



# THE LAND REPORT

Fall 1993

Number 48

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The Photographs on pages 19 and 20 were provided by Joy Johnson of the Center for Rural Affairs; those on pages 27-29 are courtesy of the Kansas State Historical Society; the photograph on page 30 is courtesy of the Sustainable Food Center. Other photographs in this issue were taken by Kirsten Bergman, Abigail Breuer, Laura Sayre, and Jeff Shields, and were processed by Laura Sayre and Jeff Shields.

The Illustrations on pages 12 and 16 are by Kirsten Bergman.

## On the Cover

Our Allis-Chalmers 66 pull-type combine waits for repairs — and summer — in the big barn.

# In This Issue

Complexity. Several of the pieces in *Land Report* 48 address this “emerging science at the edge of order and chaos” and the impact it is having here at The Land Institute. On page 3, Corey Samuels reports on the progress of the Visiting Scholars Program, which takes complexity as its central topic; Christian Petrovich relates the ideas of complexity to the 1993 natural populations study on page 10; and Dave Sing reviews three recent books pertaining to complexity on page 39.

As Tom Mulhern notes on page 5, The Land Institute hosted an unprecedented number of international visitors in 1993. Abigail Breuer takes up this international theme on page 20, with an account of her conversations with farmers throughout the nations of the Former Soviet Union. I review two books on French farmers and peasants on page 41.

Other articles offered here have a regional bent, paying tribute to two fellow non-profit agencies working for better stewardship and greater social justice: Audrey Barker describes the Center for Rural Affairs's Land Link program on page 18; and Jennifer Katcher reports on the work of the recently-founded Sustainable Food Center on page 30. State offices are also becoming more involved in this type of work, as Nathan Sayre points out in his discussion of contemporary conservation and youth corps programs.

Finally, in the “Natural Connections” section, Wes Jackson and Eric Karlstrom share two very different impressions of the varied landscapes of the Great Plains.

—LS

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# At The Land

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## Visiting Scholars Show Complexity in a Natural Light

Corey Samuels

The first two in our series of visiting scholars sparked class discussions at The Land Institute in the fall of 1993. The series began September 13-16 with William C. Wimsatt, a professor of philosophy at the University of Chicago. Wimsatt was accompanied by two colleagues from the program in Conceptual Foundations of Science, Jeff Schank and Greg Mikkelson. The three spent a whirlwind week lecturing about their brand of holistic research and advising Land research staff on how we might use these ideas.

Wimsatt's lectures centered on his critique of classic reductionistic science. Although he acknowledged that it is fundamentally necessary to simplify problems—because it is impossible to evaluate all possibilities—he repudiated determinism, the idea that all happenings in the world can be predetermined infinitely into the future. Next, Wimsatt introduced his own preferred method for problem-solving, the heuristics. Heuristics are rules of thumb that work in certain situations. The trick is to define the conditions under which a given heuristic will always work, and then to use the places it doesn't work to find new rules. When a rule works dependably within its defined parameters, it is said to be robust.

Our second visitor, at The Land Institute November 1-4, was Arthur Zajonc, a physicist at Amherst College. Zajonc is unique in his field in that he makes use of historical and spiritual explanations to understand physics. His recent book, *Catching the Light: The Entwined History of Light and Mind*, traces popular and scientific views of light through the ages. Zajonc spoke on topics from his book and on his study of Goethe's writings about light. He also suggested ways in which this history can inform our views of agriculture and nature.

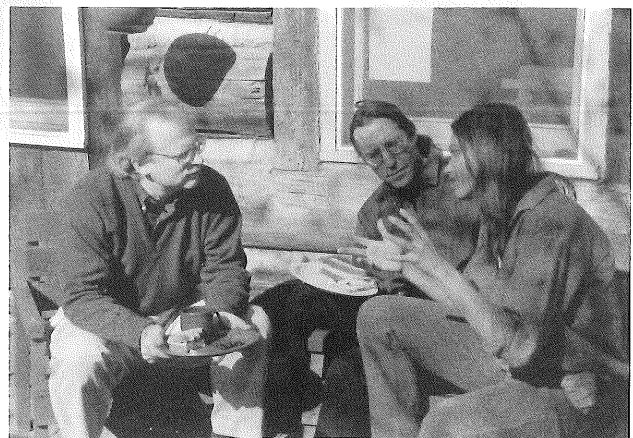
Zajonc's work emphasizes the idea that our way of seeing is not absolute, but rather is fundamentally influenced by context and expectation. He demonstrated this by showing slides of images that are deceiving to the eye (for instance, the drawing in which one can see either an old woman in one position or a young woman in another) and by discussing studies that have been done of individuals who were born blind, had their sight restored by surgery in adulthood, but who then

still didn't see in the way most people do. Zajonc also shared fascinating stories of early scientists' ideas about the nature of light. These served as further proof that there might be ways of seeing in science besides the reductionism we are accustomed to.

Followers of The Land's research may see some of these ideas reflected in our projects in 1994. Both scholars discussed how their research might be of use in the three parts of The Land's research program: perennial polyculture, the Sunshine Farm, and Matfield Green. In addition to getting feedback on ongoing research projects, Land staff held follow-up classes to entertain ideas for future work.

In addition to their daytime classes, Zajonc and Wimsatt each delivered an evening public lecture in The Land's classroom building. These events attracted people from across the state, and the discussions generated by the audience provided further food for thought on the implications of the emerging science of complexity for all our lives.

The next visiting scholars in our series will be attending as participants in a workshop entitled *Ecology, Agriculture, and Medicine: The Role of Complexity Thinking in Experimental Design*, to be held at The Land Institute January 5-8, 1994. They include James Drake, Stuart Kauffman, Roger Lewin, Stuart Pimm, Charles Sing, and John Todd.



Visiting Scholar Art Zajonc shares a discussion over lunch with two guests from Lawrence, Kansas.



# Visitors' Day Features New Projects

*Caroline Mahon*

The 1993 Visitors' Day took place on Sunday, October 10. More than two hundred people participated in the various tours and seminars on a cool dry afternoon. In addition to a prairie walk led by Ecologist Jon Piper and tours of the perennial polyculture experimental plots with Plant Breeder Peter Kulakow and intern Christian Petrovich, Farm Ecologist Marty Bender led hay wagon tours of the new Sunshine Farm project. These tours included plowing demonstrations with Farm Manager Jack Worman's team of draft horses and several other local draft horse teams.

Other Visitors' Day events highlighted The Land Institute's Matfield Green project. In the art gallery, Terry Evans exhibited her most recent photographs of Matfield Green and rural Chase County. The exhibit explored a range of subjects: the prairie landscape of the Flint Hills, portraits of the Matfield townspeople, and interior spaces within abandoned buildings in the town. In addition, Sara Wilson and Eric Karlstrom gave a slide presentation in the classroom and discussed the first summer of the Matfield Green project—getting acquainted with the community, starting the renovation of buildings, opening the cafe, gardening and canning, and beginning to compile the ecological community accounting data.

Additional Visitors' Day activities included a composting demonstration, given by intern Abigail Breuer, and a presentation on landscaping with perennials, by intern Audrey Barker. Orchardist Harry Bennett brought the last of his apple harvest and his wooden cider press up from Marion, Kansas, to give a cider-making demonstration and, in the process, provided refreshments for everyone. Visitors' Day concluded with a discussion and talk by Wes Jackson and Director of Development Tom Mulhern. Additional home-made, home-grown refreshments, including fresh pumpkin pie and squash cake, were provided by the interns.





