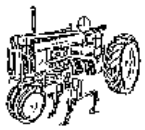
THE LAND REPORT

Fall 1986

Number 28



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Photographs in this issue by Michael Collins, Teresa Maurer, Dana Jackson, Terry Evans and Tim Conner.

On the Cover

The cottonwood leaf in the dry prairie grass speaks the place and the season. It is a common sight, especially along prairie streams like our Smoky Hill River, where cottonwoods grow like weeds. Iralee Barnard, a prairie illustrator whose drawings have often appeared in **The Land Report**, shows us the beauty in such common occurrences in nature.

New Logo

This past summer we requested help in designing a new logo for The Land Institute. Friends of The Land and former students submitted many interesting designs, and we displayed them in the classroom for students and staff to study. We finally selected one sketched by 1984 intern, Ann Zimmerman, currently a law student at Harvard. Danielle Carré modified the logo design and drew it on a poster in time for our tenth anniversary celebration on October 11. Here it is. We hope you like it. And yes, eventually the new logo will decorate T shirts and/or hats!

The Land Report

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Editor.....Dana Jackson
Arts Associate.....Terry Evans
Circulation Mgr..Sharon Thelander
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Contributing to #28: Patrick Bohlen, Brad Burritt, Danielle Carré, Michael Collins, Mari Sorenson Detrixhe, Dana Jackson, Wes Jackson, Rob Peterson, Dwight Platt, Dennis Rinehart, Melissa Sarlat, Paul Winter.

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

At The Land

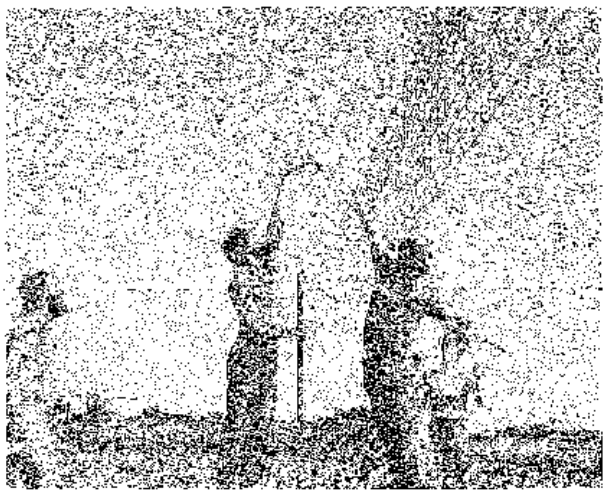
Dana Jackson

This issue of The Land Report reflects the work and thought of the 1986 fall session. On September 9, students and staff droppped the summer routine and resumed classes over assigned readings in the mornings; they did the field work required by the experiments in the afternoons. Through October this meant harvesting, threshing and cleaning seeds; in November and December it meant spending hours at the computers, entering and analyzing data and writing papers. Brad Burritt and Dennis Rinehart wrote articles for this Land Report about leymus and sorghum, two potential perennial crops we are researching.

All thought and discussions were not limited to ecology and genetics readings or the implications of results from our experiments. The main commons area at The Land is a classroom-library, where students and staff often spend their lunch hour reading the current magazines and newsletters. This stimulates discussion about issues such as the economic plight of farmers and the decline of rural communities, the deforestation of the tropics, and the nuclear arms threat. Articles in this issue exploring the history of dependence upon commercial fertilizer (by Danielle Carré), the advertising of herbicides (Melissa Sarlat), and an ambitious exploration of the interaction of good and evil in environmental issues (Rob Peterson) came from such reading and discussion.

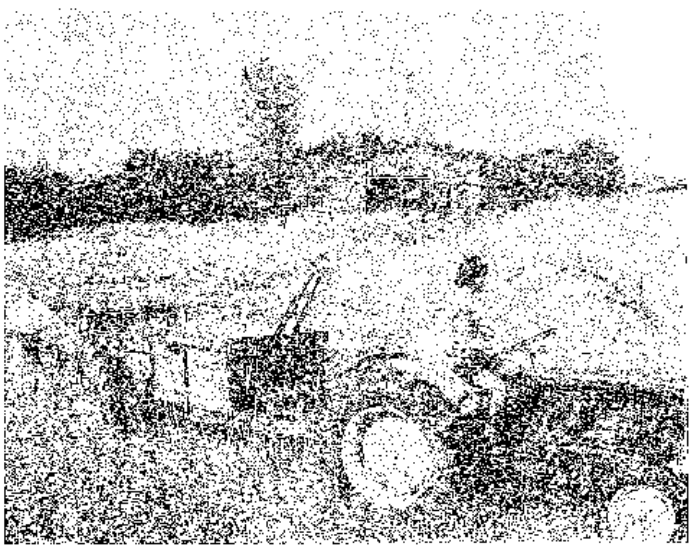
This issue also covers two important fall events at The Land. First, the dedication of the Wauhob Prairie during our tenth anniversary celebration was highlighted by a dedication speech given by Dwight Platt. We have reprinted it so more Friends of The Land can understand the importance we have placed on protecting this piece of land. Second, we bought nine acres with a house and outbuildings adjoining our east boundary. In his article, Wes Jackson explains why this acquisition is more advantageous to The Land Institute than building needed office and research space.

The Land Report exists to present a description of work and thought at The Land Institute. The fall session has been rich and rewarding and cannot be covered adequately. Those who want to learn more about what goes on here are invited to phone us and make arrangements for a visit.

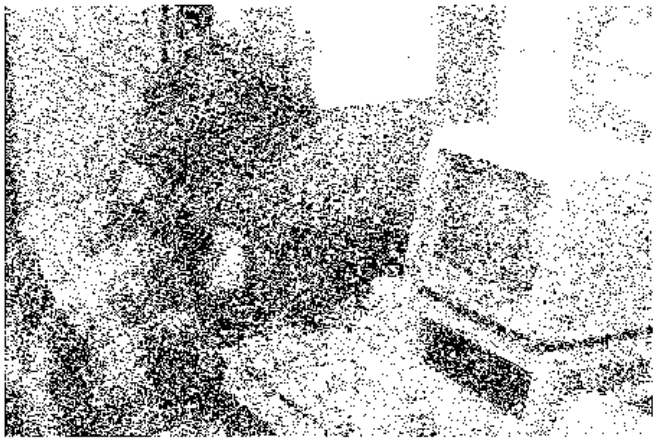


Above: Recreation time for Mark Slater, Guy Grigsby, Mark Gernes and Dennis Rinehart.

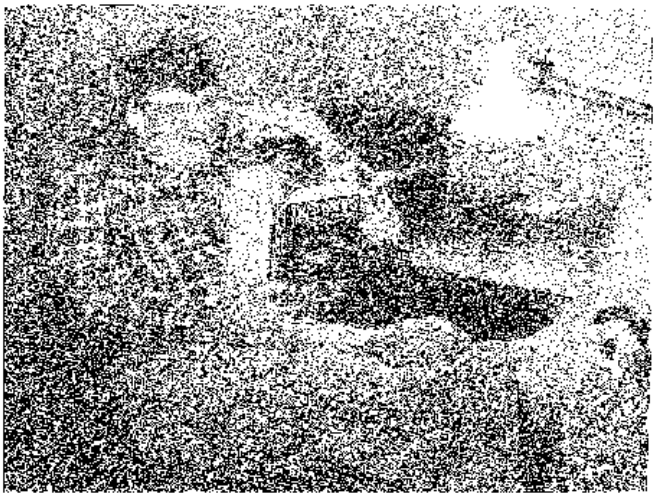
Patrick Bohlen fixes a snack in the student kitchen.



Right: Melissa Sarlat and Rob Peterson move equipment out of the barn so there will be space for anniversary dinner tables and chairs.

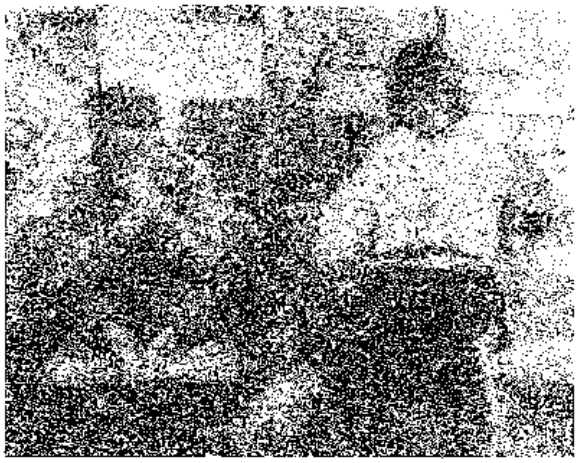


James Henson



Paul Threadgill

Duncan Vaughan will not be leaving The Land soon. He started his post doctorate this past September and will be at The Land until mid-December 1987. He received his B.S. in agricultural botany at the University of Reading in England and worked at the famous Kew Gardens. He spent three years with the International Rice Research Institute in the Phillippines, then received an M.S. and Ph.D. in genetics and plant breeding at the University of Illinois.



Melissa Sarlat listens; Teresa Maurer teaches.

Post Doctorate Program

Three post doctorates will leave The Land Institute in December and begin new positions in January at the Kerr Center for Sustainable Agriculture in Poteau, Oklahoma.

James Henson has been at The Land for the longest period, since September 1985. His academic background includes a B.S. in agronomy from the University of Missouri, M.S. and Ph.D. degrees in plant breeding and plant physiology from North Dakota State University. James worked for a private agricultural company and then did a post doctorate at the University of California, Riverside, before coming to The Land. James' farm upbringing and his research experience made him a valuable member of the research team at The Land.

Teresa Maurer came to The Land Institute last April, 1986, after completing her Ph.D. in Ecology at the University of Oregon, where she studied biological control of weeds by insect agents at the Lawrence grasslands in eastern Oregon and worked for the Nature Conservancy. Teresa's teaching ability and computer expertise were put to good use this fall.

Paul Threadgill spent a brief four months at The Land, from September through December 1986, becoming oriented to the basic concepts of sustainable agriculture. After earning a B.S. in Biology and an M.A. in Botany at the University of Kentucky, he completed his Ph.D. in Plant Population Ecology from the University of Western Ontario. He will be working as an agroforester at the Kerr Center.

The Kerr Center for Sustainable Agriculture began operation on January 1, 1986 as a private, non-profit organization to do research, education, demonstration, and consultation on ecologically and culturally sound systems for obtaining food, fiber and meaningful livelihood from the land. The Kerr Center is based on a 4,150 acre ranch, in the Poteau Valley of southeastern Oklahoma.

The post doctorates join another Land Institute alumna, Holly Winger (1985) who is the communications specialist at the Kerr Center.

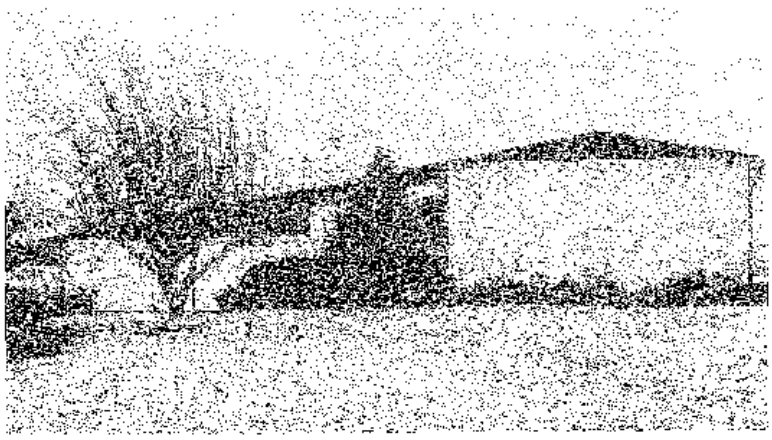
New Property Purchased

Wes Jackson

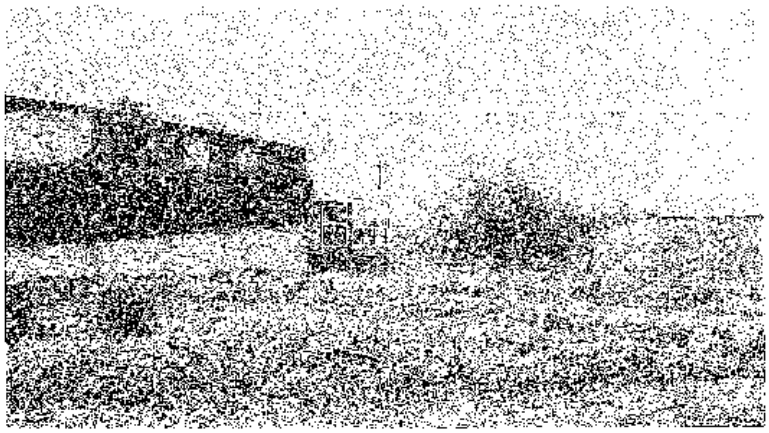
Almost anyone familiar with our concerns about the "growth economy" and "small is beautiful" is likely to question what has happened to The Land Institute itself over the last ten years. I certainly worry about that aspect of the human condition which says, "If we were a little bigger, we would be better." The economist John Kenneth Galbraith pointed this out nearly thirty years ago now, and it does seem that it is easier to grow than stand still. What I am getting to is an admission that this past October The Land made a major commitment that I hope we don't live to regret. We bought nine acres of property immediately east of the original twenty-eight. This nine acres includes a custom-built 21 year old house and three good outbuildings. More on that later. First some history.

The Land Institute's facilities have all been acquired, built and paid for as we went along since we started ten years ago. Partly because our experimental results in agriculture have shown so much promise, our scale has increased. Three years ago there were eleven or so of us around here. Now there are twenty who receive paychecks on a regular basis from The Land. We began to outgrow space in 1985 and realized we were becoming somewhat inefficient and uncomfortable. This past year we started to plan and raise money to build a new greenhouse and research office facility, and we picked out a site on the Land Institute's 160 acres near the experimental plots on the north side of the road. A generous donor made a commitment of $100,000 over five years for the greenhouse.

At the end of August, quite unexpectedly, this nine acre property and buildings came up for sale. Because of its ideal location relative to our experimental plots and facilities and because of the large amount of square footage in good buildings suitable for our purposes, the Board decided that this acquisition would benefit The Land Institute. The cost of existing improvements on the property is considerably lower than if we were to start building them from scratch. We still need a greenhouse, but there is an excellent site for one just south of the house. With only the greenhouse to build, less staff time will be diverted to planning and overseeing construction. The following is a description of the structures and how we, at the moment at least, intend to use them.



West side of house looking from Herbary.



Open ground is site for construction of research greenhouse as large as 40 X 80 feet.

House

21 years old, 3,226 square feet of living space on 2 levels. Zone heating-cooling; solar assist for space heating (no storage); 18" of insulation in ceiling over bedrooms, 12" over living areas. Steel beams, 2 x 12 floor joists, abundant built-in storage. 625 square feet in attached garage. Attached screened patio. Laundry room.

Uses:

Living Room	Business office
Kitchen/Dining	Meeting room
Bedrooms	1 guest room 3 offices for staff and post doctorates
Family Room	Classroom and library or office
Laundry Room	Dark room
Garage	Potential office area

On October 24 we started using the living room for a business office, and I set up my office in one of the main floor bedrooms. Five other staff members and post doctorates now have offices in rooms on the lower floor. The space and privacy have made us more productive.

Metal Pole Shed
1,080 square feet, galvanized metal

Uses: Storage of combine, seed cleaning equipment, drill, disk, plow, 2 tractors, rotary and sickle mowers, etc.

Hay Storage Barn with Attached Pens
960 square feet, galvanized metal. Designed for hay and grain storage, fattening steer and butcher hog on concrete slab.

Uses: Storage of straw or hay mulch.

Shop with Attached Buildings
1,726 square feet, all insulated, with heat, power, water, sewer. Shop to accommodate welder, saws, power tools; small "sophisticated" chicken house; walk-in cooler; meat processing area with sink, hot-cold running water; milk processing area; milk parlor with concrete floor and feed storage area.

Uses:

Shop	To be used as is. Could be converted to research space since it is partially insulated.
Chicken house	Seed storage
Walk-in Cooler	Seed storage
Meat & milk processing	Space for research
Milk parlor	Work space

We went through the following rationale in making the decision. It represents a rough, but we think somewhat conservative, estimate of the cost if we were to obtain and build all these facilities ourselves.

Land: 9 acres	$ 14,000
House: 3,226 sq.ft. @ $43.50	140,331
Attached Garage: 625 sq.ft. @ $8	5,000
Metal Pole Shed: 1,080 sq.ft. @ $6	6,480
Metal Pole Barn: 960 sq.ft. @ $6	5,760
Outbuilding--mostly insulated: 1,728 sq.ft. @ $8	13,824
Two water wells	4,000
	$189,395
Purchase price for land, wells, 7,619 sq.ft. buildings	$159,500
Advantage	$ 29,895

In calculating this advantage, we have not accounted for costs already sunk in construction site work, roads, septic tank, concrete walks, landscaping, etc., which would also be more expensive for new construction.

