low energy prices had to be assumed.

The study, which was for the period until



THE OGALLALA AQUIFER REGION

2020 and not beyond, did not consider that the long-term impact of irrigation upon the land resource could be negative. Marty Strange pointed out, "In Nebraska we have too much water. It makes it possible to do terrible things to the land." Large companies have purchased sand hill country in Nebraska and are plowing up grasslands to plant and irrigate corn. This is also happening in eastern Colorado and southwest Kansas. Ironically, irrigation to increase production and improve the economy could lead to desertification of the area, Wes pointed out. The study would have been much more useful if it had set out to find out what kind of an agricultural economy could be developed that would be in harmony with its resource base.

Irrigation and capital-intensive farming on the Great Plains has led to the loss of family farms and erosion of the resource base of communities and people. Tax policies have been more favorable to large agribusiness than to the small farmer.

The Great Plains area does not need government planning to help farmers continue irrigating, but "programs which subsidize disinvestment in non-sustainable agriculture," Marty Strange said. For example, subsidies could be used to pay people to remove center pivot systems. There could be a penalty for investment in irrigation equipment in the form of denying farmers the right to use accelerated depreciation on irrigation equipment. Depreciation is an accepted facet of business accounting, but accelerated depreciation is the same as a government subsidy. Another government action could be to eliminate the water depletion allowance. Then companies who still intend to irrigate could be required to post a reclamation bond before developing an area such as the sand hills of Nebraska with center pivot irrigation. This might decrease the number of acres of grassland plowed up to plant corn, or insure that it is carefully replanted to grass after farmers are through growing corn.

"Nineteen Paths to Better Use of Water" was the headline of a newspaper story describing the recommendations in the draft report of the High Plains Ogallala Aquifer Study. On the surface, they seem hard to fault as most of the recommendations are conservation oriented, directed at extending the life of the Ogallala Aquifer. At the same time, they are designed to perpetuate the very system of agriculture on the Great Plains which is leading to desertification in some areas, the loss of the family farm, and the loss of wildlife and ecosystems. The model of the corporation-owned, irrigated fields for energy-intensive corn/livestock production, much of which will be exported to offset the high price of oil, is the wrong model. All the research recommendations in the study will benefit this model, as well as farm equipment, pesticide and fertilizer companies, and the researchers at land grant universities who invented it.

Members of the study group meeting at The Land discussed how important it is to begin to present alternatives to conventional agriculture. Extending the life of the Ogallala Aquifer to continue irrigation will not save agriculture on the Great Plains because water is just one of many factors, not the determining factor, in a viable agriculture for the long term. What will it take to direct the United States toward the development of an agriculture that is environmentally sound, sustainable, and socially and politically just? Perhaps the continued critical analyses of studies such as the High Plains Ogallala Aquifer Regional Study will help.

The Ogallala Working Group will present their analysis to the full Missouri Basin-Great Plains Caucus in Rapid City, South Dakota, during meetings on September 12-13.

Great Plains Desertification: It Could Happen

Wes Jackson

I understand that there are geographers who seriously believe that all deserts are human made. I don't know whether this is true or not. We do know that our own Southwest looks very different than what Coronado surveyed. The grass covering was nearly complete then over vast areas which now do well to sponsor cacti. The "biomass turnover," as the ecologist would say, wasn't very great, but the standing abundance of grass created an illusion that the potential carrying capacity was many times greater than it is.

The presence of water in dry country makes us lie to ourselves, for where water is, life responds so vigorously that all seems right and good. We tend to assume that what we are seeing is part of a permanent pattern. The Spaniards' illusion of an abundant landscape in the Southwest was a foreshadow of the American's illusion of permanent abundance on the land above the Ogallala and beyond. A drive by field after field growing 150 bushels per acre corn in the irrigated Great Plains gives one the impression that this bounteous land can provide continuous copious harvests. I am reminded of the tube wells of the Sahel which brought short-lived increase before the ecological crash which expanded the desert and brought on the infamous famines of the last decade. The wells of the Ogallala could produce a similar landscape for our own Great Plains, with the effects stretching far beyond the surface which covers the aquifer.