# The Land Institute Welcomes International Visitors

*Tom Mulhern*

The work of The Land Institute has always sparked international interest, and we regularly welcome visitors from around the world. Our international connections multiplied in recent months, as we hosted three groups of visitors travelling in the United States under the auspices of the International Visitor Program of the U.S. Information Agency.

The first group of six visitors spent July 20 at The Land as part of their month-long study tour focused on issues of sustainable development. These were officials with governmental and non-governmental organizations (NGOs) in Guyana, India, Namibia, Nepal, the Philippines, and Ukraine. After a morning tour of The Land's



*Our Polish visitors and their hosts gather for a group photo. Front row, l to r: Zbigniew Ostrega, Kirsten Bergman, Jeff Shields, Marek Maciejowski, Wladyslaw Kopinski. Back row, l to r: Jan Rzymelka, Roman Stanczyk, Tom Mulhern, Marcim Herbst.*

facilities and lunch with the interns and staff, we and our visitors had a lively discussion about what might constitute sustainable development.

On August 23, we welcomed a group of twelve Latin American visitors on an environmental study tour. These were government officials, NGO representatives, academics, and journalists from Argentina, Ecuador, El Salvador, Guatemala, Honduras, Mexico, Panama, and Peru. We followed the same pattern of tour-lunch-discussion with this group, and they then stayed on an extra day to visit The Land's new project in Matfield Green, Kansas. There, Wes Jackson, Sara Wilson, and Eric Karlstrom showed and discussed with our guests the beginnings of this exploration of ecological community development.

The third group came from Poland as part of a program on environmental policy, spending October 7 here at The Land. This group of four included: Marcim Herbst, Managing Director of the National Environmental Education Center in Warsaw; Marek Maciejowski, Executive Director of the Ecobaltic Foundation in Gdansk; Jan Rzymelka, Assistant Professor at the Institute of Earth Science of Silesian University in Katowice; and Roman Stanczyk, President of the Foundation for the Protection of the Great Mazurian Lakes in Gizycko.

Arrangements for all visits were handled by the Meridian International Center in Washington, D.C., with the local support of the International Visitors Council of the Greater Kansas City Chamber of Commerce and the Wichita Rotary Club. Skilled translators accompanied each group, equipped with the portable technology of simultaneous translation to facilitate our discussions.

These visitors enriched our educational program and gave us some very specific contacts for future collaboration. All groups endorsed the importance of the work of The Land Institute and challenged us to more actively develop its relevance to other countries and cultures. We hope such visits will become a regular feature of life at The Land.

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## 1994 Research Fellow Chosen

The 1994 research fellow/intern coordinator will be 1993 intern Audrey Barker. Audrey is from Rochester, New York, and received her B.A. in biology from Carleton College in Northfield, Minnesota. This year, Audrey has worked on the polyculture experiment and been responsible for maintenance of the herbarium, including collecting seed for future expansion. Audrey is particularly interested in planning and overseeing the intern garden next year. She is also a cellist in the Salina Symphony.



*Audrey Barker*

# Welcome to the Matfield Green Cafe

*Sara Wilson*

"Now that's where the scale used to be, right where that piano is," Jewell Swift points out as he walks into the Matfield Cafe, just days after its first opening. "Well, this place sure has changed. I haven't been in this building since it was the hardware store," he comments. Jewell sits at one of four tables in the room. Jewell Swift Jr. is with him, his son visiting from western Kansas. As coffee and tea are served to the Swifts, Ken and Gladdys Brent, aged 87 and 82 respectively, pull up in their tan pickup. Gladdys was born and raised on a ranch just outside Matfield Green, and her husband has been in the area the duration of their married life. As the morning progresses in the Matfield Cafe, five other locals will come and go.

The Matfield Cafe officially opened its doors in early September, 1993, and now has regular hours—although a limited menu—from 8 a.m. to 1 p.m. Tuesday through Saturday. Staffed and supplied by Land Institute interns, it is one part of The Land Institute's ecological community accounting project underway in Matfield Green, Kansas, a small town situated in rural Chase County, deep in the Flint Hills. Ecological community accounting, in its most basic form, is best explained by a blackboard that sits behind the coffee mugs in the cafe. It reads, "MENU: Coffee—Peru, sugar—Hawaii, Cream—Betty and Charlie Swift [farmers two miles south of Matfield], Lead Plant Tea—gathered off the prairie 1 mile east of Matfield Green."

As Jewell Swift observed, the Cafe is housed in the downstairs front room of what was once Matfield's lumber yard office, a two-story frame building purchased and renovated by The Land Institute with a special grant from a foundation. The upstairs of this building has individual sleeping rooms for interns, visiting scholars, and guests. Classes and meetings have been held around the large tables in the main room. As part of the renovations, a large wood-fired brick oven was built extending out from one wall of the cafe, and Sara

Wilson and Caroline Mahon have been baking bread and an occasional pizza for the cafe clientele.

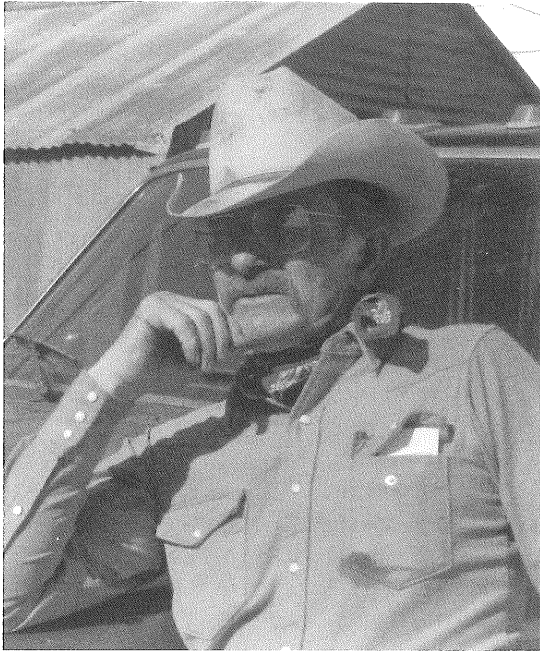
Matfield is typical of many small towns on the border of the Midwest and Great Plains: it had its heyday over a generation ago when more people were required to work on the land. It is now a town of around fifty, most of whom are older retirees. There are only four young families to take the place of the passing generation. At one time, there were a number of establishments in Matfield Green, including three grocery stores, two gas stations, the hardware store and lumber yard, a barbershop, and a cream and egg station. Today, Matfield has a half-time post office that is under threat of closure, a bar, a church, and now a small cafe. It is nine miles to the nearest gas station and fourteen miles to the nearest grocery store.

In order to be more than a passing fad, sustainable agriculture cannot simply orbit the extractive economy, as Wes Jackson would say; instead, it needs to develop as an integral part of local communities with local, more sustainable economies. The Matfield Cafe is designed to draw attention to the ecological patterns of local life, to encourage development and maintenance of the smaller loops within these patterns, and, last but not least, to provide a place for the local and visiting people of Matfield Green to stop and talk.



*The former hardware store in Matfield Green, Kansas.*

## Changes at The Land



*Jack Worman*

The Director of Education Search Committee has announced its selection of Brian Donahue as our new Director of Education. A native of Pennsylvania, Brian has spent much of the last ten years directing Land's Sake, a community land stewardship program located near Weston, Massachusetts. He is finishing up his Ph.D. at Brandeis University this fall and will be arriving in Salina in late January, in time to greet the 1994 intern group. Brian's dissertation is on the environmental history of Concord, Massachusetts, from 1635 to 1900.