How do we think we are going to pay for all of this? Including money we gradually accumulated in our Land Purchase Fund, we have raised over $60,000. Our friends at the Jessie Smith Noyes Foundation in New York loaned us $100,000 interest-free. We, of course, want to pay that back as soon as possible so they can put their money to good use elsewhere. We are asking individuals to make outright donations or pledges to be paid out over two, three, four, five years or whatever--anything in order to get this behind us.

Left, building attached to shop (shop roof upper left). Center, storage barn. Right, pole shed.

We have never made commitments until we had the money in hand or safely promised. The Noyes loan provided a cushion which made us feel we might make an exception this time, but we are anxious to pay it off.

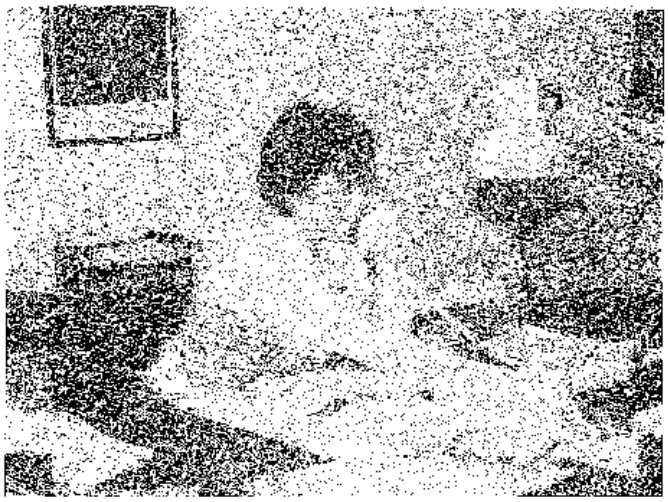
Now back to the growth economy and the growth of The Land Institute. E. F. Schumacher, a man whose writings and spirit continue to influence us daily, is the man who said "small is beautiful." We believe that in spite of our recent purchase, we are still small. Schumacher also said that opposition to growth in and of itself is not the right way to think about the problem. Some things will be growing while other things are contracting. That is the way of the world or for that matter, the universe. What we have to be concerned about is

South side of house with solar collectors.

to what extent the growth economy is, in fact, dependent upon the extractive economy. Have we at The Land Institute, with this purchase, therefore accelerated the extractive process by making this commitment? Our answer is that if we have, not by much, and we do hope to "do a little better by being a little bigger."

Here is another way to put it. Let's hope that the money we spend turns out to be "solar capital" or "transition capital" toward a sustainable future. We intend to do everything we can to keep it from becoming "burn it up" capital which fuels the extractive economy. Maybe that ought to be our pitch in fund-raising. Maybe, in fact, this is the way the transition will occur, when an increasing quantity of financial resources are transferred from extractive enterprises to sustainable ones. With that in mind, how can you refuse to mail us a check today?

A Familiar Face Returns



Linda Okeson

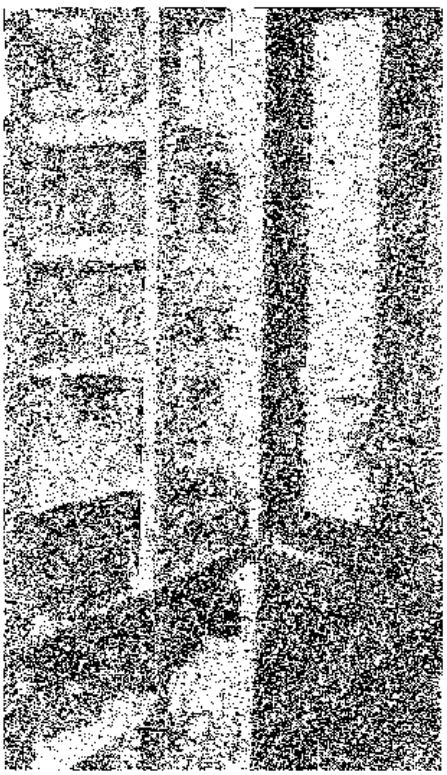
We are happy to welcome back a new but old employee, Linda Okeson. Linda began working for The Land Institute in the fall of 1981 and resigned early in January 1986 to take a job with a law firm. On October 24 she set up her desk in the living room of the new house (now the business office) as business manager and administrative assistant to the co-directors.

Linda Okeson became one of only four Land Institute employees when she joined the staff in 1981. This October she returned to a staff of eight, plus four post doctorates, a research fellow and eight interns. Along with more personnel, we have greater expenses and more complex business affairs; fund-raising takes more time. Linda's return lightens the load for our bookkeeper-secretary, Sharon Thelander, and assures the co-directors that things will be running more smoothly from now on.

Garden Delights

The garden is silent now in mid-December. A blanket of snow, patterned on the rich earth, quietly tucks it away for the winter. Now and again we still go out there to pull leeks, the last of our produce, blanketed with straw.

This has been a great year for the garden and for sharing the bounty. The success of the garden was reflected in the group potlucks and in the amount of food preserved. The potluck is a unifying ritual; at these gatherings one can see amply laden tables of food featuring our garden vegetables. Each time there is a diverse range of carefully prepared food and a reinforcement of the community spirit that exists here. Our pantries are full of bright, colorful jars containing, tomatoes, beans, pickles and jam, so we continue to enjoy the products of summer's warmth in the cold gray days of winter.



Wauhob Prairie Dedicated

Dana Jackson

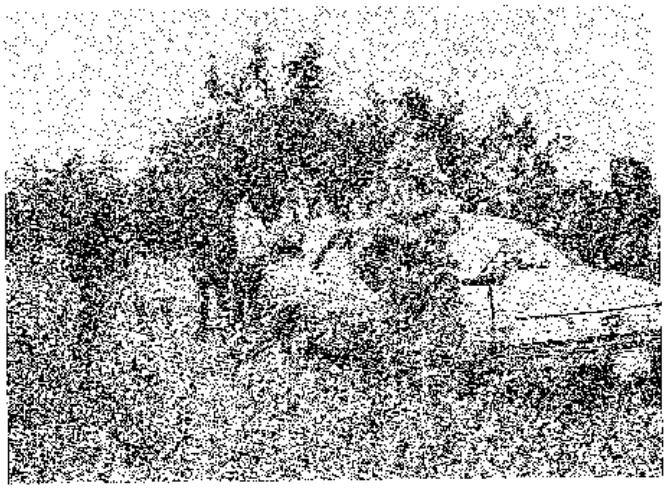
We faced the north wind on the top of the hill listening to the miraculous sounds coming from Nancy Clark's flute-- variations on the Shaker hymn, "Tis a Gift to be Simple." We knew her fingers must be stiff and cold, yet the notes kept coming, the ripples of sound she produced blew towards and over us by the wind.

About fifty people had left the tea and cookies and warmth of the classroom and walked through mud and wet grass to be present at the dedication of the Wauhob Prairie. Several hours earlier we had briefly discussed cancelling the dedication and relocating the anniversary dinner in town (it had rained all night and all morning), but we finally decided to go ahead as planned.

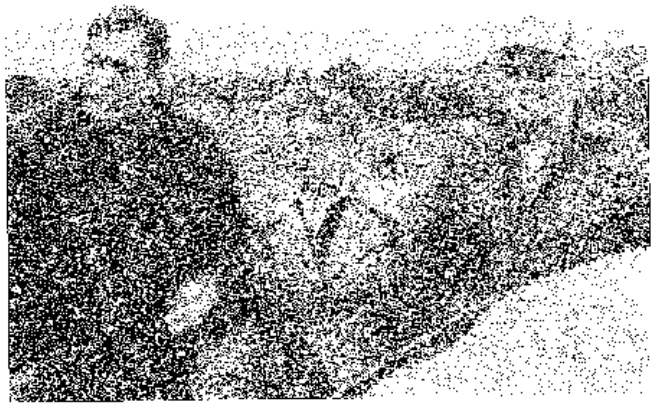
The participants hunched down into their coats, hands in pockets, and listened attentively to Nancy's lovely flute offertory to the prairie. Then Wes Jackson welcomed the participants and introduced Loyd and Bess Wauhob, owners of the prairie remnant which The Land will protect under a fifty year lease with the Wauhobs.

Jon Piper, staff ecologist at The Land who is doing studies on the Wauhob Prairie, talked about its special qualities. Then Dwight Platt, prairie ecologist, professor of biology at Bethel College and member of the board of directors of The Land Institute, made the speech of dedication. In the last part of our ceremony, Teresa Maurer described the mixture of prairie plant seeds which she had collected in quart jars for participants to scatter by handfuls over a bare area as they left the site.

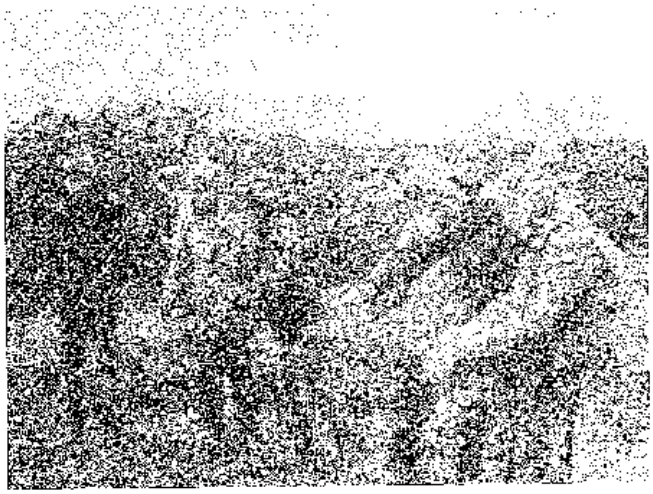
If you drive by The Land Institute, look for the wooden sign designating the Wauhob Prairie on the north side of the road across (and a bit west) from the main driveway.



Jon Piper speaking at dedication on the left. Nancy Clark by music stand on the right.



Wes Jackson, Bess Wauhob, Loyd Wauhob.



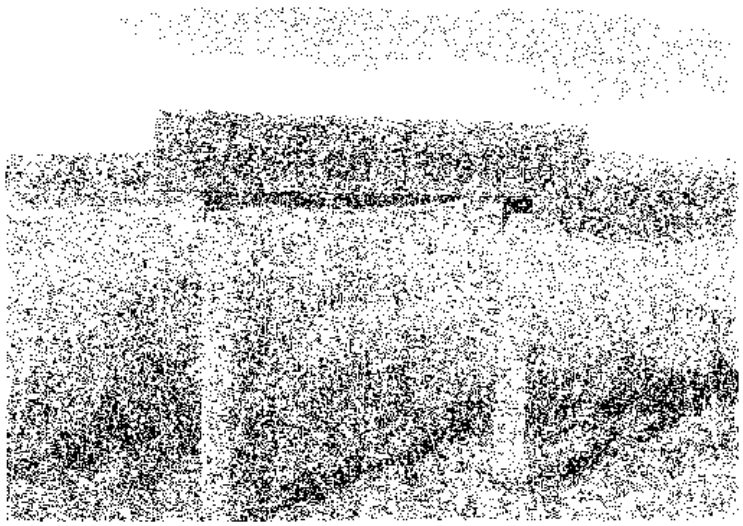
Board member Ivy Marsh (far right) and other Friends of The Land scatter prairie seeds.

In spite of the cold, over 150 Friends of The Land attended the 10th anniversary dinner catered by Gene Revels of Salina in the barn following the dedication. Karen Black, a member of our board of directors, made all the arrangements, and Iralee Barnard created the dried prairie plant wreaths and bouquets decorating the barn. Speeches by Steve Burr, former board member, and Russ Brehm and Mari Peterson, former students, followed the dinner.

Anniversary celebrants warmed up at the concert by the Paul Winter Consort at Salina Central High School that evening. The audience of 700 responded enthusiastically to the music of Paul Winter, soprano sax; Jim Scott, guitar; Glen Velez, percussion; Rhonda Larson, flute; and Zella Terry, cello. The Smoky Hills Audubon Society and The Land Institute co-sponsored the concert, which was funded in part by a grant from the Salina Arts and Humanities Commission.

Speech of Dedication

Dwight Platt



This afternoon we are gathered to dedicate a library, a library not of printed books but of biological information incarnate in living organisms. This is a library of information on the natural history and heritage of this area. For this prairie community before us is part of the stream of life that has flowed over this land for millions of years. The prairie we dedicate today is the latest page out of a long history of evolutionary development at this place.

If we focus our vision down to a small square of this prairie plot, we see a microcosm of the prairie community. The dynamic web of relationships between plants and animals and microorganisms and their physical environment that is evident in a square foot of prairie sustains the life of the prairie community. These interdependent relationships have stood the test of evolutionary time and provide a model of a successful sustainable system.

If, as we look at this small piece of prairie, we expand our vision backward in time and outward in space, we can imagine what the prairie must have been like when it stretched from what is now Canada to Texas, a sea of grass. The winds across these central grasslands provided the incessant undulating motion that led John Madson to call it "the running country." The march of seasons resulted in kaleidoscopic change in the floral mosaic of the prairie landscape. This small remnant allows us to imagine what the prairie on which our ancestors settled was like.

A little more than one hundred years ago, settlers moving west discovered the fertile soil built by the prairie community over eons of time in this place. And in a few short years the communities of bluestems, indiangrass, prairie clovers and silphiums were replaced by new communities of wheat and oats and alfalfa and other introduced plants. The development of this highly productive agricultural region from the prairie grassland is a tribute to the ingenuity of the human species. But the completeness of this biological transformation and the rate of depletion of the natural resource are causes for concern. Even many of our wild places are filled with exotic organisms, and there is little space left for the native prairie.

Why is this dedication of a piece of land for a native prairie community important? It is important because the prairie in central North America is a unique part of the earth's biological diversity. It evolved here and is native to this place. It can only be preserved here. There are many anthropocentric reasons for wanting to preserve this biological diversity, not the least of which is its importance as a model for the research that goes on here at The Land Institute. But this dedication is being done not only for humanistic reasons, but also as an affirmation of the native biota and its importance as a part of this living earth. More than an affirmation, it is an action that sets aside a piece of land for many of those plants and animals that inhabited this place long before our ancestors came here. In this action we are being responsible stewards for the good creation that surrounds us, for the protection of which we are accountable to the Creator and to those generations that will follow us in this place.

Aldo Leopold, in "On a Monument to the Pigeon," said:

> For one species to mourn the death of another is a new thing under the sun. The Cro-Magnon who slew the last mammoth thought only of steaks. The sportsman who shot the last pigeon thought only of his prowess. The sailor who clubbed the 1st auk thought of nothing at all. But we, who have lost our pigeons, mourn the loss. Had the funeral been ours, the pigeons would hardly have mourned us. In this fact, rather than in Mr. DuPont's nylons or Mr. Vannevar Bush's bombs, lies objective evidence of our superiority over the beasts.

Here again this afternoon we show that feeling for our fellow creatures. But we do not mourn. Rather we rejoice because we are able to dedicate this piece of land as living space for prairie species now and in the future. In doing so we preserve that stream of biological information that has come to us out of the past in this place.

Leymus: A Plant with a History of Human Use

Brad Burritt

Leymus is a perennial, grain-producing grass that we are studying at The Land. Viking settlers cultivated it for its seed, while native peoples from California to Alaska and Russia gathered its grain from wild stands. Baskets, ropes, string and thatching material have all been fashioned from its leaves, which also make good livestock forage. Leymus has a long history of human use and shows great promise as a future food crop.

Leymus species were only recently removed from the Wildrye (Elymus) genus, so their common names still include "wildrye," as in "Beach wildrye." They are members of a tribe of grasses that includes wheat, barley and rye, but they have little else in common with domestic rye (Secale cereale). The wide distribution of many Leymus species caused controversy over their correct common names, so we have decided to call the type we work with the most, Leymus racemosus, by the neutral name Leymus. In this report, I often refer to any Leymus species as Leymus or by its abbreviated scientific name (i.e. L. mollis = Leymus mollis).

The Leymus genus consists of some fifty species scattered across temperate to arctic regions of the northern hemisphere, ten of which are native to North America.[1] Species occur in areas of their adaptation, though their ranges often overlap. The greatest variety of Leymus species in North America grows in the Northwest, but examples have been found from Alaska across Canada to Hudson Bay, and down into much of the U.S., including the coast of New England and all the states west of a line drawn roughly from Lake Michigan to central Texas.[2]

Within these broad geographic boundaries, Leymus species occupy a great variety of ecological niches. They are found from sea level, where they bind shifting beach sand with their extensive fabric of rhizomes, to at least 10,000 feet above sea level.[3] I identified a stand of Beardless wildrye (L. cinereus) at 6000 feet, that has, for as long as I remember, occupied a ditch bank on my family's western Colorado farm. Far from the limits of beach sand and high mesa ditch bank soils, Leymus species also root themselves in tidal flats and sea cliffs, low mountain meadows and slopes, lake shores and grassy flats, alkaline meadows and river gravels, floodplains and tundra. While many species prefer loose, sandy and often wet soils, others choose dry and shaly slopes. Clearly, representatives of this ubiquitous genus have distributed themselves into a great variety of habitats.