Until recent times, Southwest Kansas could boast of a million acres of Sand Sage Prairie along the Arkansas River. In 1973, a 150 mile stretch of the river died. It died because water was being pulled out of the river upstream by Colorado farmers and out of the ground from the Ogallala by farmers now plowing and planting the

Sand Sage Prairie. Until the irrigation age began to lower the Ogallala, the river literally ran on top of the aquifer. Now when the yearly release of 10,000 acre feet from a Colorado dam reaches Kansas, much of the water drains down through the dry sand into the increasingly shallow Ogallala. The full outcome of this forty year-old mining operation is yet to be appreciated, but there is one ecological consequence deserving wider discussion. When irrigation finally fails in the area which used to be Sand Sage Prairie, farmers will not be able to revert to dryland farming as their neighbors on each side of this sandy strip. Without government help there will be little incentive to revegetate these million acres. But if that sand is not tied down with vegetation, it will blow. This strip is positioned in the worst way imaginable, for it runs east-west, presenting itself broadside to the prevailing winds of the south-southwest. Its orientation, and a nearly constant high wind velocity, will make these million acres the mother lode of the expanding desert. Farmers to the north who have reverted to dryland farming will eventually have to shut down as the cutting sand invades their fields and ditches.

One of the principles of agricultural economists is that when the water becomes too expensive to pump, farmers will simply revert to dryland farming. One of the prinicples of dryland economics however, is that while an area can accumulate and maintain abundance, it cannot sustain a high annual harvest, be it vegetation or water. This is the lesson we should have learned from the vegetation change which came to much of the Southwest from the time the conquistadores arrived until the failure of the cattle industry in the 1880's. But we didn't learn it them. Maybe we will begin to learn now when we cross the unnecessary bridges spanning the dry Arkansas River bed. But to learn a lesson isn't enough; it has to be internalized as well. Let's hope the second step happens before hot wind begins to tatter the tassels of drought-tolerant sorghum north of the sand country. Let's hope too many farmers don't believe the ag economist from the university and think they can simply revert when the water bonanza becomes uneconomic.

CONTINUED FROM PAGE 8.
"Two Worlds of Water" - Donald Worster speech.

potential, and maybe the intention, of total power. Conceivably now we can reverse entire Arctic streams and make them fill Arizona swimming pools. We can and have turned deserts into alfalfa fields, tomato patches, and golf courses. We may before we are through obliterate the earth. Power over nature of this extent necessarily brings to our discussion of domination a new series of questions: Is nature, as well as humanity, today dominated in the way we have defined? Do natural entities possess their own values, separate from our interests, and their own capacity for self-direction, self-fulfillment, that we can injure or repress? What is our obligation as humans to other natural beings? Are we morally required to respect their diversity, their integrity, their stability? These are unfamiliar questions for many people, and we answer them awkwardly, hesitantly, with nervous glances around the room to make sure others are not scoffing. they must be considered a part of western water policy today.

There is a related question that for most people may be easier to take up and discuss. It is this: What impact does total control over nature have on the human community?

...We now stand high up on a ladder of water development. It has taken us, along with our predecessors, incredible energy and determination to climb rung by rung to this point. Lower down we could not see where the ladder was taking us, what the view would be from the top, or who would be sitting on the highest rung. Now we have answers to those puzzles. There is clearly visible at last a great leviathan who rules over the uppermost heights, keeping everyone else from going any higher. That leviathan is a beast made up of private economic power--agribusiness, energy conglomerates, food processors--and of public bureaucratic authority. If we want to stay high on the ladder, we must accept the beast's preeminence, we must be content to see it grow fatter and fatter at our expense, we must take a lesser place for ourselves in its massive shadow. But if we do choose that position, then be aware that the most ominous thing to be seen from our new elevated vantage is that the ladder itself is unsupported by nature; it teeters back and forth in midair, threatening to fall the moment leviathan fails to maintain his balance, or becomes too heavy to do so.

The artificial water regime coming to dominate the West, and indeed much of the world, is propped up by nothing more than a set of airy expectations. It is, to begin with, a very expensive system that feeds water to agriculture, cities and increasingly to industry. ...An intensive water empire has other costs than construction: insect and disease vulnerability, uncertain labor supply, salt poisoning of soil and water, staggering energy bills to run the pumps. ...Leviathan cannot manage; already he is having trouble keeping up with the problems and grasps at even higher rungs to avoid crashing, threatening to bring us all down with him.

Faced with such a prospect, prudent men and women must wonder whether we should edge our way back down the ladder, taking a step or two at a

time till we are closer to earth and out of leviathan's shadow. We can indeed come down if we will, though it may mean ignoring the advice pouring from above. Coming down will require a mix of old and new knowledge, of forgotten and still uninvented farm practices--all those specifics I leave for others to devise. But I can suggest here a few fundamental strategies that will be indispensable in finding our way to a sustainable water future, to a sustainable life in the region, to a sustainable modernity.