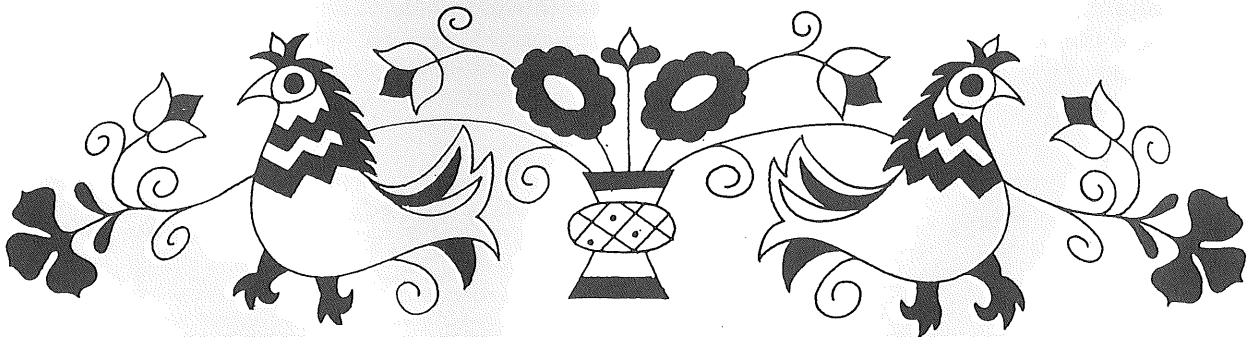
Jim Huskins has resigned and taken a position as pastor to the Salem Brethren Church near Nickerson, Kansas. The Sunshine Farm manager position is now filled by Jack Worman, a farmer and breeder of Percherons from the Salina area. Mary Handley, formerly part-time plant pathologist at The Land Institute, is now working at Kansas Wesleyan University in Salina. A member of The Land

Institute's board of directors, Sally Cole, is in residence this fall and winter in order to participate in the Visiting Scholars Program and help out with general operations. Louise Sorenson, our development assistant, celebrated her first year at The Land Institute on November 9, 1993.

The Matfield Green division has a new intern in the form of Caroline Mahon, a studio art major from Williams College. In Matfield Green, Caroline joins Eric Karlstrom, a professor of soil science at California State University at Stanislaus, and Sara Wilson, a 1992 alumna of the Salina program.



*Caroline Mahon and a friend*





# Ecosystem-Scale Research: An Open Invitation

Christian Petrovich

Pete Ferrell, a Butler County rancher, pointed out to me last summer that the prairie is an ecosystem that works on a big scale. In order to understand it and work with it you need the perspective of thousands of acres. Right after he told me that he bent down on one knee and pushed his fingers into the soil to feel for roots, moisture, tilth. And so he told me two stories: one of wind and migrating hawks that cover the whole prairie at once; the other of earthworms and roots that hold to a tiny piece of prairie soil and know it intimately.

Since 1976 The Land Institute has been working to develop a perennial polyculture on the prairie soils just southeast of Salina, Kansas. The roots of our efforts have held to this piece of land, and by burying our fingers deeply in this soil we have learned much. In 1994 we will begin a research project that takes what we have learned and applies it to the scale of the entire Great Plains bioregion—from Texas to the prairie provinces of Canada; and from the tallgrass prairie that borders the eastern forests to the shortgrass prairie that spreads out toward the Rockies in the west.

We have two basic goals for this project: to study prairie ecology by taking in the perspective of the whole Great Plains; and to test the perennial polyculture mixes we have been working with by planting them along climatic gradients from cold to hot and from wet to dry. In addition, we hope to address the following more specific questions:

1) A perennial polyculture should, like the prairie, be able to take care of its own nutrient and pest control needs. What can we do during establishment to set the stage for a perennial polyculture to take care of itself?

2) We have studied the ratios of major plant groups on native prairie near Salina and found them to vary according to soil quality and moisture content. If we use our local prairie study as an analog of the soil and moisture gradients of the Great Plains, and plant our mixtures in the appropriate ratios of major plant groups, will the

perennial polyculture be healthy and productive like the surrounding prairie?

3) What new insights and understandings can we gain from looking at the changing vegetation structures of prairie patches all over the Great Plains? Are there common threads or patterns at the macro-level?

4) And finally, what can we learn from listening to the people who live with the prairie? And from listening to the prairie itself?

The details of the study are not wholly defined at the time of this writing. But the essence is collaboration. Just as the prairie ecosystem requires an intricate network of individual organisms working together to build prairie soil, I will require a great deal of collaboration with people throughout the Great Plains in order to build this research project.

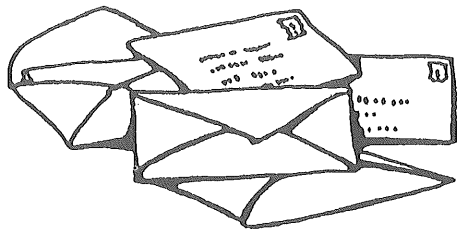
I will be the carrier of seeds for the project. I will begin in the South and migrate north with the season, establishing the polycultures. But I will be dependent on the help of people wanting to contribute their efforts. I especially need people willing to donate *the use of* a small patch (at least 20 x 20 ft) of their land for the planting. I am asking for people to help plant and maintain the polycultures. And I am also looking for critics: people who will challenge the ideas and so help them grow. Finally, I seek the contribution of your experience. I want to hear your stories about this place we live in. What does the prairie mean to you? How have you learned to live in it? What is the essence of a prairie?

I'd like to emphasize that you need no special letters after your name to be a valuable contributor to this project. I want to hear from anyone and everyone who cares about the prairie or who has some connection to it. Let's take up a study of the prairie that looks to the horizon but that leaves its fingers firmly rooted in the soil!

And with that, I extend my invitation. If you would like to help in any way please write to me, Christian Petrovich, at The Land Institute, 2440 E. Water Well Rd., Salina, KS 67401. Thank you.



# Letters



## Comments on Future Agricultural Productivity

Thank you for Marty Bender's excellent analysis of the long-term potential for a truly sustainable agriculture in the U.S. [*Land Report* 47; "Agricultural Productivity in a Post-Fossil Fuel Era"]. It is the first discussion I've seen of the subject from such a broad yet detailed perspective. As Marty points out, much research on sustainable agriculture focuses on individual farms without a true accounting for the inputs and nutrient flows from a macroscopic perspective. That an organic farmer can bring in organic material and nutrients from sources willing to see their land depleted may be great in the short term for the farmer acquiring the material, his or her piece of ground, and even the consumer of his or her produce, but it does nothing for the long-term ability of the nation to produce food, fiber, and energy.

To tie this further into "the livestock controversy," I would like to say that it would be helpful for us non-scientists if someone would shed further light on the economics of manure vs. green manure. In what ways is plant biomass converted into manure superior to plant biomass converted directly into humus by incorporating it into the soil? The status of manure may be elevated inappropriately by its value to its *user* at the expense of its *producer*, i.e., as a commodity in an extractive economy it has value as a vehicle of nutrient transfer, but may have no intrinsic value *per se* to the whole system.