The anatomy of Leymus species varies as much as their distribution.[4] Some, like L. simplex, are short and creeping; their seed heads, lean and narrow. Others, epitomized by L. condensatus, tower to ten feet in height and display long, branching seed heads. The roots of L. triticoides may burrow to a depth of thirteen feet.[5] These morphological differences have surely aided them in their adaption to varying habitats.

Peoples from California to Alaska, across to Newfoundland, Greenland and Iceland, and on into Russia have used Leymus plants in a multitude of ways. Eskimos and Aleut Indians made beautiful baskets from Leymus leaves, choosing certain times of the year to harvest those to be dyed.[6] They also used the leaves to thatch their dwellings.[7] In Greenland, people placed leaves between their inner and outer boots for insulation.[8] In what are now parts of the U.S.S.R., natives wove mats and ropes from leaves, and string from root fibers.[9]

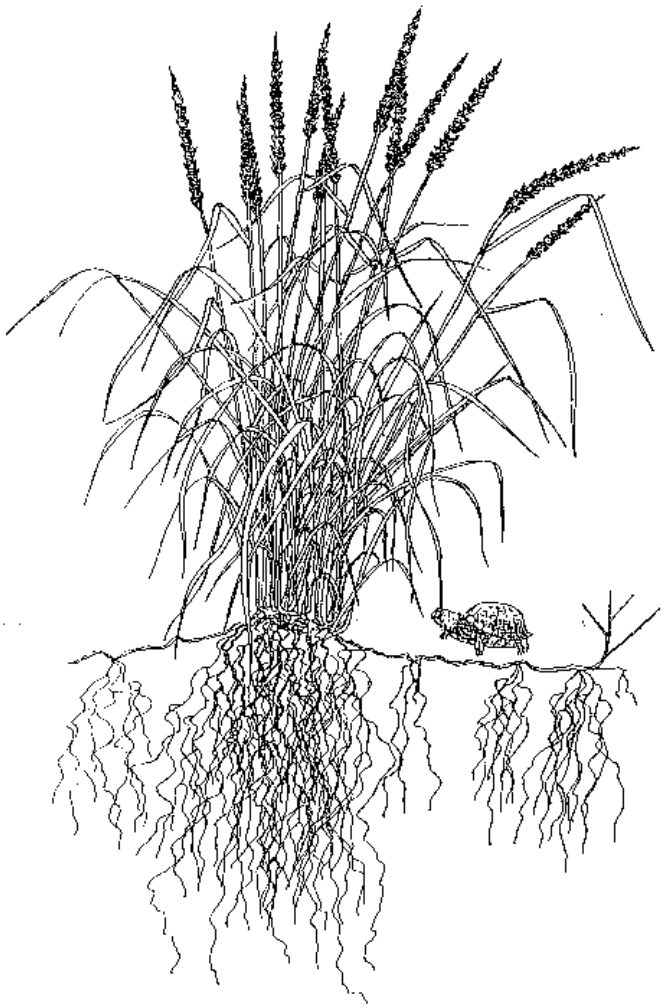
Despite the toughness of Leymus' long leaves when mature, they provide good quality livestock forage in their younger, more succulent state. Early in the summer, all the leaves are young and palatable, but appearantly toughen as the season progresses. However, tender new leaves are initiated throughout the season, and one observer noted how animals can find fresh leaves of Leymus long after most other grasses have dried up.[10] We noticed that our plot of L. racemosus greened up very early last spring, and as late as mid November, I was still able to find new leaves, frost-nipped but still growing in the autumn sun. Whether grazed or harvested for hay or silage, Leymus vegetation can nourish cattle, sheep and horses, the latter of which are said to prefer the part of the flower stalk just under the ground.[11] One ranch in Alaska harvested 500 tons of L. mollis for silage annually.[12] Surely the growth of the stands must have been thick and expansive to yield so great an amount. With their fibrous roots, spreading rhizomes, and adaptation to sandy habitats, L. mollis, L. condensatus and others have also been used in the U.S. and the Soviet Union to stabilize shifting sand dunes.

A further look at the history of Leymus species also reveals the precedent of their use as human food. Generally, indigenous peoples gathered the grain from wild stands. Native Americans used Beardless wildrye (L. cinereus) this way, at least in the Mendocino County area of California, where they made pinole, a type of flour, from it. Eskimos in Alaska harvested grain from Beach wildrye (L. mollis) and also dug its new underground shoots to cook and eat.[14] I sampled these shoots from our L. racemosus and found them sweet and tender, even when raw. The grain of L. racemosus is edible, too. In northern desert and semi-desert areas of

Russia, conventional crops sometimes withered and died during drought, while this Leymus was able to supply people with seeds for food.[15]

Viking settlers in Iceland may have even cultivated L. arenarius for its grain. Griffin and Rowlett, writing in the Jounal of Ethnobiology, discuss evidence for this intriguing possibility.[16] Their research found that the settlers first gathered the grain from thick, wild stands of the "Lyme grass" as a diet supplement in far-northern areas where wheat and barley production sometimes failed. Then, as the northern-hemisphere's climate cooled in the Middle Ages, the settlers were forced to replace their conventional small grains by cultivating lyme grass. As late as 1753, fields used to produce the "Sea lyme grass" could still be seen, but they soon began to disappear as commercialism and trading regulations imposed by Iceland's mother countries, Norway and Denmark, took their toll; and the importation of grain increased, displacing the locally grown Leymus. Still, use of Lyme grass flour persisted into this century.

To discern whether this Lyme grass flour was tastier and more nutritious than wheat and other flours, as Icelandic folklore relates, Griffin and Rowlett quantified its nutritional components. They found that its protein content



hulled leymus seeds | spikelets on rachis | mature florets in spikelet

rivaled that of red beans and even approached that of salmon, while its fatty acid percentage surpassed that of all other seed grains in their study, including amaranth, wheat, high-protein corn, rice and oats. They also observed that the yield of this little-selected variety of Leymus simulated that of domesticated cereals grown under conditions of subsistence agriculture.

These findings indicate the great need for further study of Leymus as a modern food crop. Griffin and Rowlett suggest that Leymus development is important so that large areas of near-arctic land can be exploited for grain production. However, we want to see Leymus used for grain production in certain areas where current crops are exploiting the land beyond its ability to heal itself. Leymus' perennialism allows it to persist and bind the soil for years at a time, reducing erosion and requiring far less soil disturbance than conventional grain crops. Also, it lends itself to a polycultural system that may be able to sponsor its own fertility and keep pests at a minimum without excessive cultivation or pesticide application.

Our study at The Land involves primarily L. racemosus, a native of southeastern Europe, including parts of Bulgaria, Romania, Turkey and Russia. In Russia, it provided grain for human diets, especially in times of drought. With the plants in our biggest plot, we've estimated grain yield, characterized traits that may contribute to that yield, and rated symptoms of the plants' diseases. Our highest sample yield converts to over 800 pounds per acre, or about half what wheat produces in this area and somewhat more than what Griffin and Rowlett considered to be equivalent to the yield of wheat grown by subsistence farmers. The worst disease we've found is ergot, which causes large, purplish kernels to be formed in the place of normal ones. These kernels are quite toxic to eat, so we must figure out how to reduce their number. In another study, Leymus seeds are being evaluated for their potential to germinate depending on different treatments the seeds received and when they were planted. We've also planted Leymus with Maximilian sunflower and

Illinois bundleflower to see how it responds to polycultural conditions. It hasn't grown well, partly because the sunflower causes so much shading. In all, we are very encouraged by how Leymus performs in this region in its present unselected state. Most plants are lush and beautiful with good large seed heads.

Further reports on our efforts to make Leymus a perennial seed-producing crop will appear in future Land Reports.

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The illustrations for this article were drawn by the author, Brad Burritt.

Sorghum: A Perennial Future?

Dennis Rinehart

Grains are "the staff of life"; they serve as staple foods throughout the world. Corn, wheat, barley and rice are among the best known grains. Grain sorghum is less well known, but certain qualities may cause this crop to be much more important in the future.

Taxonomically, the genus Sorghum is a member of the grass family, Gramineae. It is further classified into the tribe Andropogoneae, which also includes two other plants that are important to us at The Land: big bluestem and eastern gamagrass. Big bluestem is one of the three major grasses of the Kansas tallgrass prairie. We are working with eastern gamagrass as a new perennial grain crop. Such well known crops as corn and sugarcane are also grouped in this tribe.

The genus Sorghum is highly variable morphologically. This diversity is evident in cultivated sorghums. Dwarf grain sorghums are generally about one half meter in height while other sorghums may be as tall as five meters. Panicles (the seed heads) vary from widely dispersed to compact, and may even be inverted. Sweet sorghums have high sugar content in their tissues, and are used in the production of syrups such as sorghum molasses. Sorghums grown for forage tiller proliferously, giving them a bushlike morphology.

Paleobotanists generally agree that sorghum originated in Africa, where it was first domesticated. From Africa, the crop spread through the Mideast, India, and on to the East. It was introduced into Europe (Italy) in the first century A.D. from India. Sorghum cultivars first appeared in the United States in 1857.[1]

In the United States today, sorghum is grown, almost exclusively, as a feed grain crop. Commonly called milo, grain sorghum is second only to corn as a constituent of feed concentrates fed to livestock and poultry.[2] Corn is preferred to milo as a feed because milo is inferior in terms of digestibility and nutritional value. However, the difference in feed value is fading with the advent of true yellow hybrid sorghums. True yellow milos, as compared to other milos, are characterized by tannin contents reduced to negligibility (tannins are compounds which inhibit digestion), increased oil content and a higher percentage of lysine in the protein.[3] In addition to grain, the vegetative biomass of many sorghums is fed to livestock in the forms of green chop, hay, silage and forage.

The status that sorghum now holds as a feed grain crop in the U.S. is a fairly recent development. Large scale production began after the advent of hybrid grain sorghum, in 1956. By 1967, a "milo belt" had formed in the southern plains, centered in Kansas where production rose

500-1000% throughout much of the state.[4] A similar transformation occurred in Texas. In the decade following the introduction of hybrid sorghum, annual production increased from 124 million bushels to 312 million bushels in the lone star state.[5] In 1984, grain sorghum was the fourth most important agricultural product in terms of cash receipts in both of these states.[6]

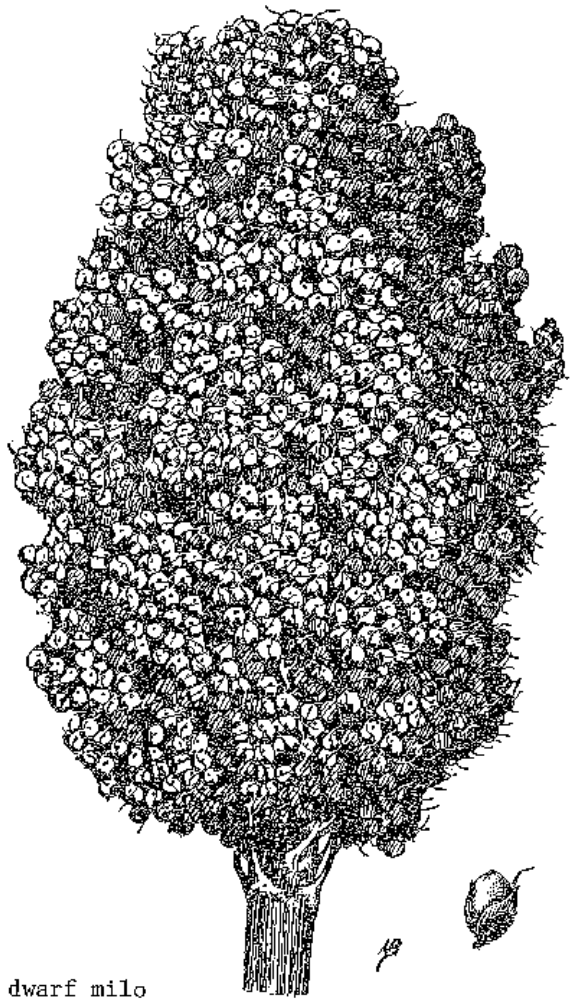
In some parts of the world, people consume sorghum directly, as a staple, rather than converting it into meats. An unleavened bread from sorghum flour called roti or chapati is made in India. Many Central Americans eat tortillas made partially from sorghum flour. Africans and Indians make leavened sorghum breads such as the pancake-thin injera. A variety of porridges made from sorghum are popular throughout Africa. Some Africans boil pearled sorghum kernels for use in lieu of rice. West Africans savor sorghum couscous, a steamed preparation of sorghum flour.[7]

Certain qualities of sorghum may enhance its status among grain crops in years to come. One such quality is drought tolerance. Sorghum's root system is more effective in extracting soil water than that of maize, and sorghum requires less water for growth than maize, barley or wheat.[8] As the economic and environmental problems associated with irrigation become restrictive, sorghum could become the favored grain in semi-arid and arid regions. Sorghum is also allelopathic to certain grasses and broadleaf weeds.[9] This may have value for reducing or eliminating costly, environmentally unsound herbicide applications. Sorghum may even serve as a soil desalinator. Sordan grass, a hybrid of milo and sudan grass, releases unusually high quantities of carbon dioxide from its roots, and will thereby affect removal of sodium salts from the soil in the presence of sufficient amounts of water. Hence, sordan grass has potential in soil reclamation while simultaneously serving as livestock food.[10]

Our work at The Land Institute is aimed at developing an ecologically sound agricultural system based on the use of perennial grain crops grown in polycultures. Research has already shown sorghum to perform well in a variety of intercropping situations. Long-season sorghums (varieties that take most or all of a growing season to mature) have been intercropped with early maturing crops such as millet and early maturing maize in Africa and Central America. Total yield in these systems may show as much as a 50% advantage over sole cropping. These polycultures sometimes accommodate a third, often late season, crop such as cowpea and Phaseolus beans. Likewise, short-season sorghums are intercropped with late maturing crops. Researchers in India demonstrated that short-season sorghum/cotton bicultures could be up to 30% more productive than either sole crop. Sorghum is also intercropped with crops that mature near the same time, usually plants that are complementary to sorghum, such as legumes which fix and release nitrogen. These systems, however, have yet to be studied in depth.[11]

Grain sorghum is perennial in its native tropical and subtropical habitats, but it cannot survive the winter in temperate zones. Sorghum is, in effect, an annual crop in the United States. The goal of our sorghum breeding program is to develop a winter-hardy perennial grain sorghum. Winterhardiness would allow sorghum to be included in perennial polycultures.

Our current strategy in the quest for a winter-hardy perennial grain sorghum is to establish a breeding program based on crossing cultivated sorghum with Johnsongrass. Johnsongrass is a winter-hardy perennial sorghum that was originally imported as a forage crop, but has since spread through much of the country as a noxious weed. It has rhizomes that are able to produce shoots. These rhizomes account for the winterhardiness of Johnsongrass. Insulated from winter's cold by the soil, they survive to reproduce topgrowth each spring. We hope that this cross will eventually produce a sorghum variety that has the grain producing qualities of milo and the winterhardiness of Johnsongrass.



dwarf milo

If we succeed in our quest for a winter-hardy perennial grain sorghum, development should not be difficult. Southern plains farmers, already familiar with the virtues of grain sorghum as a crop and its value as a commodity, probably will not need much urging to try a variety that only has to be planted two or three times a decade. The hard part will be convincing seed companies to distribute it.

Walter Pickett, a former Land Institute plant breeder, directed the first grain sorghum/Johnsongrass cross in 1983. He crossed domestic sorghum obtained from Texas A&M University with Johnsongrass collected from a natural population near Gypsum, Kansas. Three of ten progeny from this cross survived the 1984-85 winter. Seeds from the survivors were planted in June of 1985 to produce the F_2 generation. Researcher Lois Braun who studied these plants concluded from observations of selected traits that "there appears to be no significant barrier to genetic recombination between domestic sorghum and Johnsongrass."[12] We originally planned to collect seed from selected F_2 individuals this year. That operation has been postponed until 1987 due to concerns that the unusually mild 1985-86 cold season did not provide an adequate test for winterhardiness.