First, we must begin thinking of places like Kansas in terms of a thousand years. Push our consciousness of this place back a thousand years into the past, push it ahead a thousand years into the future. Ten centuries is still a recognizably human span of time... But short as it truly is, it is not a consciousness of time we can realistically expect to get from leviathan. A corporation, a bank, a federal agency, a Washington politician, all of them have more truncated memories... To free the region from their logic, therefore, means seeking aid from other directions. ...In most parts of the world's agriculture religion is such an institution. ....But if conventional religion fails to give leadership, and so far it has, we will have to find our own route to a thousand-year consciousness--a secular solution it may be. The study of a deeper, thicker local history in our schools is one possibility: the history not only of our own sort, but of all the people who have lived where we are now, the history of all those who will come after us, the history of a valley.

A second strategy needed to get us back down the ladder a few rungs is to remove ourselves as much as possible, in as many ways as we can, from the world market economy. Nothing has been more important in pushing us toward leviathan than that economic culture of buy-sell, profit-loss. Every tendency in that culture works to maximize personal gain at the expense of communities and rivers alike. ...No one ought to underestimate the difficulty of restraining the multinational forces now stripping the land, draining the rivers, but the only sure alternative is to begin taking control again of our needs and of the means to satisfy them. Local producer and consumer cooperatives have proved to be the most effective in institutions to achieve that economic independence, though turning off the television advertisers is a fast way to begin.

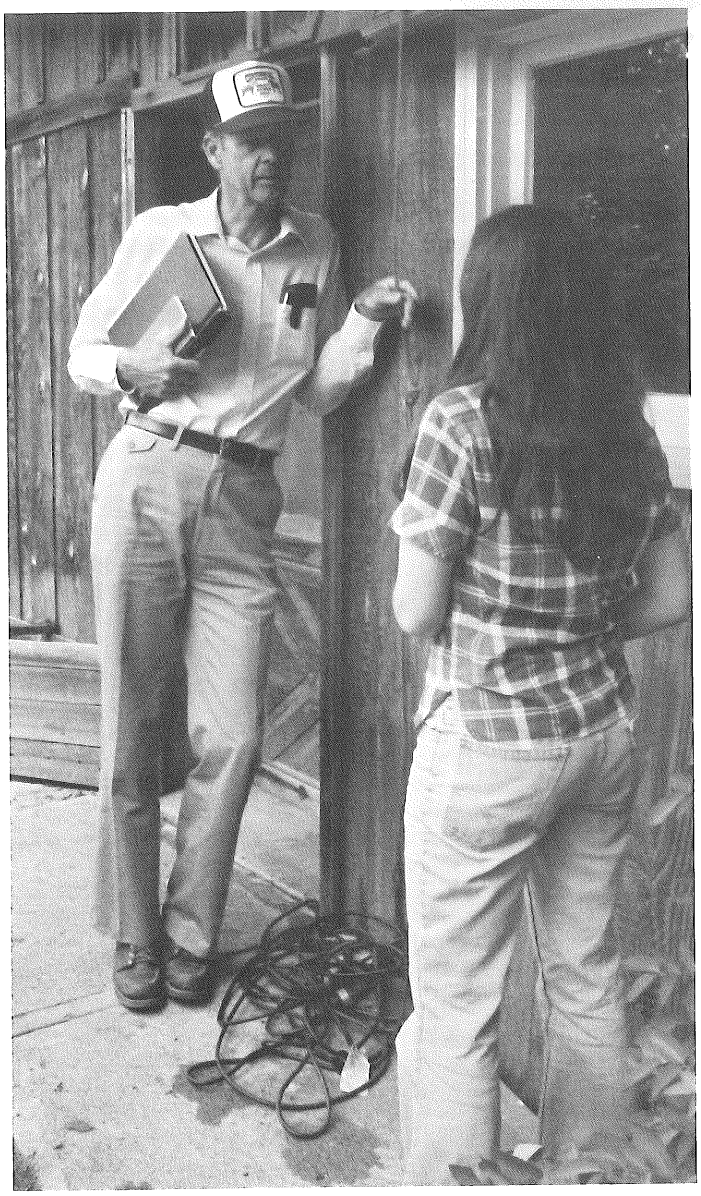
The third strategy is to redesign the tools of our agriculture and irrigation in order to put them back under the direct management of ordinary people. One of the critical ways leviathan makes other serve him is to take away their competence. He gives them water pumps they cannot fix without his assistance, canals they cannot maintain, dams they cannot design. ...To stop that slide of rural folk into inarticulateness we must recreate a water technology that farmers can manage within their own communities.