Another factor which could bring about greater efficiencies in land use is the use of tree crops to produce human and animal food, with possibly surprising benefits in the production of feed in particular. One of this continent's greatest plant forms, the chestnut tree, has important potential to produce large amounts of highly nutritious, relatively stable food. Pork fed on chestnuts is a prized commodity in Europe and the trees will produce feed on sloping land not appropriate for cultivation and at yields that may exceed those of corn. There are Asian species and hybrids not susceptible to the blight and I am told that work is being done on developing a blight-resistant strain of the American chestnut from surviving specimens, as has been done with great success by New Hampshire's Elm Institute with the American elm. The only hope for the return of this incredibly valuable tree is its incorporation into agriculture, and how great it would be to see its return!

Your article demonstrates that the Sunshine Farm Project is an important and necessary addition to The Land's original perennial polyculture work as it brings the Institute into the more pressing discussion of how we might best direct our existing system of agriculture, with its well-established food crops, toward sustainability—doing so

against the backdrop of the longer-term work of developing new food staples and ways of thinking about agriculture.

Keep up the good work!

Jeff Fairhall  
Essential Foods  
Seattle, Washington

*Author's Note: When comparing the relative value of animal manure and green manure, one must note that the yield of organic crops will depend on the rate of cycling of nutrients in the soil. Green manure has been much more effective as a nitrogen source for subsequent crops than as a source of organic matter for soils. In contrast, animal manure serves more as a source of organic matter. The untested question is whether the residual manure and higher soil organic matter content under the animal manure regime will result in as much nutrient release annually as will the use of green manure. As a way of examining the effects of improved physical and biological soil properties due to either manuring practice, one could compare the sustained crop yields of both types of regimes in long-term experiments with various cropping systems and animals.*

—MB

## Thanks for the Poetry

I want to express my appreciation for the poems that appeared in *Land Report* 47, especially "the death of the Elkins prairie," by Judith Roitman. I can't remember when I last read such as eloquent testimony to the relationship between genocide and ecocide.

Poetry seems particularly appropriate for your magazine in light of the work you do at The Land Institute—research that tries to uncover ways out of this nightmarish mess we've created. I believe that the most science can do is to point us in the right direction; only poetry can accomplish the actual healing.

I look forward to seeing more poems in future issues of *The Land Report*. Thanks again!

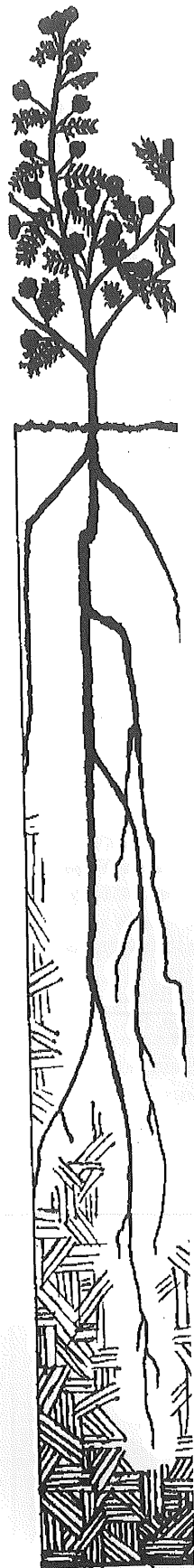
Dave Bonta  
Tyrone, PA



# New Roots for Agriculture

## Seeing the Texture of Nature with Complex Eyes

Christian Petrovich



*My ears jumped back and pinned to my skull as I watched the gamagrass quiver. Crouching with an overly serious glare, I began to stalk toward the loud chewing sound. This summer, while visiting eastern gamagrass populations throughout Kansas, I had seen many a seed stalk broken to the ground and left in a stack of half-foot segments, seed clusters gone. What rodent might this be who shares our taste in seeds?*

*A cotton mouse stepped delicately into the weeded row between the evenly-spaced research plants, ignoring my presence. I watched as its haunches jerked in a full-body chew of a gamagrass stalk. The rodents had hit this part of our research sites so thoroughly that we couldn't even collect data on gamagrass seed yield in half the polyculture plots. Yet this was the first year that rodent damage had affected the plots at all. Elusive are the patterns of movement in nature.*

*So what do you do when a rodent eats all your seed yield data? You remember that your research is affected, in some cases dramatically, by the environmental context in which it is embedded. And you return to your teacher, the prairie, to see what more you can learn.*

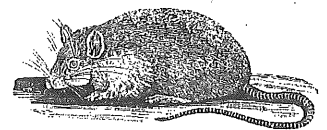
The eastern gamagrass natural populations study was initiated this year in the spirit of re-evaluation and learning. Looking at the evenly-spaced, carefully-weeded eastern gamagrass breeding project, we realized that the context in which we collect data for our prairie-based agricultural system is, in this regard, more like a conventional agricultural monoculture than it is like a natural prairie. Of course at this stage in the research that is our intention: to remove gamagrass plants from the compounding factors of their natural environments and grow them in a common environment to get an idea of their genetic variation.

Still, we recognize the interaction that exists between environment and organism, and the fact that the gamagrass plants we study are affected by the context in which they are grown.

This new natural populations study, therefore, asks two fundamental questions: (1) How are the results of our eastern gamagrass variation study affected by the cultivated monoculture context in which they are embedded? And (2), given the understanding of gamagrass variation we have now gained from this context, what more can we learn by returning to the natural context of the prairie ecosystem?

We were full of anticipation this spring as we headed to our first eastern gamagrass natural population. The "we" in the truck at the time was Corey Samuels, Peter Kulakow, Jon Piper, and myself. This site (endearingly named "3069") was one of the 81 different gamagrass populations from 10 Great Plains states that are represented in our research garden. For our purposes, a gamagrass population is defined as a group of gamagrass plants living within a common area, the boundaries of which are marked by the location of the outermost gamagrass individuals. This summer we were to visit 16 different eastern gamagrass populations throughout Kansas.

Driving the overpass that got us to the west side of Interstate 135 and looking down to the location of the 3069 gamagrass, we found that another definition needed to be made: what is a "natural" population? This population exists in a 20 meter-wide strip of roadside ditch sandwiched between a heavily-trafficked road and extensive wheat fields. The ditch itself appeared to have been created by the construction of the uplifted





road, so we couldn't even claim that this was a remnant population left over from the 10,000 year-long history of prairie evolution that was here before concrete. Gathering up our data sheets and tools of quantification, we got a closer look, and noticed that aside from the gamagrass the vegetation consisted largely of exotic brome grass, cheat grass, and even wheat. Stepping over a few beer cans it became clear that our definition of "natural" was going to have to be rather general. So when I say "natural" populations I mean gamagrass populations that weren't obviously planted by people.

As it turned out 3069 was *the* most impacted site, based on the percentage of exotic species. Among a total of sixteen sites, four more of the sites were roadside populations like 3069, three were in railroad right-of-ways, three were in hay meadows, two were in grazing areas that had been unstocked for at least two years, one was in an active cattle pasture, one was a riverside population, and one was an intact prairie in an ungrazed nature reserve.

We came to these sites with many questions and that has required a rather eclectic methodology. The first question was, how does the ecological context affect the quality, or phenotypic variation, of the gamagrass? In each natural population we evaluated twenty gamagrass plants for many of the same physical characteristics that we measure in the research plots: seed yield, basal diameter of the plant (a reliable index of total biomass), peculiarities of the seed heads, number of flowering stalks, and an assessment of disease impact. We can now compare this information to that from the five representatives of each population we have growing in our research plots to see if, and how, they are different. This is the first level of gamagrass observation, the individual level.

The second level was the population level, in which we described qualitative characteristics that were common to the population as a whole. Integral to this methodology is the concept that genetic variation is lower within a population than it is between populations. The parent population taken as a whole can thus be somewhat comparable to the offspring plants we have grown in our experimental garden, both being expressions of the different environmental contexts they were grown in.