This year we continued our quest with a series of similar crosses involving thirteen accessions of a domestic sorghum obtained from New Mexico and sixteen accessions of Johnsongrass derived from natural stands in various parts of Kansas. One reason for these new crosses is that the New Mexico domestic sorghum has better seed producing qualities than the domestic sorghum used in the 1983 cross. The new crosses serve the additional purpose of broadening the germplasm base upon which our breeding program rests. The hundreds of person-hours devoted to this project by Peter Kulakow and other staff, as well as myself and other interns, paid off. We obtained several hundred seeds from the crosses made this summer. We sent some of them, via Kansas State University, to a winter nursery in Florida where they are currently growing. Seed from these plants will be brought back to The Land Institute next spring for planting. Use of a winter nursery allows us to grow two generations in a year rather than just one. If we are able to continue taking advantage of winter nursery services, the time required to complete our search for a winter-hardy perennial grain sorghum will be cut in half. In any event, we are gaining confidence in the eventual success of a perennial sorghum.

New developments in grain sorghum breeding are steadily improving the quality of this crop. With characteristics such as drought tolerance and allelopathy in its genetic repertoire, sorghum is bound to become even more appealing as a grain crop in the future. These advantages, combined with sorghum's proven track record as a grain crop should make perennial varieties acceptable to farmers. The ability of sorghum to perform in polycultures is well known. If we succeed in developing a winter-hardy perennial grain sorghum, and if perennial polyculture is the agricultural wave of the future, sorghum will be in perfect position to become America's first major perennial grain crop.

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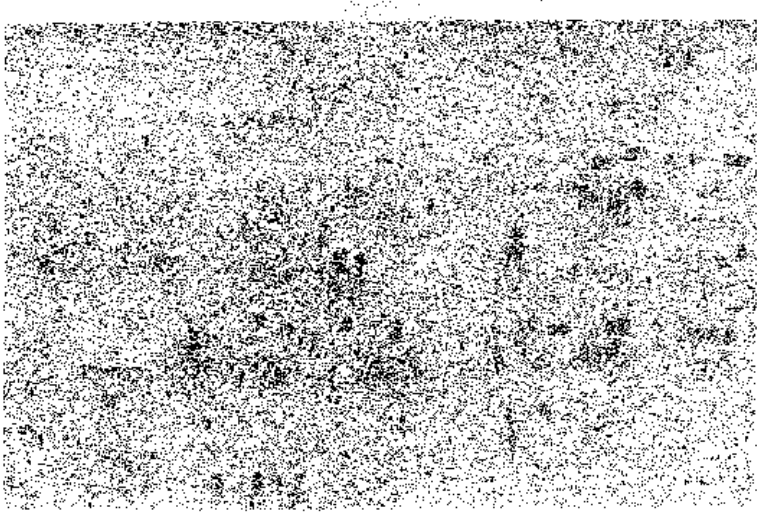
AGRICULTURAL INTERN PROGRAM

Each year, The Land offers ten internships in sustainable agriculture to students at the graduate or upper-level undergraduate level. Interns receive stipends of $95 a week. They find their own housing in Salina and bicycle or carpool to The Land for the 9-5 day. The 43 week program runs from mid-February to mid-December. The Land admits students of any race, color, national or ethnic origin.

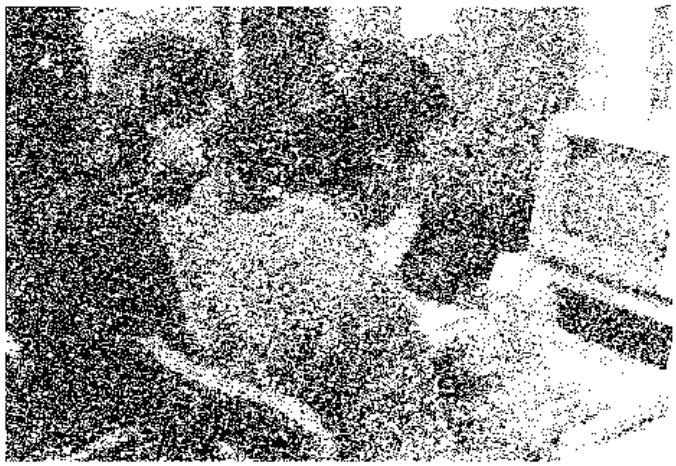
You can obtain **The Land Report Research Supplement** with results of the 1985 experiments through the mail upon request. Cost: $1.75. The 1986 results will be available in April.

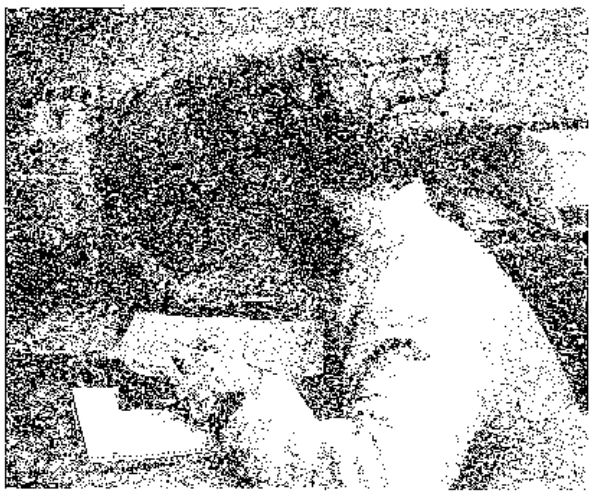


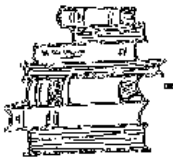
Fall Session Research Work

Land Institute staff and interns presented the results of this year's experiments to the Research Advisory Group and other interested friends on December 9. The seminar and the forthcoming Research Supplement mark the culmination of the 1986 research year. This fall found us busily harvesting seeds, compiling, computing, and comparing data, and writing and editing presentations and reports.

Pictured are (clockwise from above) Duncan Vaughan harvesting Maximilian sunflowers, Mark Slater's prairie insect collection, Patrick Bohlen and Michael Collins entering data into the computer, Rob Peterson recording seedling emergence, Mark Gernes calculating sunflower yields.







Books

Soil and Survival: Land Stewardship and the Future of American Agriculture

by Joe Paddock, Nancy Paddock and Carol Bly
Sierra Club Books
730 Polk Street
San Francisco, Ca 94109
228 pages, cloth, $19.95

The authors of this book argue that topsoil loss continues not from lack of technology or money, but from a lack of commitment to the land itself. An ethical and spiritual commitment to the land and its preservation has been replaced by concern for its dollar and production values. In this book, the authors incorporate poetry, prose, and bits of oral history with their own writings forming a mosaic of diverse perspectives to forge a new model for soil cultivation and preservation.

The authors believe that changes must originate within the farming community itself. In response to the need to educate farmers to care for their land, the Land Stewardship Project was formed. As a non-profit educational progran, the Land Stewardship Project works with farmers in the American heartland to help promote an awareness of the problems and help provide working solutions.

Two of the authors, Nancy and Joe Paddock, have brought their land stewardship teachings to Land Institute Prairie Festival audiences. Nancy is the author of the play "Planting in the Dust," presented by Laura Clark in 1985. Joe read his poetry at the 1986 Festival, and his poem, "Black Earth" appeared on the invitation.

Wes Jackson highly recommends **SOIL AND SURVIVAL** in the introduction (reprinted below) he wrote for the book.

INTRODUCTION TO *SOIL AND SURVIVAL*
by Wes Jackson

Every ton of topsoil slipping seaward from its hillside home, beyond natural replacement levels, represents a failure of culture. Soil erosion is not a simple matter of poor practice or lapsed memory or bad luck due to an unlikely rain. It is the failure of us as a people to comprehend that we have yet to discover America, that we have only colonized it. Because we are a fallen species, and by this I mean a species out of context with the nature that spawned us, we are now forced into being participants in the Creation in a manner unprecedented by any other species probably in this part of our sidereal universe. Though the chance to be a participant in the Creation may be in the category of adventure, it is a frightening adventure, for we could fail. For openers, we may not have the ethical stretch in this paleolithic being of ours. We may not have the staying power. We could even get tired before we really begin. The poet Gary Snyder says that it is a 2,000 year journey before us. It is a journey that will require poets and stonemasons, musicians and farmers, artists and even scientists. As the last of the fossil fuel reserves wink out, and the Faustian bargain of nuclear power is more evenly comprehended across the population, we will have to give soil its due. On a global basis, we have squandered more soil carbon than the fossil variety. Roughly a third of our soil carbon was lost with the opening up of the North American continent.

Here is a book that will help us in that long stretch before us. This is not one more "ain't it awful" book. It is a book written by two poets and an essayist and fiction writer who have worked together on farmland issues for eight years. Pay no attention to the cynic's sneers that myth and songs cannot stop sheet erosion. Just remember that the single vision of hardheaded science and technology has been used to accelerate the loss of useful atoms from our nation's slopes. And remember, too, that the National Soil Loss Equation does not measure the indignity of a future with more potbellied children, more children who will never learn to read. That equation measures "acceptable loss."

This is more than a book about soil and survival. The authors have been much too modest in their title selection. This is a book about soil and life, soil and our roots, soil and culture, soil and civilization. As far back as 1940, E.B. White could "see no reason for a conservation program if people have lost their knack with the earth." White could see "no reason for saving the streams to make the power to run the factories if the resultant industry reduces the status and destroys the heart of the individual." He called this the most "frightful sort of dissipation." White saw the necessary connections, yet in the nearly half century that has passed since he wrote those words, nearly all of our efforts at protecting soil and water have ignored this dimension and we have failed miserably.

Here is a book then which seeks to make that connection, which seeks to help us all establish that "knack with the earth." What we should have learned in the half century since the Soil Conservation Service was formed is that protection of our soil and water is not an engineering problem alone. To simply give water advice with terraces and grass waterways is an inadequate engineering trick. Applying biological methods on the farm alone won't do either. To the entire array of efforts already tried individually and together we now know that we must add the thoughts of those who have studied and listened to the human heart. We must add

the missing content that, as Aldo Leopold said will "change our loyalties and affections."

One warning. This "knack with the earth' business is not to be treated as a piece of the pie which includes all of the sound engineering methods and biological controls. It is the source from which all things flow. The proper implementation of technique is a derivative of that source, that "knack." These authors deal with that "knack." In my experience there has never been another book quite like it.

A Reading List

People frequently write The Land Institute and ask for a reading list, but we do not have one to send out. We do consider E.F. Schumacher's **Small is Beautiful**, Amory Lovins' **Soft Energy Paths**, Wendell Berry's **The Unsettling of America**, Aldo Leopold's **Sand County Almanac**, and Wes Jackson's **New Roots for Agriculture** basic background for our work and values. In that part of our curriculum we call "Considerations for a Sustainable Society," we try to discuss books that interns have not studied already, so our list of assigned readings varies from year to year. What follows is a list of books we used in the classroom in 1986.

---Bellah, Robert N.; Madsen, Richard; Sullivan William M.; Swidler, Ann; Tipton, Steven M.; 1985. **Habits of the Heart: Individualism and Commitment in American Life** (New York, Harper & Row).
---Berry, Wendell; Colman, Bruce; Jackson, Wes; **Meeting the Expectations of the Land: Essays in Sustainable Agriculture and Stewardship**, 1984. (San Francisco, North Point Press).
---Daly, Herman, ed., 1980. **Economics, Ecology, Ethics: Essays Toward a Steady State Economy** (New York, W.H. Freeman and Company).
---Doyle, Jack, 1985. **Altered Harvest: Agriculture, Genetics, and the Fate of the World's Food Supply** (New York, Viking).
---Ehrenfeld, David, 1981. **The Arrogance of Humanism** (Oxford, Oxford University Press).
---McPhee, John, 1983. **Encounters with the Archdruid** (New York, Farrar, Straus and Giroux).
---Nash, Roderick, 1982. **Wilderness and the American Mind** (New Haven & London, Yale University Press).
---Worster, Donald, 1977. **Nature's Economy: A History of Ecological Ideas** (Cambridge, Cambridge University Press).

SOME OTHER READINGS FROM PAST SEMESTERS:
---Berry, Wendell, 1981. **The Gift of Good Land: Further Essays Cultural and Agricultural** (San Francisco, North Point Press).
---Brown, Lester, 1981. **Building a Sustainable Society.** (New York, W.W. Norton & Company).
---Hawken, Paul, 1983. **The Next Economy** (New York, Holt, Rinehart and Winston).
---Stone, Christopher D., 1972. **Should Trees Have Standing?: Toward Legal Rights for Natural Objects** (Los Altos, William Kaufmann, Inc.)

Is Your Water Safe to Drink?: An Introduction to Questions and Answers about Drinking Water in Kansas

written by Marlene Bosworth, illustrations by Michel Cavigelli, edited by Mary Fund
Kansas Rural Center
304 Pratt
Whiting, Ks. 66552 28 pages, $1.00

This is a very practical booklet designed to help people answer basic questions about the quality of their drinking water, such as: How do I know if my water is safe? what kinds of contaminants can get into my water? will these contaminants make me sick?

The booklet focuses on groundwater quality because over 80% of all Kansans rely on groundwater for their water supply.

One of the most helpful parts explains how to have water wells tested, what to test for, and how to interpret results.

This booklet is a publication of the Rural Center's Water Research and Education Project. The purpose of the water project is to (1) promote public awareness and understanding of water issues, (2) encourage local involvement in state and regional decision making, (3) promote a conservation ethic in Kansas communities, and (4) broaden water policy debate to include the general agricultural and resource use debate.

Prairie Meditation

Patrick Bohlen

There is perhaps no greater contrast on a single landscape than that between an emerging wheat field and a tall grass prairie in autumn. The singularly vibrant, green turf of seedlings in the wheat field make the land seem unseasonably fresh and alive. By contrast, the subtle and manifold, red and golden hues of the prairie create a mood permeated with the solemn tones of autumn.

Though the sensual appeal of the prairie landscape contributes directly to our sentiment that it must be saved, our scientific knowlege of how it operates bolsters that sentiment with a deeper meaning. The productive prairie sustains its own fertility. It builds a complex soil structure rich in organic matter. The spreading roots of its grasses and forbs form a tough sod that holds the rich soil in place. The wheat field, by contrast, degrades the soil. It depends on fertility supplied from the outside or spends that built up over centuries by the native sod. Soil erodes from the plowed hillsides. The Land Institute's research is motivated by our recognition of the differences between the prairie and the wheat field. As part of our work, we maintain a small but magnificent portion of native prairie.

Our view that the natural biotic community is a successful standard against which our agricultural systems must be gauged, adds to a substantial list of reasons why the native grassland habitat should be preserved. This list began to be compiled earlier this century when grassland ecologists first realized the imperative of preservation. Because of their experience with the prairie's native vastness, not all early prairie ecologists initially felt the force of that imperative. In his history of the founding school of American plant ecology, Saving the Prairies (University of California Press, 1981), Ronald C. Toby describes how one of these early ecologists came to understand the necessity of prairie preservation.

Plant ecologist John E. Weaver, an early proponent of the idea that the prairie ecosystem was inherently stable, felt that despite any disruption, even intrusion by humans, the prairie would always tend towards its native climax. He did not, early on, hold the view that the prairie needed to be preserved. The events of the Great Drought and Dust Bowl of the nineteen thirties changed his view and made him a stronger spokesman for preservation.

At the height of the droughty cataclysm, Weaver saw twenty percent of the cover on a stretch of bluestem prairie turned to Opuntia cactus. More significantly, and devastating to his own world view, he saw whole regions of mixed grass prairie turned to short grass and a vast area of what had been tall grass prairie, previous to the Great Drought, turned to mixed grass by the time the drought years had ended.

What Weaver saw during those years was not only the traumatic effects of uncontrollable climatic change but also how human activity combined with that change to worsen the final outcome. The clouds of dust that typified the Great Drought resulted from erosive agriculture. By the time the dust had settled, it had become clear to Weaver that humans posed the greatest threat to the diminishing prairie community. While the drought brought the inherent stability of the prairie into question, the Dust Bowl dramatically revealed the profound impact humans were having on the landscape.

Weaver began to realize that human effort was essential to preserve the prairie community. He saw that in a human world, the future integrity of the prairie landscape could not rest solely on its own resilience, but depended also on the imperative of conscious conservation efforts by people.

Now, nearly half a century after the Dust Bowl tragedy, biologists take the imperative of preservation for granted. It is difficult now not to notice the loss or decrease of native landscapes and their associated flora and fauna. The disappearances are slow and subtle and sometimes manifest themselves in very small things. This summer, a single butterfly brought the significance of the loss of prairie habitat sharply into focus.