...A final strategy, and for me the essential one, is to learn to feel again--not merely to think the thought--that the natural world is our world. It is flesh of our flesh, bone of our bone. It is not exactly us, of course; a river has another and separate identity from ours. But it is part of us, we are part of it and of all its parts, even when we wall it off behind a levee.

Donald Worster (center)

CONTINUED FROM PAGE 9.
"Getting Along with Nature" - Wendell Berry

healthy soil, probably too complex for human comprehension, can yet be husbanded, can benefit from human care, and can deliver incalculable benefits in return. This is a possibilty that can reach to any city backyard, garden and park. In any place under human dominance (which is now virtually every place), this is a possibility that is both natural and cultural. If humans want wildness to be possible, then they have to make it possible. If balance is the ruling principle, and a stable balance the goal, then for humans this requires a consciously-chosen and deliberately-made partnership with nature, a partnership, that is, which is not natural, but an artifact, made by human knowledge, imagination, skill, work and restraint. That is to say, that we can only be true to nature (and this is a very traditional idea) by being true to human nature, to our animal nature, plus those cultural patterns and restraints that keep us from acting like animals. When humans act like animals, they become the most dangerous animals, even to themselves and other humans. And this is because of another critical difference between humans and animals. Whereas animals are usually restrained by the limits of



Wendell Berry

physical appetite, humans have mental appetites which can be far more gross and capacious than physical ones. Only humans squander and hoard, murder and pillage because of notions.

...We also need culture-born instructions about who and what humans are, and how and on what assumptions they should act. The chain of being, for instance, is an old idea that has not been replaced by any adequate new one. It was simply rejected, and the lack of it leaves us without a definition. Lacking that ancient definition, or any such definition, we do not know at what point to restrain or deny ourselves. We do not know how ambitious to be. We do not know what or how much we may safely desire. We do not know when or where to stop... Ignorance of when to stop is a modern epidemic, and it is the basis of the principle of industrial progress and economic growth.

...The scale of agriculture from a technological or economic point of view is too big. From a demographic point of view, the scale is too small. When there are enough people on the land to use it, but not enough to husband it, then that wildness of the soil which we call fertility begins to diminish, and the soil itself begins to flee from us, in water and wind.

If then the human economy is to be fitted into the natural economy, in such a way that both may thrive, the human economy must be built to proper scale. It is possible to talk at great length about the difference between proper and improper scale. It may be enough to say here that the difference is suggested by the difference between amplified and unamplified music in a landscape, or the difference between the sound of a motorboat and the sound of an oarlock. A proper human sound we may say is one that allows other sounds to be heard. A properly-scaled human economy or technology allows a diversity of other creatures to survive.

...To argue the necessity of wildness to and in human economy is by no means to argue against the necessity of wilderness. The survival of wilderness, of places that you do not change, where we allow the existence even of creatures we perceive as dangerous, is necessary. Our sanity probably requires it. So probably does our intelligence. Whether we go to those places or not, we need to know that they exist. And I would argue that we do not need just the great public wildernesses, but millions of small, private or semi-private ones. Every farm should have one. Wildernesses can occupy corners of factory grounds and city lots, places where nature is given a free hand, where no human work is done, where people go only as guests. These places function, I think, whether we intend them to or not, as sacred groves, places we respect and leave alone, not because we understand well what goes on there, but because we do not. We go to wilderness places to be restored, to be instructed in the natural economies of fertility and healing, to admire what we cannot make.

...What I've been implying, what I now want to say, is that I think there's a <u>bad</u> reason to go to the wilderness. We should not go there to escape the ugliness and the dangers of the present human economy. We must not let ourselves feel that to go there is to escape. In the first place, such an escape is now illusory. It's hard to find a wild place where you can't smell progress or hear it. In the second place, if even as conservationists we see the human and the natural economies as necessarily opposite or opposed in that plane, that one can be escaped from into the other, we subscribe to the very opposition that threatens to destroy them both. The wild and the domestic now often seem isolated values, estranged from one another, and yet these are not exclusive polarities, like good and evil. There can be continuity between them, and there must be.

Perspectives

Dana Jackson

THE LAND REPORT exists to tell Friends of The Land and subscribers about the work done at The Land Institute in its search for sustainable alternatives. Although we try to keep a global perspective and be informed on national environmental issues, THE LAND REPORT cannot review all the issues for our readers.