When asking how gamagrass is affected by the context in which it is embedded, we need to know what that context is. The third level of investigation, then, was to describe the sites qualitatively. In narrative form, we noted the patterns we perceived in the gamagrass population, the physical topography of the place, the distributional patterns of the vegetation, the evidence of human impact, and any other observation we could make. This aspect of the study was perhaps the most exciting, and certainly the most provocative, for two reasons.

First, inherent in the methodology is the recognition that as researchers we are subjective qualifiers of our environment and that our perception is a valuable tool for understanding

nature, rather than a handicap that distorts reality. In this respect it was an exploration of the scientific methodology advanced by the great geneticist Barbara McClintock, which was eloquently described by Evelyn Fox-Keller: McClintock can risk the suspension of boundaries between subject and object without jeopardy to science precisely because, to her, science is not premised on that division. Indeed, the intimacy she experiences with the objects she studies—intimacy born of a life-time of cultivated attentiveness—is a wellspring of her powers as a scientist.<sup>1</sup>

Admitting that boundaries between subject and object are fuzzy at best

frightens most scientists because it opens a nasty can of worms full of examples of poor science, of subjective observations wherein people fabricate what they desire to see and call it truth. Yet this kind of fraud can also be found in science that calls itself truth by claiming a false objectivity. What frightens me most is the removal of scientists from the subject of their study. Rather than developing a "cultivated attentiveness," an intimate understanding derived from embedding oneself in the phenomenon one is studying, many of today's scientists lose themselves in the "objective" methodology of research, in theoretical abstractions based on nothing more than a sketch of the problem and a bundle of compounding assumptions that, although they may be logical, may also have nothing at all to do with nature. Hence we have a generation of "ecologists" who make computer models about



*A roadside population of eastern gamagrass.*

ecosystems or construct elaborate theses based on other people's data sets without ever having developed an intimate understanding of the ecosystems they are modeling.

I hope that by using our powers of perception, we can embed ourselves so deeply in the phenomenon we are studying that the boundaries become will translucent; and then we will gain insight into that which the prairie has to teach.

The other exciting aspect of this qualitative description is that everyone participated—all of us interns, Corey, Peter, and Jon as well—and added their unique skills of perception to the site descriptions. It will be fascinating to see what evolves out of this cooperative approach—this scientific methodology modeled after the networks and webs of ecological interactions.

One of the major assumptions of The Land Institute's work is that by mimicking the structure of the prairie with our agriculture, we will get the functional qualities of the prairie, including its resilience and sustainability. We currently define that structure in terms of the vegetation composition, or the ratio of major plant groups. Looking closely at the vegetation composition specific to natural gamagrass populations should give us further insight into using eastern gamagrass as a component of a prairie-based agriculture.

We used a canopy-coverage method of vegetation analysis in which we delineated transects through the gamagrass population and distributed 20 quadrats randomly along them. Within each quadrat we identified the species present and noted the percentage of the quadrat's area they covered. This method converts the real, varied distribution of species into a crystallized average cover for the site. This is acceptable for sites that are evenly distributed. However, certain patterns of patchiness, although common in gamagrass populations, cannot be detected by this method alone. In situations like these qualitative observations can assist and complement quantitative analysis.

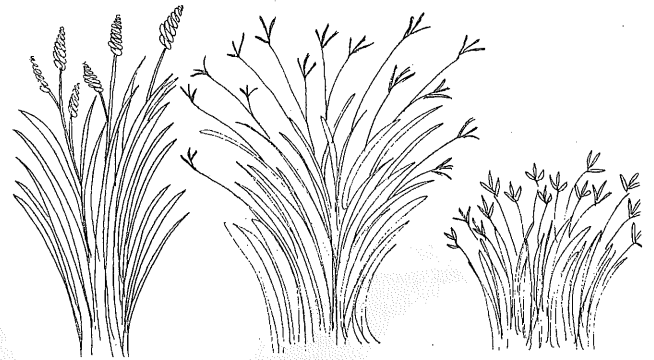
*Surrounded by clippings of information, data nibbled off from the gamagrass sites and dragged into three-ring notebooks, I feel like a rodent in my own right—a packrat. Added to this stash of scribbles are photocopies of relevant papers—the little seed packets of past studies—and a notebook of ideas, frustrations, and the dashed notes of conversations. What is there that emerges from all this? What have we learned from our consultation with the prairie this summer? There are strata of insights. First are the blatant, coarse-grained observations. These are the ones that presented themselves with ease. Then there are the finer-grained understandings. Because of the limitations of our resolution, the fine-grained understandings will have to wait for further analysis, but I will*

*discuss the direction they are headed. We will start with the big rocks and work our way to the silt:*

*A boulder, one with fossils.* This study points directly to the importance of *in situ* conservation of wild prairie. The wild prairie is our source of understanding, our opportunity to learn the ancient knowledge of a timeless evolution. When I walked along the heavily impacted 3069 population, a question entered my mind: "what do exotic species have to teach?" At the very least, they teach us that our agriculture, and even natural ecosystems, can be vulnerable to forces against which they have no prepared defenses. We need to preserve prairie remnants as guardians of the organisms that may be resistant to these kinds of invasions. But we also need wild prairie to keep us humble, to let us know whether what we do has ecological validity. When we think we know what we are doing, we need to go to the wild prairie and find out if the birds agree.

*The pleasing contour of a limestone ridge.* A satisfying conclusion of visiting natural populations is the that the compatibility of three of our perennial polyculture representatives has been confirmed. Illinois bundleflower and eastern gamagrass were found growing together in seven sites, and in two of those sites maximilian sunflower was growing right in with them.

*What's this big round rock doing in the middle of the Kansas plains? Monoculture in the prairie?! Most of the gamagrass we visited grew in dense, apparent monoculture patches nested in a mosaic with other plant species. However, observation is often a trick of perception, and too much weight put on any one angle can be misleading. Poised on hands and knees over a three-quarter by three-quarter meter quadrat, one sees that many other species are involved, albeit at low densities. What is the significance of these seemingly irrelevant species to the overall plant community? Returning to each site three times throughout the summer, we found*



*Three possible directions for gamagrass breeding. In the center, an existing accession with desirable traits such as erect growth habit and high seed yield. As depicted on the left, breeding could lead toward a corn-like plant, with fewer, larger seed heads and stronger stalks. Alternatively, selection could favor dwarfed, many-tillered plants, as shown on the right.*

that the mosaic pattern of "monocultures" undulated, the boundaries moving as different species became mature within the same spatial area. This bodes well for a perennial polyculture that will have many species with different seed maturation periods growing in the same place.

*Fault-risen Flint Hills push up around sunken wrinkles of water drains.* The patches of gamagrass existed mostly in a very distinct part of a moisture gradient, just above the water-soaked base of the drain, yet below the crest of the drain's lip. Growing as it does, gamagrass could be a valuable soil holder today in the drainages that run through crop fields. On the other hand, since gamagrass rarely grows outside of drainages in nature, if perennial polyculture aims to be useful on more marginal lands, drought-resistant individuals may need to be sought out for the breeding program.

*Skeletons of pollen and seed folded into layers of mudstone.* There were markedly lower seed yields in the natural populations than in the research plots. The higher yields in our low density, weeded plots are probably due to the reduced competition with other plants for light and soil nutrients. Increasing seed yield is one point at which we desire to alter nature. Yet nature grows the plants; we can only set the stage for that natural act. An ecological agriculture must look to nature for ways of increasing seed yield. We must seek out the natural context and vegetation composition of high seed-yielding populations.