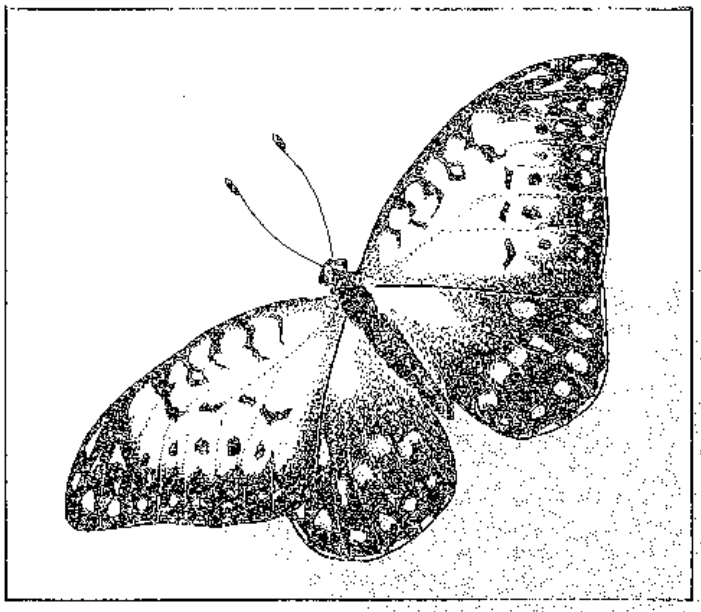
I was walking across our research plots in the bottomlands on a sweltering July day beneath a brilliant blue sky, when a large, boldly-patterned butterfly fluttered past me into the blooming alfalfa. The bright butterfly captured my attention, and as I had never seen one like it before, I set out in pursuit to get a closer look.

The butterfly left the alfalfa and crossed into the tall grasses growing on a hillside we have replanted to prairie grasses and forbs. It seemed ready to alight at moments but never did. It was moving away rapidly. Each beat of its wings was augmented by a strong northerly wind that carried it uphill in large, sweeping curves. My quiet pursuit had turned into a full uphill sprint. I ran alongside the spiraling beauty and tried to keep pace with its erratic flight. I decided I had to catch it, and after several wild swipes, I swept the butterfly into

the bowl of my straw hat. I turned the hat over excitedly. The tumbling mass of brilliant orange, black and white escaped from the bowl as though its flight had never been interrupted. It glided away and rose above the trees, definitely ending my chase.

I consulted a field guide later that evening and found out that I had encountered a Regal Fritillary, Speyeria idalia. The exhilaration of my chase turned into a kind of sorrow when I read that the Regal Fritillary may one day be very rare and restricted because its natural grassland habitat is disappearing as land is plowed or developed.

The reality of the disappearance of grassland habitat, which was brought home to me, a stranger to this place, by a single butterfly, is the same reality faced by everyone concerned with native or natural habitats everywhere. This reality is what compels us to place a high value



on small natural remnants of habitat and is part of the reason why the native prairie reserve at the Land Institute is highly significant to us. It is also what compels us to call for preservation--a call that often falls on deaf ears.

Thomas Berry, in his essay "Wonderworld as Wasteworld: The Earth in Deficit" (Cross Currents, Winter 1985-86), stated that "if there is to be real and sustainable progress, it must be continuing enhancement of life for the entire planetary community." This may seem to be hopelessly idealistic and a vague framework for practical action, but it is a view echoed in the words of scientists who have spoken out for preservation.

Invariably, the arguments of ecologists for preservation of natural communities go beyond the purely scientific reason that these communities have traditionally supplied them with the basic material of their study. Their entreaties may emphasize practical considerations or they may carry the ethical tones of Berry's plea. British plant ecologist A.G. Tansley, in the introduction to his book, Our Heritage of Wild Nature: A Plea for Organized Nature Conservation (Cambridge University Press, 1945), noted that, "the combination of cultivation with half-wild country is one of the most precious parts of our national heritage." Ecologically-minded scientists from Aldo Leopold to David Ehrenfeld have called for a conservation that affirms "resources" their right to continued existence.

Leopold went further to propose that we must develop a Land Ethic to reconcile ourselves with the environment. In his now classic essay, "The Land Ethic," in A Sand County Almanac, Leopold proclaimed that "we can only be ethical in relation to something we can see, feel, understand, love or otherwise have faith in."

The Land Ethic provides an important context for our work at the Land Institute. Though our understanding of the prairie is incomplete, our love and respect for it are strong. We turn to examine it frequently and its subtle tones play heavily on our senses.

What we see in the surrounding fields and pastures is a landscape that pales in comparison. We see wheat fields from which tons of topsoil are visibly washing towards the river. We see a landscape upon which people have failed to blend cultivated and wild country, a landscape that appears both aesthetically and ecologically diminished.

We look at our prairie reserve as a source of hope and knowlege. Its intricate textures and vivid tones, sometimes painfully beautiful in the changing light, signify a deeper reality. Our small reserve includes a ninety acre prairie that has never been plowed the eight acre Wauhob Prairie that we dedicated this year, and over forty acres of hillsides and fields we have planted to native grasses and forbs. These areas are an important symbol for us. They have afforded the interns and staff, most of whom have never before lived on the prairie, a chance to examine the native biotic community first hand. As custodians of this prairie, we enact, in however small a way, part of Leopold's vision. We become part of that thinking community, without which, in his own words, "the case for a Land Ethic would appear hopeless."

Regal Fritillary illustrated
by Danielle Carré

The Paul Winter Consort in the Soviet Union

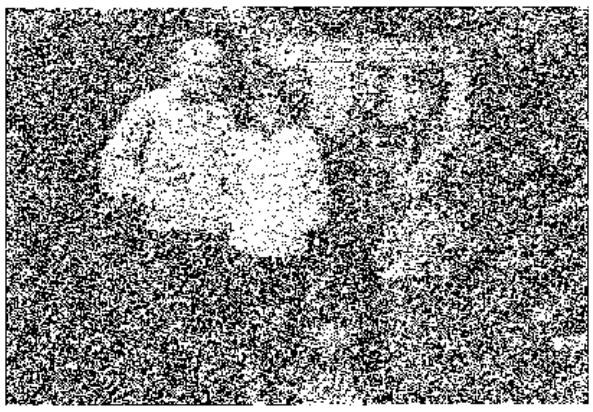
Paul Winter

Lake Baikal, one of the treasures of the earth, lured me back to Siberia for a fourth visit this September, in my ongoing work toward music for Baikal, an album celebrating the beauty of nature and wildlife in and around what Siberians call their "sacred sea," the world's largest and deepest freshwater lake. I was joined after a week by the entire Consort--keyboardist Paul Halley, cellist Eugene Friesen, flutist Rhonda Larson, and percussionist Glen Velez-- for a three week tour across the Soviet Union. We opened in Krkutsk, where 10,000 tickets had sold out quickly for our group, relatively unknown to them. It was the first time an American band had come to Siberia, and we found there, as everywhere in the Soviet Union, a great fascination for things American, particularly our music.

The audiences were intensely enthusiastic. People listen so deeply there, perhaps because they must find nourishment in their inner lives, since they have such restrictions in their outer lives. Everywhere we went we met people who took us into their homes and feasted us until we could barely walk. We made many new friendships, and these are the bases for our deep optimism about the future of Soviet-American creative synergy.

The high point of the tour was our work with the Dimitri Pokrovsky Singers, an extraordinary folk ensemble who sing from the roots of the ancient Russian folk music, with riveting harmonies and a vocal power that seems to emanate from Mother Earth herself. Their singing so moved Paul Halley that he intends to return there to study with them, so he can bring back something of their tradition to the Cathedral Choir.

Our final concert, in tandem with the Pokrovskys, was at Moscow University, sponsored by the University Ecology Club. It was the kind of unforgettable foot-stomping celebration that leaves the Cold War in the lurch. After the final encore, I told the audience: "Tomorrow we go home to the United States, and people will ask us, 'What was it like in the Soviet Union?' And we'll tell them that we saw a land of great beauty--in its nature and its culture--and that we met a people whose soul is as deep as Lake Baikal."



Coming out the front door of the classroom building, October 11, 1986: Paul Winter, Rhonda Larson, Glen Velez, Wes Jackson, Dana Jackson.

Tim Conrad

Paul Winter in the Salina performance.

Reprinted from Cathedral: News of the Cathedral of St. John the Divine, Vol. 2, Number 1, December 1986, by permission of Paul Gorman, Editor. The Paul Winter Consort are artists in residence at the Cathedral in New York City.

The Consort had not been back in the United States from Russia very long when they performed in Salina on October 11 to help celebrate The Land's 10th Anniversary. We are pleased to reprint this piece, which answers some of the questions many of us would like to have asked Paul about the Russian trip. How wonderful to know that the audience at Moscow University shared "common ground" with the Salina audience in joyfully celebrating the earth through the music of the Paul Winter Consort!

All praise be yours through Brother Wolf,
All praise be yours through Sister Whale
By Nature's song my Lord be praised
By Brother Eagle, Sister Loon,
Through Brother Tiger, Sister Seal,
Through Sister Flower, Brother Tree,
Let creatures all give thanks to Thee,
All praise to those who live in peace.

from "Canticle of Brother Sun" in the album Missa Gaia- words by Paul Winter and music by Jim Scott.

Evil — and Change

Rob Peterson

"And the serpent said to the woman: 'No, you shall not die the death. For God doth know that in the day you eat thereof, then your eyes shall be opened, and you shall be as gods, knowing good and evil.'" Genesis 3:4,5.

The Land Institute is a consequence of evil in the world. It exists because its participants want to do something about perceived evils. The Land's research focuses on the environmental problems associated with agriculture, such as soil erosion, pollution, and resource depletion, but its work also addresses cultural problems involving ethics, community, and public policy. Those involved with the Land feel that how humans make a living from the earth is often destructive and that working for improvements is worthwhile. Wes likes to joke that The Land Institute's goal is "saving the world from sin and death." While this goal is ridiculous because of its improbability, the joke is partly serious. As an institution devoted to change, we must also ask if such a goal is even desirable.

The role of agent of change engenders difficult questions. Is our vision of what ought to be better than what is? Is it better than someone else's vision of what ought to be? Is advocating change arrogant? Are good and evil simply relative terms dependent on preferences and effectiveness, or can one say that certain things (excessive soil erosion, poisoned water supply, greed, violence) are evil in some objective sense? Does it even matter? In taking a public position for a certain kind of change, we must consider these and other questions very carefully.

Humans have long been trying to save the world from sin and death. Individuals and groups have passionately argued, even died, for ideals they deemed better than prevailing beliefs and practices. Their efforts have not been futile, and the paths of human history are tinged with brightness and beauty. However, the conquest of sin and death has been far from a rout. Often the very measures taken to uproot sin and death have fertilized its growth. Nuclear weapons, designed and built to stamp out the evil of insecurity from weakness, have bred an even more insidious evil of insecurity from excessive power and potential destruction. Big equipment and chemical inputs, designed to eradicate the evil of poverty due to low farm yields, have ushered in the evil of farm poverty due to high production costs and low prices, and of destructive competition among neighbors. Indeed, the walls of the sin and death hall of fame are decorated with awards to the well-intentioned.

Perhaps fighting sin and death is not the worthy endeavor it appears to be. We may be too quick to indict sin and death. Death is obviously an important and necessary part of life. Could evil be an equally important part of goodness? [1] Mythology, history, and experience provide numerous examples of greatness made possible by evil. The evil of eating the forbidden fruit in the Garden of Eden gave rise to the goods of knowledge and likeness to God. For Christians, the ultimate good, salvation, was made possible by a great evil, the killing of Christ. The concept of the "blessing in disguise" is a recognition of the role that evil can play in good. Great art rises out of intense conflict. The image of Beethoven on his deathbed, madly shaking his fist at the cosmos, is a testament to this phenomenon. In everyday experience we seem to learn and grow much more through difficulty and pain than through comfort. Perhaps we should not complain about evil. Maybe its benefits are worth its costs.

The most appropriate approach to the problems of sin and death might be to wait to reap their benefits. However, while intuition supports the notion that good, even intense beauty, can rise out of evil, the phenomenon does not validate complacency, nor does it negate evil. How could one justify the benefits of evil to those who are starving to death or suffering from some evil for which they are not responsible? Ivan Karamazov, in Dostoevski's The Brothers Karamazov struggles with the doctrine that evil now is necessary for a higher harmony later. He gives painful examples of children being tortured and treated brutally:

> And if the sufferings of children go to swell the sum of suffering which was necessary to pay for truth, then I protest that the truth is not worth such a price.[2]

Ivan argues effectively that some evil is simply too abhorrent to be justified in terms of any greater good. Clearly, simply accepting sin and death as a necessary price for harmony will not do. Evil may contribute to greater good, but it also contributes to greater bad.

What can we at the Land Institute, or anyone do about sin and death? We do not want our actions to backfire and create bigger problems. We do not want to put a lid on beauty and greatness by squelching all conflict

and evil that might feed healthy growth and creativity. Yet we must not stand idly by, grooving on potential upcoming harmony while innocent people suffer and the topsoil cascades into the sea.

Theistic religions have long struggled with these questions. How can a God who is omnipotent and good (which one must be if one is God) and evil both exist? Why does God allow evil? Philosophers through the ages have offered solutions to this dilemma. Some have rejected the existence of God. Others have denied the existence of genuine evil, maintaining that all is good within a greater scheme known only to God. Some believe that the problem will be sorted out in heaven and hell, and that although there is evil now, one day it will be conquered. While these approaches may or may not ring true, they do not necessarily answer questions about how we humans might deal now with what we perceive as evil. The Process Philosophy of Alfred North Whitehead and others offers some meaningful insight into these questions, into our intuitions about evil, its role in good, and possibilities of change.

To Whitehead, the basis of all existence, of all reality is process, or the creative advance of events.

> I hold that these unities of existence, these occasions of experience, are the really real things which in their collective unity compose the evolving universe, ever plunging into the creative advance.[3]

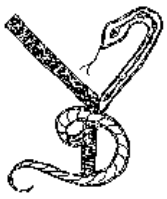
While each "occasion of experience" is a direct product of its past, the process of transforming an event from potential to actual allows the infusion of novelty. Freedom is thus essential to Whitehead's metaphysics. Within a present event, an entity is free to determine in what novel way it will enjoy the past and how it will present the past plus itself to future events. While freedom and novelty apply to all of reality, they are most significant for beings with consciousness, especially humans, who can consciously entertain alternate, even abstract possibilities. A corollary to the axiom of freedom is that "all direct power is persuasion."[4] One being or event cannot absolutely determine another, but we humans do have the power to persuade changes for better or worse by entertaining novel possibilities and acting toward their realization.

"Any local agitation shakes the whole universe,"[5] says Whitehead. This interconnectedness allows our actions to have effects. Our freedom to act in novel ways has many consequences, including the introduction of discord. To Whitehead, discord "is the feeling of evil in its most general sense, namely physical pain or mental evil, such as sorrow, horror, dislike."[6] Soil erosion, war, pollution, and greed fit this definition of evil. The evil of discord is in tension with a second type of evil--triviality, which to Whitehead is "The loss of the higher experience in favor of the lower experience."[7] Boredom, complacency, unquestioning conformity, and apathy are in this category of evil. Wes likes to talk about the character of the "satisfied sonofa bitch"--the person who is comfortable with his or her situation and feels no responsibility or connection to the disharmonies in life. The actions of the "satisfied sonofa bitch" are evil by triviality. He or she could choose to entertain greater complexity, to deal with difficulty in more intense and meaningful ways, and to creatively act to make beauty out of discord.

That discord and triviality are in tension is demonstrated by the possibility of increasing one by decreasing the other. Feelings of discord can be assuaged by increasing triviality. For example, one can reduce uncomfortable feelings about discord between this country's brutal military policy in Angola and Nicaragua and our democratic ideals by trivializing the situation--deciding it is not important, choosing not to think about it, or blindly trusting our leaders. Our painful feelings of discord would decrease, but we would be dealing with the situation in more trivial ways than we might. To this extent, our behavior is evil. On the other hand, attempts to decrease triviality risk greater discord. For example, DNA research increases the complexity of decisions we face, enhances our ability to instigate change, and widens the scope of non-trivial possibilities. In doing so, the research also greatly heightens the risk of discord and destruction.

rocess philosophy portrays goodness in aesthetic terms. Experience is good to the extent that it is characterized by beauty, which rises out of the interplay of intensity and harmony (opposites of triviality and discord).[8] Whitehead talks about varying degrees of beauty, ranging from minor beauty to the ultimate good of major beauty. Minor beauty is the harmonious absence or reduction of discord. Beauty grows as a situation becomes more intense, yet retains harmony. Faced with complex, contradictory, even discordant experience, maximum beauty is obtained by the introduction of novelty such that the intensity of the complex and contrasting (even painful) feelings is preserved, yet they are felt more as complementary than as incompatible. For example,, one might establish a lawn on a piece of land from which little or no soil erodes. Minor beauty lies in the lack of soil erosion. A farm family deciding how to use the adjacent land may experience such contrasting pressures as the need to prevent soil erosion and the immediate need for cash flow; the need to prevent pest damage and the responsibility to keep the environment clean; feelings about social

justice and about self-protection; and wanting happiness now and feeling responsibility to ensure sustainability for the future. Major beauty occurs where the family feels these contrasting pressures with full intensity and is inspired by them to create novel patterns aimed both at preserving the intensity of these feelings and at creating harmony among them.



et beauty is greater than creative problem-solving. Suppose the Land Institute develops a perfectly sustainable agriculture system involving herbaceous perennials in polyculture and the world adopts the system. Evil would still not be conquered, for:

> Even perfection will not bear the tedium of indefinite repetition. To sustain a civilization with the intensity of its first ardour requires more than learning. Adventure is essential, namely, the search for new perfections.[10]

The creative advance will not be satisfied even with achieved perfection, for a perfect system soon becomes trivial. This idea offers a profound challenge. To just be a decent person--a good neighbor, hard worker, leading a comfortable life--may not be enough. If one is static, not growing or challenging oneself to improve, one may be living trivially, which is a form of evil! Sometimes a swift kick from difficulty is required to urge one to overcome such comfortable complacency. According to Whitehead:

> The social value of liberty lies in its production of discords. There are perfections beyond perfections... Thus the contribution to Beauty which can be supplied by Discord--in itself destructive and evil--is the positive feeling of a quick shift of aim from the tameness of outworn perfection to some other ideal with its freshness still upon it.[11]

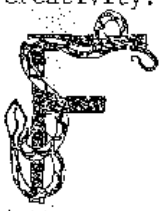
Whitehead supports our intuition that good can rise from evil.