We receive the magazines of almost all the major environmental organizations in the U.S. The initial displeasure over Interior Secretary James Watt has now become widespread alarm over the entire Reagan Administration's anti-environment policies. Ten organizations have pubished a 37 page documentation of the disastrous actions of the Administration, and we are printing a few paragraphs from the introduction below. We hope readers will read the entire indictment, increase their financial support of a favorite environmental organization, and contact their congresspersons again and again about the issues.

INDICTMENT: THE CASE AGAINST THE REAGAN ENVIRONMENTAL RECORD

Friends of the Earth, Natural Resources Defense Council, The Wilderness Society, Sierra Club, National Audubon Society, Environmental Defense Fund, Environmental Policy Center, Environmental Action, Defenders of Wildlife, Solar Lobby.

"President Reagan has broken faith with the American people on environmental protection. During his first 14 months in office, he and his appointed officials have simply refused to do the job that the laws require and that Americans expect of their government--to protect the public health from pollution and to use publicly owned resources and lands for the public good. Instead, Reagan Administration officials are handing over to private use the clean air and water, forests, grasslands, coal and oil that belong to us all...

The Administration has moved swiftly. It has changed clean air rules to allow many coal-burning plants to dump more sulfur dioxide into the air, where it re-forms as acid rain. It has withdrawn rules to control industries that dump toxic chemical wastes into landfills or flush them into city wastewater plants where they corrode equipment. From strip mines to waste dumps the Administration has cut back enforcement of the laws. Its agencies make fewer inspections and take many fewer illegal polluters to court.

When it could not get Congress to change the environmental laws, the Administration used budget cuts to cripple the agencies that carry them out. Eight major statutes passed in the last 12 years assign to EPA a job that will double in size in the next few years. The Administration wants to slash EPA's budget by 40 %...

The Administration's energy policy has been to eliminate virtually very program that provides direct benefits to individuals and small businesses seeking to conserve energy or use solar energy, while protecting billions of dollars in subsidies for nuclear power, synthetic fuels, and the oil industry.

The Administration is blind to the dangers of nuclear power. It has withdrawn safeguards against nuclear proliferation and, seeking a quick solution convenient for industry, has overridden a cautious process to deal with nuclear waste disposal. The Administration is considering the use of fuel from nuclear power plants to make nuclear weapons, erasing the distinction drawn by President Eisenhower between Atoms for Peace and weapons for nuclear war.

The Reagan Administration's approach to the environment and natural resources is not conservative; it is radical..."

The Friends of The Land have been extremely important. Many helped collect materials to build the first classroom/office/shop; many donated their time and labor to begin reconstruction after the building burned in October 1976. Friends donated books and money to help develop another library and began contributing to the general support of The Land through yearly gifts. The Land needs these friends, and new friends too.

The Land Institute is a private, educational-research organization. In recent years, several private foundations have awarded grants for special programs. These would not have been made if The Land had not shown a record of broad-based support from individuals who make annual contributions. Continued financial support from Friends of The Land is vital.

Contributors receive THE LAND REPORT and other occasional publications, plus notices of events sponsored by The Land Institute. The Land Institute is a non-profit organization, and all gifts are tax deductible.

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On the Front Cover: Our Quarter Section

"This is the phenomenon of edge or margin that we know to be a powerful attraction of a diversified landscape, both to wildlife and to humans. The human eye itself seems drawn to such margins, hungering for the difference made in the countryside by a hedgey fencerow, stream or a grove of trees. And we know that these margins are biologically rich, the meeting of two kinds of habitats."
(From Wendell Berry's Prairie Festival speech)

Dick Courter has included some edges in his sketch of the 160 acres which The Land Institute purchased in March. As a bird watcher and President of the Kansas Audubon Council, Dick sees that the value of the quarter section is not only in its 68.5 acres of cultivable land and 80 acres of pasture, but in what is generally referred to as "wasteland" in the real estate appraisal: the pond and its marshy sides, the small creek, the wooded areas, and a rocky hillside at the north end of the pasture covered with Echinacea.

As a member of the Board of Directors of The Land, Dick also appreciates the quarter section for its usefulness to our agricultural research program. Several acres of wheat were disked out this spring and replanted to 4000 accessions of perennial grasses to begin a plant breeding program. (See page 14) The cultivator invariably knocks the stakes askew, which is more amusing to Dick than to the driver of the tractor! The sketch also shows the burn experiments in the pasture, the rectangles darker and greener than the surrounding grassland.

By early July, The Land had received $105,000 in contributions toward the purchase price of $112,000. Pledges to be given in the next fiscal year will bring donations over the top. The Land Institute is grateful to all the Friends who contributed to the Land Purchase Fund, and to all those who regularly encourage and support the agricultural research program.

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