*Boney scales of surface-level rock armor acres of grasses against the plow's blade.* While the swather is much less disruptive of local vegetation than the plow, haying is nevertheless incompatible with high seed production. In the three hay meadow sites, the gamagrass was dwarfed and could produce only a few weak, thin flowering stalks. These places were hayed in mid- to late July, coincident with the time seeds begin to mature. Even haying right after seed harvest may not leave gamagrass plants enough time to store energy for next year's seed crop.

*Post rock fences for miles.* This brings us to grazing. I visited three ranches this summer. On the first, the cattle wouldn't touch gamagrass. There I saw it standing fully grown in great abundance. On the second ranch, however, cattle ate the gamagrass with apparent relish. All that was left were grazed-down nubs. The third ranch had recently switched to rotational grazing, and the gamagrass seemed to be increasing in abundance under the new management of greater rest periods.

Timing is critical. Grazing or haying after the plants go to seed may weaken their ability to store energy for next year's growth, and season-long exposure to grazing pressures may weaken gamagrass entirely. Although gamagrass should never be cut or grazed shorter than eight inches, it

may become unpalatable when it is left untouched until fully grown. Allan Nation suggests that "buzzing" grasses with cattle in mid-June—before seeding, during the time of fast plant growth when recovery is easy—can stimulate an increase in seed yield.<sup>2</sup>

*Scorching red Dakota Sandstone canyons torn out of the plains.* Fire helps gamagrass get an early start. The sites that were not burned and had a big litter load from last year were about two weeks behind those that were burned. An area of mowed gamagrass was about a week behind burned areas.

*Ancient sand dune covered with grasses.* Now we reach the finer-grain, the grit in your teeth and the sand that slips through your fingers. We have scooped it into cupped hands, but haven't yet sorted the grains. We will synthesize the results primarily by correlation. We will see if there are groupings of gamagrass qualities that correlate to common contextual qualities of the different environments. We will look at the vegetation information in many ways: overall, within sites of common gama-grass qualities, within sites of common regional vegetation associations, and within sites of common management histories. We will also classify the vegetation into four functional groups—warm-season grasses, cool-season grasses, legumes, and composites—to compare with the seven-year prairie study conducted here at The Land Institute. It will be a process of exploration on a micro-scale to see what has evaded the resolution of our coarse-scale perception.

In our efforts to understand the prairie, it is important to remember Gary Snyder's words: ...we do not easily know nature, or even know ourselves. Whatever it actually is, it will not fulfill our conceptions or assumptions. It will dodge our expectations and theoretical models. There is no single or set "nature" either as "the natural world" or "the nature of things." The greatest respect we can pay to nature is not to trap it, but to acknowledge that it eludes us and that our own nature is also fluid, open, and conditional.<sup>3</sup>

Nature demands creativity of us. You can see it in the huge diversity of species in the prairie and in the uniqueness of what each organism contributes to the landscape. There will be no formula, no ratio of parts, no bag of perfectly mixed seed in a prairie agriculture. Nature demands that we respond to the peculiarities of the place, anew each time, with the adaptability of a 10,000 year old prairie.

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# A Research Update: Three Potential Perennial Grains

Jen Tressler

*Desmanthus*, *Leymus*, and *Sorghum*, oh my! These plants get a lot of attention at The Land Institute, and this year I have been responsible for ongoing projects concerning each of them. Because I have been getting to know these plants for my research projects, and because they haven't received much recent press in *The Land Report*, I decided to re-introduce them and update the progress of our research in this issue.

The goal of our work with these and the other species in our research gardens is to develop perennial food grains that can be grown together. According to The Land Institute's vision, the characteristics of a perennial agriculture for the Great Plains will be similar to those of a grasslands ecosystem, which maintains itself without eroding the soil or depending on human applied chemical inputs. We call the system a perennial polyculture. We wish to develop the qualities of perennial habit and high seed yield for each species, making the system an agronomically attractive and ecologically sustainable alternative to conventional agriculture.

*Desmanthus illinoensis*, also known as Illinois bundleflower, is a perennial legume that is native to the Great Plains. It was named in 1803 by a French botanist, Michaux, who was in the Illinois Territory and noticed the curved, clustered seed pods of the plant.<sup>1</sup> Its flowers are small, white, pompon-like structures. In an average year plants reach a height of four feet, but this season the plants approached six feet in height, no doubt thanks to this summer's high rainfall. Because Illinois bundleflower is a legume, it may help maintain soil fertility by making atmospheric nitrogen available to neighboring plants.

Both yield and nutritional content of Illinois bundleflower are promising. Yield data over ten years have shown that this species can produce over 1000 pounds of seed per acre, comparing well with soybeans, which in Saline County average about 1200 pounds per acre.<sup>2</sup> An Illinois bundleflower planting can produce good yields for several years with little annual cultivation. It is important to note that these qualities exist despite the fact that it has undergone very little breeding effort relative to soybean varieties. In 1985, intern Mary Bruns studied the nutritional value of bundleflower seed and found that the protein content is about 38 percent on a dry weight basis. This also looks good

compared to soybeans, which have 40 percent protein by the same measure.<sup>3</sup>

During our study of Illinois bundleflower we have seen differing yield patterns among our different accessions, or collections. Some accessions have shown high but inconsistent yields, while others display lower but stable yields. This brings up the question of which pattern would be more desirable in a cropping system. This year I harvested and weighed seed from our germplasm plot, where many wild accessions of Illinois bundleflower are grown together for comparison. We harvested seed from 32 accessions of Illinois bundleflower for the fourth year. I will be interested to compare my results with those of Abigail Breuer and Audrey Barker, who are looking at one accession of the plant in the third year of harvest in the polyculture plots. Since these data sets feature the same accession planted in different years, we may be able to distinguish the effects of the plants' ages from the effects of their environments or yearly weather patterns.

The second species I have been working with, *Leymus racemosus*, or Mammoth wild rye, is a perennial grass that is not native to the Great Plains. Its seed has been eaten in parts of Russia when other crops have failed during drought. Species closely related to mammoth wild rye also have interesting histories: leaves have been used by Inuit and Aleut Indians for making baskets and thatch, and by native peoples of Eastern Europe for making mats, rope, and string. The grain of a large-seeded type of leymus, lymegrass, was ground into flour in Norway and Denmark even into this century, when it was replaced by imported wheat.<sup>4</sup> Our plants were grown from seed collected in the grasslands of southeastern Europe.

Several single-species plots of leymus were established at The Land Institute in 1990, and leymus was one of three species included in the polyculture study begun here in 1991. This year I harvested and weighed seed from both of these areas in order to judge how leymus



*Desmanthus illinoensis* late in the season.

performs in triculture relative to monoculture environments. This will be the second year of yield data from this experiment. From what I've observed, leymus is a hardy perennial that proliferates well. Yields in 1990 averaged 831 pounds per acre.<sup>5</sup> It is a cool-season grass like wheat, and sets seed at a different time than Illinois bundleflower or eastern gamagrass, so it fills in the late spring-early summer gap nicely relative to our other polyculture plants.

The final area of research I am involved in at The Land Institute is the sorghum breeding project. This study is different from our other breeding work. In this case, we are not starting with a wild perennial, but rather with an established annual grain that has a wild perennial relative. The main question is the same, however: whether we can develop crops that are at once perennial and high seed-yielding.