While Whitehead's philosophy recognizes that evil can contribute to beauty, it does not discount the existence of genuine evil.

> Process thought supports the judgement of Austin Farrer that 'good breeds more good than any evil can' and that the 'use of evil for good ends does not immediately sterilize it; it continues to breed after its own kind.'[12]

Ivan Karamazov's feelings about incomprehensible horror are valid. The history of this century alone supplies adequate evidence that some evil simply cannot be accepted as good in its effects. Whitehead understands this problem in terms of freedom and intensity. Major beauty can only occur where experience is intense. However, the same intensity that is a prerequisite of great beauty can also precondition great evil. Human consciousness has the freeedom to both increase and preserve intensity, and to perpetrate both intensely beautiful and intensely evil acts. While great beauty does not justify evil, such beauty cannot exist without the accompanying possibility of great evil.

In a system of creative advance where novelty is freely introduced at all stages, and where "any local agitation shakes the whole universe,"[13] an entity such as the Land Institute has the power to persuade change. Given any reality, good or evil, the possibility exists for the greatest (or the worst) potential results. The goal of change is toward the greatest beauty. In its quest to work for change the Land must continue to examine itself, being aware of the risks of increasing intensity and of the evils of reduction to triviality. It must persuade consistantly in order to be effective while avoiding the rigidity that can stifle creativity.



inally, one need not be a martyr to work for change. Enjoyment of the intensity of life in the immediate present is not incompatible with concern for the future. In fact, concern for the future can be an important and rewarding element of present experience. Enjoying life does not preclude pain and suffering, but the greatest enjoyment includes dealing with both harmony and discord with aim toward beauty. Whitehead says:

> The function of means is not disjoined from the function of becoming an end. The sense of worth beyond itself is immediately enjoyed as an overpowering element in the individual self-attainment. It is in this way that the immediacy of sorrow and pain is transformed into an element of triumph.[14]

This Whiteheadian principle is poignantly illustrated by Alice Walker in The Color Purple. In one scene, Shug is talking to Celie about what God is, and what induces people to find God. "Trouble do it for most folks, I think. Sorrow Lord. Feeling like shit..." Like Whitehead's "sense of worth beyond itself," Shug talks about "that feeling of being a part of everything, not separate at all. I knew that if I cut a tree, my arm would bleed." She also says, "I think it pisses God off if you walk by the color purple in a field somewhere and don't notice it."[15] The color purple symbolizes enjoyment, even

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Dana Jackson

October 18, 1986
Madison, Wisconsin

WE ARE WOMEN, WE ARE FARMERS, AND WE ARE ANGRY!

We the undersigned women in agriculture, have participated in an historic event, the breakdown of barriers between academic scholars and practicing farmers and advocates. Through the perspective of women, sharing both their research and their personal experiences, we have seen the world-wide pain and suffering caused by the on-going agricultural depression. Therefore, we assert that

1. the family farm system must be saved;

2. America needs the farm family and the small towns;

3. agriculture policies must encourage the regrowth of rural America;

4. the United States must develop long- term and just national and international policies that are in the best interest of farmers and the land and the people they feed;

5. agriculture policy must be oriented to the development of a sustainable agriculture base for the economy; and

6. women must be directly involved in the formulation and promulgation of agricultural policy at every level.

We call upon policy makers, elected officials, educators and producers to begin immediately to implement these recommendations.

The women making the above statement were 150 participants at the second national conference on American Farm Women in Historical Perspective held October 16-18 on the University of Wisconsin campus.

Several deep concerns about today's agriculture system surfaced again and again in the conference sessions. Women were angry that the American economic system did not reward farmers with prices high enough to pay the cost of production. They were distressed that farm families were being forced to leave their farms and communities. They thought that women had not been sufficiently involved in the development of agricultural policy. They were worried that the health of the land was being damaged through conventional farming practices. A group of women decided that the conference should respond to these themes, and they prepared this statement which was approved by the conference participants in a plenary session.

Women attending the conference represented diverse organizations, including Women Involved in Farm Economics (WIFE), American Agri-Women, Iowa Farm Unity Coalition, Kansas Organic Producers, Farmers Union, National Farmers Organization and Farm Bureau. Many represented the family farm system as much as they represented organizations. Third generation Wisconsin dairy farmers, women who had put up hay, cultivated corn, and milked cows right along with their husbands and children, while still doing the cooking, cleaning and laundry, discussed the historic role of women in agriculture with scholars from universities across the country who gave papers in the fields of history and sociology.

The conference theme was **"Women and Farming: Changing Roles, Changing Structures,"** and it was clear from the first day that the conference was not just an academic exercise. In the opening plenary session, a panel which included Nancy Vogelsberg-Busch (organic farmer and former Land Institute student) and three other activist women discussed "Farm Women in the Political Arena." The keynote speaker that evening, Dr. Sarah Elbert from the State Univ. of New York, Binghamton, saw injustice for farmers and poor quality for consumers in the U.S. food system. She stated that family farms are now seen as passive victims of social Darwinism, and that the current American food system, in which one-third of our food budget goes to fast food restaurants, does not benefit farmers or consumers. Yet agriculture provides 20% of all U.S. exports, and benefits the nation as a whole.

The role of women as leaders working for change in farm policy came up in several conference discussions. Women have tended to sit back at farm organization meetings and let the men speak. Women spoke through their husbands, but did not stand up and express themselves. Women have been the ones to seek help when farm foreclosures began to be real possibilities. The wife made the initial call to the lawyer or crisis center, often because she kept the books and was the first to see that things were going wrong, and then said, "Here, I'll let you talk to my husband." At the same time, women have organized meetings about farm policy, have taken part in tractorcades, and set up debt counseling centers. They have also become significantly involved in elective politics. Naioma Benson, national president of Women Involved in Farm Economics (WIFE) stated that women's political leadership "is in the pipeline and will emerge in the national scene five to ten years from now." One speaker warned against becoming "commissioned and task forced to death," in lieu of gaining positions of real political power where women could effect change.

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Lasso—Winner or Loser?

Melissa Sarlat

Traditionally farmers have hoed, pulled, and machine cultivated weeds in the fields when they interfered with crops. In the years up to the 1940's, they also used sulfates, ammonium, and potassium salts to kill weeds. Today it is uncommon to meet a farmer who does not use commercially manufactured chemical herbicides.

Monsanto Company is marketing, under the trade name "Lasso," the weed killer alachlor. Alachlor, the nation's most widely used herbicide, belongs to the class of chemicals named chloracetamides.[1] Lasso, a pre-emergence acetanilide-type herbicide, is recommended for control of grasses and suppression of resistant pigweeds"[2]. Advertisements suggest that two ends are assured through use of this product: 1) crop success, a result of high yields, and therefore, 2) a profit. Walking the fields for endless hours with hoes, spades, and gloves to eliminate weeds seems dismal in an age when time means money. Even repeated cultivation with tractors takes up a lot of time, and from a tractor seat one cannot usually tell if weeds have been extirpated. To achieve a yield superior to last year's (being a "winner on the field"), it is desirable to save time and have guaranteed results with Lasso.

Monsanto's billboard photographed on Kansas Interstate 70 heading towards Kansas State University, (our land grant agricultural college), from Salina, promises winners. Note the camaraderie: Monsanto for the KSU Wildcats, and, implied, KSU for Monsanto. The symbolism is explicit: whether on the football field or the agricultural field, a person who embraces the right strategy, can achieve power over the opponents, whether they are the "Sooners" or weeds. Making a touchdown has never been so easy, and touchdowns win the game.

Marketing professionals gear product advertisements to the individual consumer groups they want to reach. Surveys are taken to find out the personalities of potential customers. Farmers are concerned with weather reports, futures markets, and crop reports; and that information is usually obtained during nightly television news hours, or early morning and noon radio hours. That is when agribusinesses run commercials such as this:

> These days when crop prices are down, things are tough for farmers. Times like these you need the highest yields possible. That's why there's (product name). It takes care of weeds so you can be assured the high yields you demand.[3]

The farmer depicted on television is usually a male, about 40 years of age or older, who is standing next to a huge tractor in a huge 'clean' field (it is understood there is no soil erosion). The portrait of the neatly dressed farmer who has control over the field is effective in promoting the product image. These ads also instill fear in viewing farmers, making them believe they must use these products to prevent crop failure and loss of their farms. Today's farmer is vulnerable to such sales pitches. The billboard advertising Lasso (alachor) probably increased sales.

In November 1984, the Environmental Protection Agency (EPA) decided a "Special Review" of the chemical alachlor was necessary, even though it has been registered for use for seventeen years. (The completed review, recommendations, and comments, will be available to the public in about mid January 1987.) The EPA also restricted the use of alachlor, citing it poses a significant potential cancer risk to persons working with it. Currently, applicators of the chemical are required to wear protective clothing, although many farmers do not take the regulations seriously. The Agency also notes that dietary exposure from food and feed crops treated with alachlor and from water contaminated with alachlor is probable.[4]

In a telephone conversation with Harvey Tripple, Regional Product Development Director for Monsanto, Mr. Tripple stated that "no humans have ever had any serious diseases" from Lasso. But yet, the Canadian government has banned Lasso because "the continued use of alachlor represents an unacceptable risk of harm to the public health and the environment."[5] Alachlor has been found in surface water in Ottawa. It also has been detected in surface water in Iowa and Ohio, presumably from water runoff on corn and soybean fields where the herbicide was used.[6] The chemical has even been found in ground water in Iowa and Nebraska, indicating

its leaching potential. Where did we expect the 100 million pounds per year of Lasso put on the soil for the past fifteen years to go?[7]

Monsanto's patent on Lasso is due to expire in 1987, so this product likely will be produced under other names.[8] Farmers can expect to see competetive prices on alachlor, which will probably increase its use.

Advertising on billboards, television, and radio cultivates and sustains the illusion of success obtained through high yields. The markets in the United States and abroad however, are not expanding, and greater yields only depress market values for overproduced goods. Lasso pledges to be "A Winner On The Field," but that doesn't translate to the farmer being a winner in the market or a financial success. Strongly associating Monsanto with Kansas State University doesn't make the Wildcats winners, but does chemically contaminate the agricultural university. And the public certainly doesn't win if contamination of the environment by alachor continues.

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A FAMILY FARM AGRICULTURE?

For many years I have been supportive of a proprietary, owner-operator agriculture, sometimes called family farming. It might be supposed that I would advocate such an agriculture as a way to achieve a more regenerative kind of agriculture.

I choose my words carefully. An owner-operated agriculture is more hospitable to enterprise diversification and resource conservation than are some other structural arrangements. Particularly objectionable is an absentee landlord agriculture. On the other hand, family farmers are not saints. Many of them have abused their land. Some have been more interested in violating environmental rules than in conforming to them. Although I continue to believe an owner-operator agriculture has many merits and would generally be receptive to resource-protecting cultural practices, it would be a benighted view to expect heroics from it. Family farmers will require the same repertory of rewards for good practices and penalties for bad as will other systems of farming.

Harold Breimyer, Ag. Economist, in keynote address at conference on Sustainable Agriculture & Integrated Farming Systems, Michigan State Univ., June 13, 1984.

CONTINUED FROM PAGE 23. **(EVIL)**

celebration of life--of living the moments of life in such a way as to fully absorb the varying experiences of love, hatred, joy, pain, cruelty, kindness, good, evil, the purple of bruises, and the purple of flowers--making of this experience a moment as beautiful as possible and making this moment contribute to creative beauty in the future. The life that helps change toward greater good is the same life that gives the greatest present intensity and harmony; it is seeing the color purple and all that it entails.

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CONTINUED FROM PAGE 24. **(WOMEN)**

Women want to continue the family farm system, although historically the system has not been appreciative of women's work. They want to pass on the land, which they or their husbands have inherited, to their children. They have done field work, and many recognize the danger to soil and water brought on by the economic pressure to treat the farm like a factory. Qualities generally associated with women (although many men also display these) such as nurturing, patience with details, the ability to handle diversity and ambiguity, are needed for sustainable agriculture.

Kansas farmer, Nancy Vogelsberg Busch summarized the current challenge to women in agriculture: "We shouldn't ask whether women can work in agriculture. We should ask, 'Is our current agriculture befitting to women?' If not, we have an obligation to change it."

The Fertilization of Industrial Agriculture

Danielle Carré

American agriculture has undergone tremendous changes since the first settlers arrived and started farming. The transformation from small, labor intensive farms to large, highly mechanized commercial enterprises has had far-reaching effects on our society and physical environment. An integral component of this transformation has been the development of the fertilizer industry. Last year farmers applied 48 million tons of chemical fertilizers to their cropland.[1] The fertilizers replaced the essential nutrients (nitrogen, phosphorous, and potassium) which were removed from the fields in the form of harvests. But farmers have not always been so dependent on commercial fertilizers. Why did this change? Why did they shift from an on-farm recycling system using organic wastes to a dependence on commercial fertilizers?

When the first settlers arrived in America they saw a land of abundance. They often wrote home to friends and family about this new land of thick forests and open meadows where the fertility of the soil was endless. The first farmers did not concern themselves about maintaining the fertility of the soil.[2] Land was cheap and plentiful and labor was scarce.[3] They continually cropped on the same piece of land until the soil was exhausted, essentially mining the soil of its fertility and abandoning it. These poor farming practices did not go unnoticed; many European travelers commented on the poor condition of the land. As one British traveler put it, " The American planters and farmers are the greatest slovens in Christendom, their eyes fixed on present gain, they are blind to futurity."[4]

By the late 1700's, nearly a century of exploitive practices began to take its toll. Yields were rapidly declining,[5] and new land was becoming scarce and expensive.[5] Farmers were forced to start thinking about maintaining the fertility of their soil. They were well aware of the need to return nutrients to the land; regenerative practices were common in Europe. Conditions in America, however, had encouraged an exploitive mentality.

The practice of returning nutrients to the soil first started on the East Coast near the urban centers. The soils in this area had undergone the longest abuse, and crop yields were poor. In addition, urban markets were expanding and farmers had to increase yields to meet the growing demand. Initially the system emphasized recycling on the farm. Any debris, crop residue, or manure produced on the farm went back on the land.

One of the first factors that pulled farmers away from the farm recycling system was the expansion of the urban markets and the demand for hay. The many horses in the cities required hay, so farmers started growing hay to sell in the market. This meant that the farmers kept fewer animals on the farm and they began to look elsewhere for sources of organic wastes. Besides horses, the city had dairies, slaughterhouses, tanneries, soap boilers and fish markets which all produced wastes that the farmers sought for their cropland.

The expanding market for agricultural products was probably the greatest factor in promoting a shift to a commercial fertilizer system. Instead of attempting to be largely self sufficient and selling what was left over, the farmers in the 1800's began to sell most of what they raised in the market, and they began to rely heavily on outside products to maintain the fertility of their land. Richard Wines in Fertilizer in America notes that farmers crossed the important boundary between self sufficiency and capitalistic farming when they became businessmen, buying raw materials (fertilizer) and selling finished products. This transition from recycling on-farm materials for fertilizer to purchasing fertilizer may have been a more important step to the commercialization of agriculture than the decision to grow crops for the market.[5]

The shift to commercial production continued throughout the 19th century, but the largest change occurred during and immediately following the Civil War. The wartime demand for agricultural products and the resulting higher prices encouraged many farmers to change from subsistence farming to commercial production. Farmers also started to use many of the new efficient implements, which were especially important during the war when so many men were in the army and labor was scarce. The higher prices and labor shortage induced farmers to adopt new technologies, creating the first American agricultural revolution.[6]

MANURE FOR ALMOST NOTHING If you have any dead animal—say, for instance, the body of a dead horse—do not suffer it to pollute the atmosphere by drawing it away to the woods or any other out-of-the-way place, but remove it a short distance only from your premises, and put down four or five loads of muck or sods. Place the carcass thereon and sprinkle it over with quicklime, and cover over immediately with sods or mold sufficient to make, with what had been previously added, twenty good wagonloads, and you will have within twelve months a pile of manure worth twenty dollars for any crop you choose to put it upon. Use a proportionate quantity of mold for smaller animals, but never less than twenty good wagonloads for a horse; and if any dogs manifest too great a regard for the enclosed carcass, shoot them on the spot.

from The Farm and Household Cyclopedia
Copyright by F.M. Lupton, 1885, page 77

The second agricultural revolution occurred after World War II. Food exports increased greatly in the 1940's, and farmers again met production demands by adopting the latest advances in agricultural technology.[7] By this time agriculture was becoming highly mechanized, and people started to turn towards chemicals to add fertility to the soil and to control pests.

The search for an efficient and easily applied fertilizer provided the impetus for the development of a commercial fertilizer system. The manures that farmers hauled from the cities were bulky, and they had to apply large amounts to get sufficient yields on their poor soils. Farmers wanted a product that had a high concentration of nutrients, that was cheap, and could be easily transported.

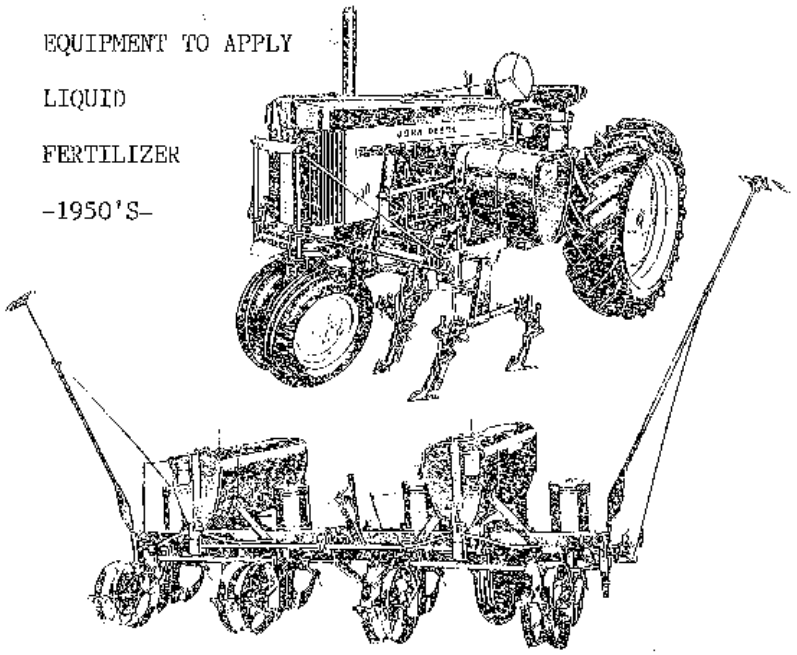
Leached ashes from the soap boilers was one of the first substitutes farmers tried. Although their success was limited, the use of ashes was significant because it started the initial fertilizer distribution network. Bonemeal was another substitute. Before the bones could be applied to the soil they had to be ground, a process farmers could not easily do themselves. The use of bones extended the commercial fertilizer industry since farmers not only relied on a network to collect and transport the material, but also to process it.

Guano was introduced into the U.S. in the 1840's. Guano, found on the Chincha Islands off the coast of Peru, consisted of the accumulated droppings of sea birds that roosted there. The advantage of Guano was that it was a highly concentrated source of phosphate and nitrogen, and farmers already locked into buying commercial fertilizers quickly adopted this product.

There were numerous problems with the fertilizers produced in the 1800's. The nascent industry did not have the technology to produce a reliable product; adulteration was common. Often the industry could not produce enough to meet demand. By the 1880's, however, more sophisticated technologies solved many of the problems of fertilizer manufacture.

The modern fertilizer industry emerged in the late 1800's when the companies began to mine rock phosphate and potash. In 1921 the Haber-Bosch process of ammonia production was discovered. After World War II, the advancement of chemical technology gave the fertilizer industry a boost. The industry is now one of the largest components of the chemical industry.[8]

The agricultural education system that developed in the U.S. played a significant role in forming farmers' attitudes toward the commercial fertilizer system. Before agricultural schools were established, a number of agricultural societies existed. The earliest one, formed in 1785, was the Philadelphia Society for Promoting Agriculture. This society, and others formed later, did not consist of farmers collecting to exchange ideas; rather, the members were men from many professions not necessarily involved with agriculture. These professionals had more leisure time to look into alternatives than did the farmers. The purpose of these societies was to discover what agricultural improvements were being made abroad and how these techniques could be applied at home. The societies were vital for the development of the fertilizer industry. They reported what fertilizers the Europeans were using and ran experiments to see how these products performed at locally.



EQUIPMENT TO APPLY LIQUID FERTILIZER -1950'S-

A number of publications emerged from these societies; Memoirs, issued in 1808, American Farm (1819), Cultivator (1834), and New England Farmer (1822) were some of the more popular publications. All these publications played an important role in promoting fertilizers.[9]

A strong movement for agricultural education for the farm population followed the Civil War. As the industrial economy developed, urban dwellers had many educational opportunities not available to those in the countryside. Farmers, recognizing the need for a skilled and educated rural population, began to demand an improved schooling system.[10]

Congress established Land Grant Colleges by the Morrill Act of 1862 to provide the farmers the education they were seeking. In 1887 Congress passed the Hatch Act creating the state Agricultural Experiment stations. Finally, in 1914 the Smith-Lever Act established the extension service. The purpose of these acts was to promote a "liberal and practical education" and a "sound and prosperous agricultural and rural life."[11]

These colleges promoted commercial success as the path to a sound and prosperous agriculture. By the late 1800's the industrial revolution was well underway, and people looked upon the industrial model as a model of success. The schools promoted the idea that agriculture should follow the industrial pattern, and encou-

raged economic advancement based on scientific and technical progress. The farmers began to view farming as a commercial enterprise rather than as a way of living. As the industrial model took over, farmers increasingly relied on the advice of the technical experts. Efficiency and high production were the new themes in agriculture, and the best way to obtain these was through the use of new machinery, chemical fertilizers and pesticides.[12]

Farming shifted from a labor intensive to a capital intensive enterprise. In 1870, labor was 62% of the total inputs; real estate and capital inputs totaled 19% each. By the beginning of WWII, the labor input had declined to 40% of the total inputs; capital had risen to 41%, and real estate remained at about the same level. By 1976, labor had dropped to 16% of the total inputs, and capital jumped dramatically to 62%; real estate increased to 22%.[13]

The high capital costs of modern conventional farming include the costs of fertilizer. The costs of fertilizer are heavily dependent upon the costs of energy. Producing ammonia, mining phosphates and potash, and transporting fertilizers all require large amounts of fossil fuels. Fertilizer accounts for the largest amount of indirect energy use on farms.[14] Each step in the history of the fertilizer industry aided in the industrialization of agriculture. The fertilizer industry developed in the United States because of an expanding agricultural market, the farmers' need for easily-applied fertilizers, and an educational system that promoted efficiency and high production. But the United States does not have an expanding agricultural market today when farmers are plagued by overproduction. Easily applied fertilizers still appeal to farmers, as does efficiency. But the times require other goals besides high production. Farmers are trying to cut costs to achieve a net income. The price of fossil fuels significantly affects the energy intensive fertilizer industry. Though energy prices have been relatively low in the mid-eighties, we cannot expect them to remain so. The finite supply of coal, oil and gas will become apparent in the near future, and prices will go up. As farmers seek less expensive methods of maintaining the fertility of their cropland, they may have to cycle back to the recycling system. The use of legumes in rotation, and the application of manures and other organic wastes are some of the options. Farming will again become a more labor intensive process.

Another incentive, besides cost, may lead farmers to alternative systems of fertilization. Modern fertilizer use has become a process of administering shots to crops to make them produce high yields, instead of restoring fertility and balance to the soil. The contamination of groundwater from fertilizer run-off has become a serious problem in farming areas. To make agriculture sustainable, fertilizers should treat the living soil, replacing nutrients and maintaining water-holding humus, while allowing the soil microorganisms to thrive.

The transition to a more sustainable system of fertilizing fields will be difficult, although we can learn from the modern, successful organic farms. But the transition could be hastened if the education system established to educate farmers could change its focus from contemporary high yields to long-term, sustained levels of production.

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Spreading manure on Land Institute garden.

Farmers and the Folly of the Free Market

Mari Sorensen Detrixhe

Two months before I moved to this north central Kansas farm, wheat growers throughout the country voted on a non-binding referendum which signaled to Washington their interest in cutting production to stimulate higher prices. Even though the farmers' vote would not automatically trigger action, Congress, which mandated the vote, wanted an indication of farmers' interest in a new form of farm policy.

Wheat farmers were asked if they wanted mandatory production controls that would limit the supply of wheat enough to raise prices to 125% of their production costs. It appeared simple: as a wheat grower, do you want to earn money? Yes or no? Of the 22% who responded, 54% said "yes," 46% said "no."

This response was both puzzling and disturbing. Whatever happened to the guiding principle of self-interest? How could so many vote against this sweet deal? Why didn't more people vote? While seeking the answers to these questions, several larger questions arose.

Why is our country obsessed with production when we have enormous grain stockpiles built at the expense of our finite water supplies and our soil's fertility? How can the United States justify farm policies which cripple farmers and rural communities? And why do farmers focus on gross, rather than net income?

> ***The nation's wheat farmers spoke the loudest by not voting.***
> – Dean Kleckner,
> American Farm Bureau President[1]

As I sought to discover why 78% of the wheat growers chose not to vote, I encountered the government's less than discreet opposition to production controls. In a June 9th speech to the Fertilizer Institute, Agriculture Secretary Richard Lyng announced the United States Department of Agriculture's (USDA)opposition to mandatory production limits and clearly stated his intent to disregard the poll results.[2] Certainly this could dampen a voter's enthusiasm, but Congress, which asked for the poll, has the power to interpret and act on the results. So, it would still be worth one's time to vote.

But time was in short supply when the ballots arrived in farmers' homes on June 18th. In what seems to have been a carefully calculated move, the USDA mailed the ballots in mid-June and called for their return by July 7th. These are the days of wheat harvest; from predawn to the late starry night, the farmer's every waking hour is driven by the demands of the harvest. USDA knows this too.

But these antics pale when compared with the National Farmers Union's charge that the USDA stacked the deck by flooding the country with ballots.[3] Though the most recent agricultural census counts 446,000 wheat farmers, the USDA mailed out over 1 1/2 million ballots.

The USDA announced it would send ballots to "farmers and others who share in the proceeds of wheat production from a base of forty acres or more."[4] I called Ivan Wyatt, President of the Kansas Farmers Union, to ask who these "others" might be. He informed me that a ballot was sent to any person who had his or her name on a piece of land. By way of example, he said one of his board members reported that 57 ballots were mailed to members of his family, heirs to a parcel of land.[5]

The USDA virtually assured a low ballot return. Anyone who was not actively engaged in farming would have found it difficult to supply all the information requested on the ballot. And if any questions were left unanswered, the USDA declared the ballot invalid.

Though the government intended to poll only those who received proceeds from forty acres or more of wheat, a fair number of persons with fewer than forty acres responded. When the USDA announced that 54% favored controls and 46% opposed them, the count included the poeple with fewer than forty acres. Counting only those with forty acres or more, respondents favored production controls by a 57 to 43% margin. The thirteen central states which produce nearly three-fourths of this country's wheat voted 65% for controls and 35% against.[6]

At first glance, the results suggest that 78% of this nation's wheat farmers are indifferent to their economic future. But I do not believe this is so. Over 346,000 farmers and "others" cast their votes. Yet there are only 446,000 wheat farmers in the country. There is no way to know how many "others" voted, but given the skewed balloting, I believe an admirable number of farmers took a stand in this poll despite the obstacle course erected by the government.

To be consistent with bad timing, the USDA released the results on a Friday afternoon during Congress's August adjournment, too late to make the evening news. For an administration that has access to the media at any time, this must have been intentional.

> ***If there is a worse idea, I frankly cannot think of it.***
> – Former Agriculture Secretary John Block, speaking to the Kansas Agribusiness Expo, Nov. 13, 1986

It is remarkable that the referendum passed when one looks at the flood of negative publicity which bombarded farmers. Many "official" farm leaders sought to discourage "yes" votes, and to some extent, they succeeded, since the referendum passed by a relatively narrow margin.

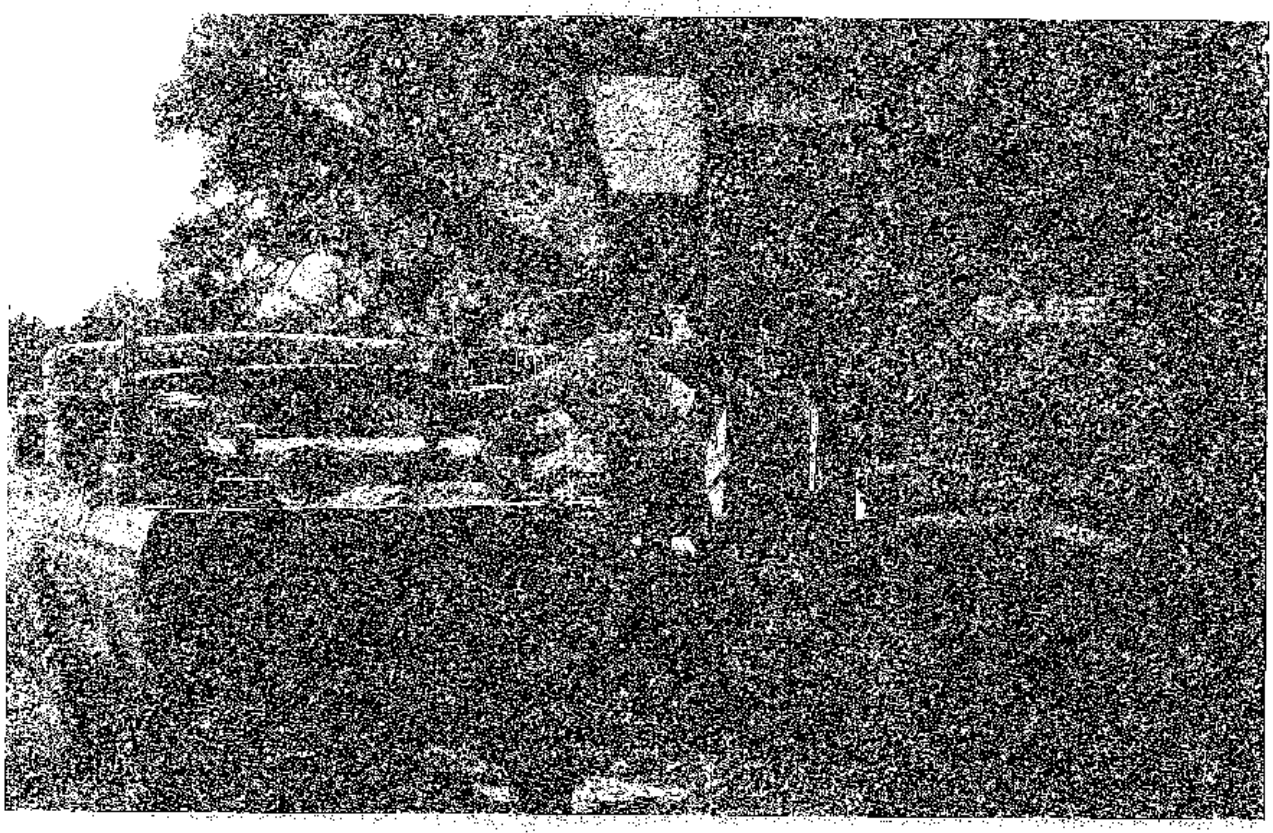
"We would be forced to abandon our export posture. It would severely weaken our agricultural base, and we would build a tariff wall around this country," Block claimed in his speech to the joint gathering of the Kansas Grain and Feed Dealers Association and the Kansas Fertilizer and Chemical Association.[7] Secretary Lyng told the Fertilizer Institute, "The strict marketing quotas that would be needed to artificially raise prices would virtually dry up commercial sales of American wheat in world markets."[8]

First, a person has to note that these men spoke neither to farmers nor to the issue of farmers' well-being. Important goals of the USDA should be to improve farmers' well-being and bring stability to American agriculture. But the government spokesmen are preoccupied with exports, despite the fact that America's position in the world market is worsening yearly. This reminds me of the philosopher Santayana's definition of a fanatic as someone who redoubles his efforts after he has lost sight of his goals.