Grain sorghum, *Sorghum bicolor*, is the second largest component of animal feed in the United States and is grown widely throughout the southern plains. In India, Central America, and Africa, people commonly consume breads and porridges made from ground sorghum. The plant originated in Africa, and it is weakly perennial in its native tropical climate.<sup>6</sup> In the temperate United States, however, it does not survive the winter, and thus here it is an annual crop.

We have been working with two species of sorghum at The Land Institute. *Sorghum bicolor*, as I've mentioned, is a grain sorghum with a high seed yield. We have crossed it with *Sorghum halepense*, also known as the weed Johnsongrass, which is strongly perennial. At this stage in the breeding program, we have two types of hybrid selections. One is strongly perennial; another produces a large amount of seed. We hope to breed these into one type that has both of these traits, with the eventual

goal of growing it with other perennials in a polyculture.

Illinois bundleflower, leymus, and sorghum should be more familiar to you now. Whether you read about them in Land Institute literature, or find yourself eating them some day, they are certainly plants of diverse backgrounds and promising futures.

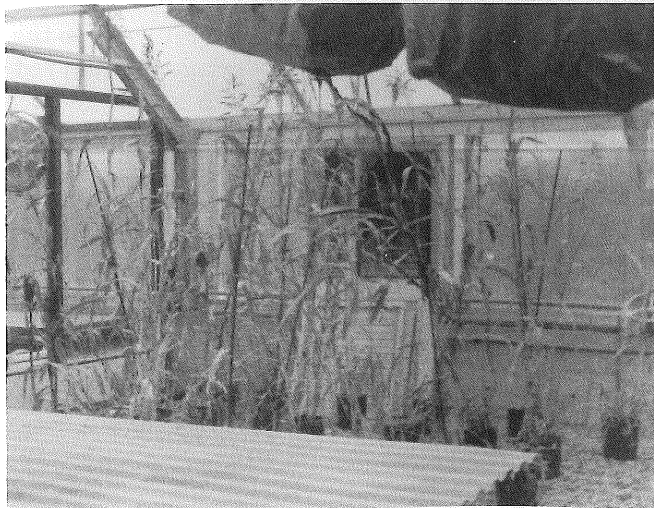
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## 1991 Research Report Still Available

Back copies of *The Land Institute Research Report* #8, edited by Jon Piper, are available for \$2.00, ppd. The report presents the results of the research in perennial polycultures carried out by The Land Institute's 1991 interns and research staff.

This annual report includes papers on: vegetation patterns at four prairie sites; variability in eastern gamagrass (*Tripsacum dactyloides*); Illinois bundleflower and slender-lobed bundleflower hybrids (*Desmanthus illinoensis* x *D. leptolobus*); evaluation of "Permontra" perennial rye (*Secale cereale* x *S. montanum*); nitrogen cycling in legume-grain rotations; overwintering ability of perennial sorghum crosses; perennial polyculture studies; and a comparative study of disease levels in collections of eastern gamagrass.



*Sorghum* hybrids growing in the greenhouse.

# Red Clover in an Organic Rotation

Jesse Geiger

Red clover, or *Trifolium pratense*, was grown by American colonists as early as 1663. Since then it has been well established in large portions of the United States as a forage, seed, and green manure crop. Today it is regaining popularity as an integral part of the crop rotations used in low-input, more sustainable farming practices. In this report I will discuss the general background of the medium red clover strain and then relate how my family has incorporated it into our farming operation.

First let's look at the history of red clover. It is generally believed to have originated in south-eastern Europe and Asia Minor. It was probably first cultivated in southern Europe over eighteen hundred years ago. From there it spread to Spain, to the Netherlands, and to Germany in the sixteenth century, and was introduced to England and the United States in the seventeenth century.<sup>1</sup> Today red clover grows wild throughout Europe and even reaches into Siberia. Due to its wide adaptability, it has developed many cultivars and proliferated in many regions of Europe and North America.

Here in America, red clover is grown most successfully in the humid sections of the northeastern quarter of the U.S. Temperatures can vary widely, however, as long as moisture is sufficient. Different cultivars and locally adapted strains have varying degrees of winter hardiness, which correlates to use in the northern, colder states. Winterkilling, lack of moisture, insect damage, and diseases are the most important factors limiting its longevity. The chief diseases are anthracnose and powdery mildew, and the most troublesome insect pest is the leafhopper.<sup>2</sup> For these and other reasons, clover is used mainly in a biennial management strategy.

There are many uses for clover, ranging from nitrogen fixation to high value salad ingredients. I will address here the most common uses: nitrogen fixation, forage, and seed.

Perhaps the most obvious usage is as a



forage—either processed as hay or haylage, or simply used for grazing. Medium red clover usually produces two cuttings of hay in a fair growing season. Its harvesting characteristics and feed value are roughly comparable to those of alfalfa, although extra care should be taken during harvest to minimize leaf loss. Today, alfalfa has replaced clover as the foremost hay crop largely due to its higher yields and

higher protein content.<sup>3</sup> As with alfalfa, extreme care should be taken when grazing clover to avoid bloat in ruminants. Common management practices used to minimize the incidence of bloat include: filling the animals before you release them for grazing, limiting their time grazing, getting them used to green clover over a period of time, and supplementing polyoxalene, a chemical found in “bloat guard” blocks. It should be noted that polyoxalene should be supplemented several days prior to grazing in order to infiltrate the body. Combining several of these strategies can make green clover a fairly safe and profitable forage.

Another very important characteristic of red clover is its ability to fix atmospheric nitrogen, due to the *Rhizobium* bacteria found in its root nodules. These bacteria work symbiotically with the plant to create and store complex forms of nitrogen in the nodules, which are basically bumps on the roots of the plant. After nitrogen is collected, it may be used by the host plant, used by other plants growing in close association, or decomposed and returned to the surrounding soil. It is commonly estimated that red clover will fix from 100 to 150 pounds of nitrogen per acre in a growing season, although the amount fixed depends on many variables, including moisture, pH, and soil condition.<sup>4</sup> It is also believed that nitrogen fixation will be highest in the first full growing season after establishment. This unique function of the legume clover makes it quite suitable either for interseeding to benefit a primary crop or for incorporating prior to a different crop.

The final most common usage for clover is seed. Clover seed is a high-value crop because it is relatively low-yielding and requires special effort to harvest properly, so supply is usually low relative to demand. Another factor increasing the value of

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clover seed is its adaptability. That is, locally developed seed is more likely to perform better for the specific locality. These factors make the seed profitable as a cash crop and insure that the overall performance of the crop in your specific conditions will improve from year to year if you save your seed or buy local seed.

Now let me discuss how we have employed red clover in our operations. I will first describe the operation, then move on to tell you how we have worked clover into the management as a source of fertilizer, hay, grazing, etc.

We operate a diverse system on the gently rolling hills and small bottomlands of northeast Kansas. Our farm has been certified organic since 1986. Over the past six years, we have strived to incorporate cows and horses with small grains and row crops in order to form a more sustainable, holistically-managed system suitable to our conditions. This has allowed us to make use of clover in practically all of the ways outlined previously.

Before realizing the benefits of clover, one must establish it. We have found that interseeding clover with small grains in the spring works well. We usually drill it simultaneously with oats. If conditions are suitable, we also drill it in standing wheat or rye. We have also had suitable success broadcasting the clover seed, although germination might be slowed with broadcasting. Inoculating the seed with a dry powder, our preferred method, might also be more effective through the drill. We use broadcasting mainly as an option if, for instance, the wheat or rye would be adversely damaged by drilling.