Lyng, Block, and others relied on a USDA Economic Research Service study to buttress their claims. The study predicted that mandatory controls would cut wheat production by 55%, the Gross National Product would fall by over $70 billion, and 2.2 million jobs would be lost, 553,000 of these in the farm sector.[9] John Block added that the plan would double feed grain costs for stockmen and increase federal farm program expenditures by $3 or $4 billion.[10] (The rationale behind this latter assertion is not clear, since government subsidies would no longer be necessary.)

The American Farm Bureau aimed its fire directly at the voters: "Farmers would have to cut their wheat acreage so much (roughly by half) that they would actually lose money under the program."[11] Truly, this is gross-- that is, the Farm Bureau must be referring to gross income. After all, farmers were given the option of being guaranteed net income under the definition of the referendum. How could they lose? Perhaps a farmer with a large amount of fixed costs might have trouble making ends meet, but by selling some unproductive assets, he or she should be able to swing into the general realm of profit-making that wheat growers, as a whole, would experience.

The major farm publications did little to mask their glee over the low ballot return, nor their abhorrence of production controls. The Farm Journal and Successful Farming devoted less than eight column inches to the story in August and September; but there, buried amidst fertilizer and chemical advertisements, were smug news briefs such as this:



Farmer fuels combine.

> The real message in the referendum: 11% of wheat growers favor controls; 10% oppose them and 79% don't care! The 21% who returned valid ballots were almost evenly split; the vote favored mandatory production controls 54% to 46%. The ballot never mentioned that required acreage cuts to qualify for the 125%-of-production cost guarantee likely would be double the current 27.5% ARP (acreage reduction program) -- production, income and exports would drop sharply.[12]

Some of these same forces battled production controls in 1963 when a similar poll, initiated by President Kennedy and conducted under President Johnson, was defeated. Though Agriculture Secretary Orville Freeman supported production controls, the Farm Bureau opposed them, and allegedly their efforts contributed to the defeat of the 1963 poll.[13]

What do the Farm Bureau, the farm publications, and the Reagan agriculture secretaries have in common? For one thing, they want the United States to appear "strong" in world markets. Though the government may desire abundant grain for use as a foreign policy tool, I believe it is largely a question of appearances. However, such appearances are but a thin veil over the internal decay in American agriculture. Our nation's export game is one we cannot win; that's what foreign countries are telling us and proving to us.

Another thread weaves through all of this: the agribusiness connection. Did former Secretary Block and Secretary Lyng choose to belittle mandatory production controls before groups of farmers? No. They spoke to seed, chemical, and fertilizer companies. Of course these companies don't want production controls; they make their money from the dizzying production treadmill. The farm publications hold the same allegiances; I had to wade through pages of fertilizer and chemical advertisements to even find the referendum stories. As for the Farm Bureau, it is a little harder to pinpoint their ties to the fertilizer and chemical industries. But as an environmental leader, I attended two Kansas legislative hearings in which state senators openly expressed their amazement at the Farm Bureau's anti-farmer stands. "Don't you represent the farmer?" one senator asked, when the Farm Bureau sided with aerial sprayers, not the farmers who were victims of pesticide drift.

The author of this article was a research associate in energy at The Land Institute, 1980-82. She then served as executive director of the Kansas Natural Resource Council for three years. She changed her name from Mari Peterson to Mari Sorenson Detrixhe this fall, when she married Ed Detrixhe, a farmer near Ames, Kansas.

The fertilizer, chemical and seed companies, and their allies strive to keep the farmer confused about the issues, or so it seems. As long as they can maintain divisiveness within the farming community, they have wittingly or unwittingly secured the wedge in the old divide-and-conquer strategy.

> ***A bushel of grain, sold on any market known today, will hardly pay for the production of that bushel of grain.***
> - Kansas Independent Bankers [14]

It has long been recognized that farmers buy from large companies at "monopoly" prices and sell in highly competitive markets. Without government intervention, the odds that farmers will secure a price to cover their input costs are slim. For years, farmers have relied on government subsidies --diversion payments, deficiency payments, and the PIK (payment-in-kind) program-- to make ends meet. Government subsidies for wheat alone totalled almost $2 1/2 billion in 1984.[15]

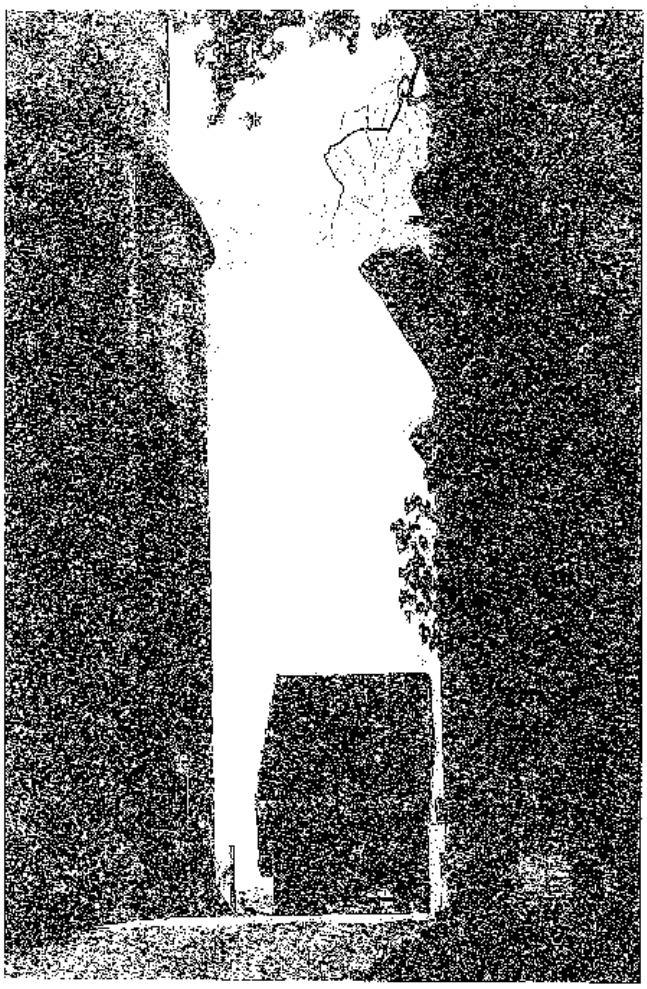
One of the only persistent voices for production controls is that of the National Farmers Union. This organization claims such controls would add $40 billion to farmers' net income, which translates into better business for Mainstreet, reduced debt loads, and the updating of worn-out machinery.[16] They and several editorialists note this action would reduce farmers' vulnerability to, and dependence on, government subsidies.[17]

Currently before Congress is the Harkin-Gephardt bill which proposes production cuts of up to 35% for major grains, cotton, rice, dairy and livestock if, in each case, these actions are approved by producer referendums. Net farm income would double to $74 billion under this bill, according to a University of Missouri and Iowa State University study.[18] Legislative sponsors add that the bill would substantially reduce federal budget outlays for farm programs.

With conflicting statistics coming from different directions, it might be hard for a farmer to know whom to believe. But there are ways to sort out this mess.

> ***Have Faith in the Market.***
> - Doyle Rahjes
> Kansas Farm Bureau President[19]

The Reagan administration has stressed the importance of a market-oriented agriculture policy, a view parroted by the Farm Bureau and the major farm publications. The 1986 Farm Bill cut price supports in order to bring down crop prices so American farmers might recapture "our share" of world export markets. This administration has had six years to guide agricultural policies toward a market-oriented stance. It is now time for an honest assessment. Farmers need to ask, "What has the market done for me?"



Unloading wheat at the elevator.

Attempts to regain foreign markets are failing. Nations such as Canada, France, and Argentina are more than willing to undercut our precipitously falling prices. And other nations, which once purchased grain, are now raising their own, particularly India which finally has the technology to do so, and Latin American countries which seek to boost their export sales to finance their debts. The U.S. now produces less than 13.5% of the world's wheat.[20]

With an incredible surplus of grain in this country, American farmers and rural communities are experiencing a severe depression. Mr. Rahjes implores farmers to "have faith in the market." However, "nothing disturbs the attitude of religious worship so much as a few practical observations."[21] At the beginning of the Reagan presidency, wheat sold for $4.21 per bushel; it has now dropped to $2.23.[22] Since 1981, farmers have lost 30% of their buying power and one-third of their export markets.[23]

Over the past few years, labor, land and machinery costs have all declined due to the recession in agriculture. But chemical, fertilizer and seed costs have risen steadily, along with their use.[24] In light of these facts, it is interesting to note to whom the agricultural secretaries spoke.

Richard Lyng and John Block chose to address the "haves," the fertilizer, chemical, and seed companies and distributors. Regardless of who is right about the impact on the economy, it is clear that mandatory production controls represent a shift in the distribution of farm income from the "haves" to the "have-nots," from the chemical, fertilizer, and seed companies to the farmers, small towns and businesses, rural bankers, and machinery distributors. So how is one to vote? To a farmer it should be clear.

Problems worthy of attack
Prove their worth by hitting back.
– Danish saying

It is no easy matter to stand up to the proponents of the free market. Many such proponents find their interests well served by this creed. Fertilizer, chemical and seed businesses prosper from the outrageously high government benefits from having ample grain to freely utilize as a foreign policy tool.

But the folly of the free market approach for farmers was well characterized by North Dakota grain and livestock producer Scott Stofferahn:

> "There's a joke going around up here. They're saying if we can get our prices down just a little lower we can start making some money. It's like the fellow that bought a truckload of hammers for $1 apiece to sell for 95 cents. He was going to make a go of it on volume."[25]

Farmers cannot come out ahead in the "free market" and are merely pawns to serve others' interests.

What seems odd is that so many farmers have embraced the economic religion of this nation. Far too many espouse laissez-faire policies, while they slip their subsidy checks into their pockets. By denying their dependence on the government, they limit the realm of farm policy discussions.

An appropriate "creed" for farmers runs contrary to the popular myths in business and government today. Farmers, strapped between monopoly-priced inputs and free market sales, must heavily rely on the government. If farmers would admit this, they would be able to recognize that the government is essentially their board of directors, and that the board must be made accountable to them.

Numerous forces are at work to keep farmers divided and out of the business of governing themselves. Not all of these are external forces. One of the most dangerous is the myth of independence which blinds farmers to their true circumstances and perpetuates political

apathy. I observe other characteristics within the farm community which also promote chaos, confusion and inaction. Though it is dangerous to generalize, I can't help but note that many farmers are fiercely competitive people, jealous and suspicious of their neighbors; stubborn, yet imitative and, in short, extremely insecure.

Farmers must gain enough confidence to trust their intuitive judgement and take seemingly unpopular stands. Plus, farmers would benefit by identifying more strongly with other members of their rural communities. Despite the competitiveness between grain growers and livestock producers, farmers and bankers, they are people who have more common than conflicting interests. They are all experiencing this recession together.

United we flounder,
Divided we flounder.
- Milagro Beanfield Wars
by John Nichols

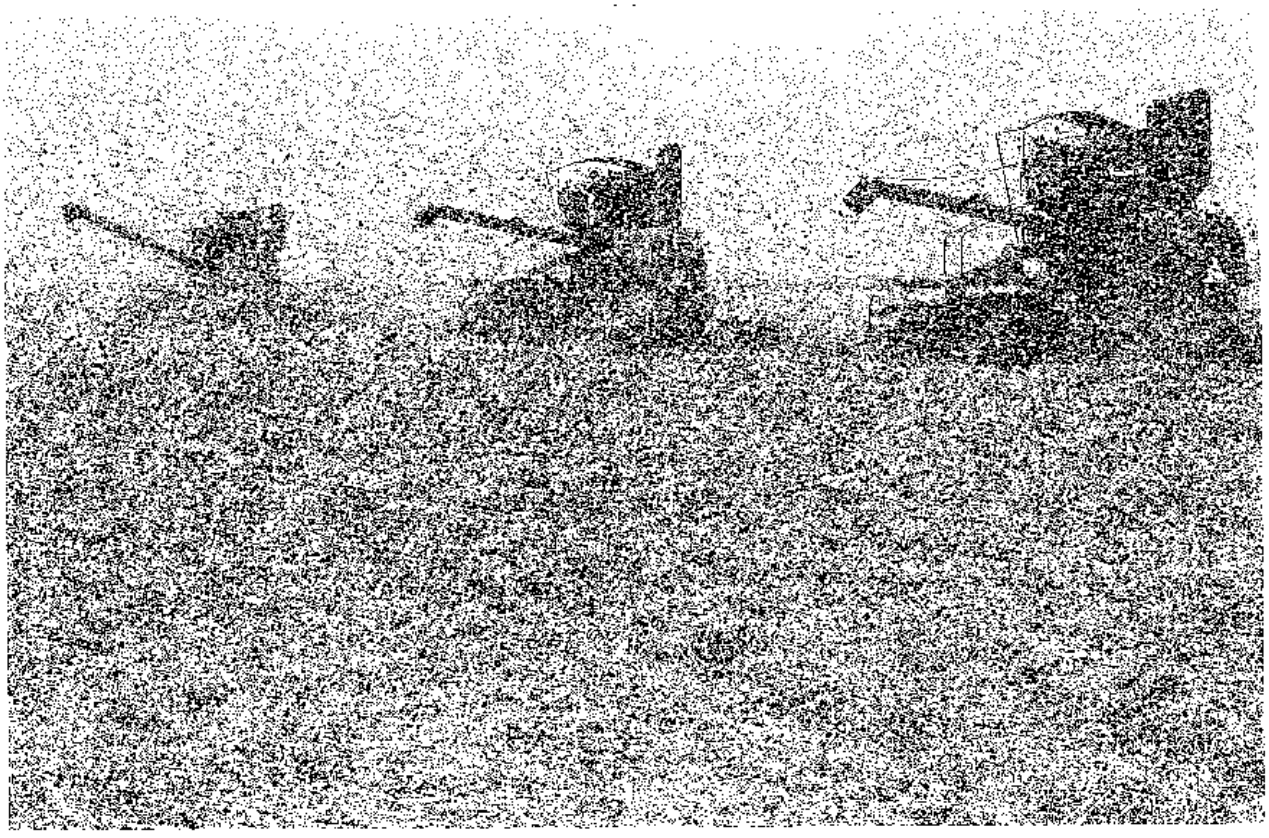
The only thing which will break this vicious cycle of chaos is conscious action. The recent referendum shenanigans are an example of the power which the government and agribusiness interests have to drive a wedge between one farmer and another to further their own interests. As a minority, and a shrinking one at that, farmers cannot afford to be naive to this fact.

Farmers do desire security and dignity in the broadest sense. But can security be found in ever more unstable forms of "relief" such as increased reliance on the vagaries of world markets, exports, government subsidies, and futures trading? Each represents an enormous gamble. None seem capable of providing the dignity of a secure income.

It remains a mystery to me why more farmers don't evaluate farm policy positions by their effect on a farmer's net income. Cash in hand is the lifeblood of any enterprise. The pursuit of parity or export markets is incidental to the real need; these are only means (perhaps) to an end. Net income (profit) is the only thing which will save the farm sector, and there may be several ways to reach this goal.

A farmer has neither the time nor the resources to take on the agribusiness establishment and its allies single-handedly. He or she must ask, "Who are my friends?" and then make alliances accordingly. It is important for farmers (or anyone for that matter) to belong to organizations which support their causes. Influence through numbers is the only way to challenge entrenched financial power in shaping new laws and policies for our country.

Farmers must carefully choose to whom they give their allegiance. The Farm Bureau is a chief proponent of market-clearing prices for commodities. But can a farmer live off the revenues of $2.23 per bushel wheat? If not, then the farmer ought to support a different organization.



I know it is difficult to contradict cultural dogma and acknowledge that the free market cannot serve farm interests. But the farm sector is unique. Its prosperity is inextricably linked to government subsidies now and government policies overall.

Production controls seem to offer long-run stability for the farm economy. Government subsidies may someday expire, and given the current levels of production, fertile soil and fresh water may become exhausted too. Production controls can ease the burden on the land and the federal budget while providing income to farmers.

The alternative is to "have faith in the market." Oscar Wilde once said, "When the gods wish to punish you, they answer your prayers."

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Butterfly Master

This butterfly stopping on my cheek
would choose yours too
if you had fallen down among
grass and pasture flowers

and your face closed
hard as mine.

This small hinged mosaic
of orange black and palomino
has been given a name
and the danger of names hovers
close to both of us today.

Walk up it stops at
the doorway of my eye:
there I am
blinded by words
in the shining light of its face.

We rush together
earth and sky.

Harley Elliott
from **Darkness at Each Elbow,**
Hanging Loose Press, 1981.

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