After the seed is established, the beneficial options present themselves. We usually harvest the young clover and crop/weed litter in the fall directly following planting. This generally makes a low quality hay, but this action will eliminate some weeds and allow the clover to further develop. Care should be taken, though, not to cut too late or too low so as to damage the plant or prevent it the time necessary to store nutrients for the winter season. The plant will need some time, perhaps a month, before freezing to insure minimal winterkill. In the following season it should thrive and thus lead to further options.

Because we manage livestock, we obviously need forage. On our farm, clover has proven to yield well in comparison to other low-input forage crops. Clover also fits into our system well from a nutritional standpoint. Our main emphasis is on hay. We cut for hay beginning in the early summer. The crop is deemed suitable for cutting when approximately ten percent of the seed heads have turned from pink to brown. It is common to get two

cuttings of hay in the second growing season. We usually limit grazing to the early part of the third growing season, after which we plow the crop down in preparation for a different crop. Grazing not only benefits the animals, but spreads manure and reduces crop bulk before spring planting.

Seed is another important aspect of clover in our operations. We usually harvest seed late in the second growing season—depending on the conditions, seed may be taken from the second or third regrowth. We use most of our harvested seed to replant, and have thus so far not realized it as an outstanding cash crop.

The final and perhaps most beneficial aspect of clover in our operation is soil improvement. Not only does clover fix fair amounts of nitrogen, but it also loosens the soil through root growth and can add organic matter. We use it primarily to fix nitrogen in preparation for other crops in our rotations.

So you see clover can and has become an integral part of diversified farming. Modern red clover is a practical plant for low-input practices due to its flexibility. When coupled with diverse management strategies, the many benefits of clover serve a variety of critical functions and greatly broaden a farm manager's options.

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# Considerations For a Sustainable Society

## Preserving Family Farms: Nebraska's Land Link Program

*Audrey Barker*

While visiting the Center for Rural Affairs in northeast Nebraska recently, I stayed at an old farmstead two miles from the town of Rosalie—a hamlet made up of two shabby bars amid a small cluster of houses. The house I stayed in belonged to an old man who rents it out just so someone will live there. The corn and beans came right up to the yard on all sides, and were farmed by somebody else. Around the house were several outbuildings—room for poultry, sheep, hogs, a garden. As I walked around the yard, I noticed that huge spruce trees were growing out front—someone had cared for this place once, and thought of it as lasting. Now the land supports only anonymous rows of corn and beans and a cheaply-rented house. I wondered what this place once was, and what would happen to it in the future.

Abandoned farmsteads like that one are visible everywhere throughout the rural Midwest and Great Plains, vividly testifying to the erosion of family farming and the reduction in numbers of farmers over the past fifty years. Current demographic trends, moreover, do not offer much reassurance. Much of the country's farmland is held by older farmers, and most farms sold today are purchased by established farmers or non-farm investors. A recent survey of Iowa realtors showed that only two percent of farmland sales were made to beginning farmers.<sup>1</sup> America's already dwindling farm population will decrease further unless land can be transferred successfully to the next generation. Many farmers do not have heirs who want to farm, and many young people who want to farm do not have access to farmland. A primary goal of the Center for Rural Affairs is to counter these trends in land tenure and to create new opportunities for

beginning farmers. Their Land Link program is the cornerstone of these efforts.

Run by Allen Prosch and Joy Johnson, the Land Link program is intended to facilitate the transfer of farmland to the next generation. Beginning farmers are connected with retiring farmers/landowners through a computer database matching service. Land Link also offers a professional farm management service and a brokerage service for landowners who want to sell land. Since the program's inception in the autumn of 1990, over forty matches have been made. Over one thousand people interested in



getting into farming are listed in the database, as are about eighty-five landowners. The large response by those who want to enter farming indicates that many people are seeking opportunities to farm. Apparently, city life has not lured all the young people away—there are many who want to farm but are having trouble gaining access to farmland.

As these figures also suggest, it is more difficult to interest those who have the assets. Much effort is put into attracting more landowners to participate. This past summer, Land Link was presented in the context of a retirement and transfer seminar offered by Prosch and Johnson in eighteen locations throughout northeast Nebraska and western Iowa. The total audience was over two hundred. Prosch explained that many people attended expecting a more conventional estate planning seminar, yet the response to the Land Link idea was favorable. Not that participating in Land Link means giving away the farm: thanks to some potential tax breaks and the low commission that Land Link Realty offers, it can be financially advantageous. But although an

emphasis on its economic viability is needed to convince landowners to see it as a real option, the appeal of Land Link is not primarily financial. Land Link participants generally place great importance on keeping their farm a family farm, on maintaining and building rural communities, and on giving young people a chance to become farmers.

Land Link is one of many strategies that the Center for Rural Affairs has developed in their efforts to help young people get started in farming. It ties in with their beginning farmer training course, their research into low-input farming, and their development of a beginning farmer loan fund. A combination of these strategies should give a beginning farmer a better chance of successfully establishing a farming operation. Both Land Link and the beginning farmer training seminars try to emphasize and encourage more sustainable farming practices. Sustainable agriculture, here defined as reduced inputs, increased energy efficiency, and more intensive management, is often a natural fit to a young farmer who has abundant energy but less than abundant capital. And many of the older farmers who are concerned about the perpetuation of their family farming tradition either already practice or are receptive to management strategies that promote the long-term viability of the land.

Once a retiring or beginning farmer is listed in the directory, he or she is given periodic listings of potential matches to peruse. At this point, any participant may initiate contact with a potential match. Prosch and Johnson do as much as necessary to facilitate meetings or to otherwise help participants come to mutually acceptable agreements. Participants are also encouraged to consult their attorneys to help with negotiations. The negotiations often take several months to

complete. Finalized agreements often involve outright purchase or lease of the land.

Another option used by some participants is a work-in agreement. If a beginning farmer does not have the money to buy or lease a farm outright, or the older farmer does not yet want to leave the farm but instead wants to ease into retirement, this option is worth consideration. The specific arrangements are unique in each case, but possibilities include a salary that accounts for building equity in the farm operation, small livestock operations owned by the younger farmer, or a lease on part of the land. Common to the agreements are a close working relationship between the farmers and the mutual hope that someday the younger one can take over management and possibly ownership of the farm. There is also a twin potential for intergenerational transfer of farming knowledge and traditions, and/or for frictions and problems due to such close working together of people recently strangers to one another. Prosch noted that this may be a problem more pronounced among farmers. The image of the taciturn and exceedingly self-reliant farmer has some basis, maintains Prosch, once a full-time farmer himself (though he gladly engaged me in lengthy conversation!). Naturally, some of the work-in type links arranged so far have fallen apart, but there are also cases where excellent mentor-apprentice relationships have developed.

A case where a work-in agreement has been successful is the link of Del Ackerlund and Marty Hitchcock. Ackerlund and Hitchcock, ages 70 and 32 respectively at the time of the agreement, shared an interest in farming sustainably. Ackerlund wanted someone who could take on the intensive management of his 800-acre organic farm. Hitchcock had attempted farming previously, but had been run out in the 1980's. After that he worked to pay off his debts, but had hoped to be more than an employee again someday. The two men negotiated an agreement whereby Hitchcock receives a salary while he lives on the farm and works with Ackerlund to learn to manage the land. Hitchcock also runs a small hog operation of his own on the farm. Both men hope that Hitchcock will someday take on management of the farm. The two have a good working relationship, Hitchcock has access and responsibility to land, and Ackerlund has the opportunity to pass down his land and way of farming.

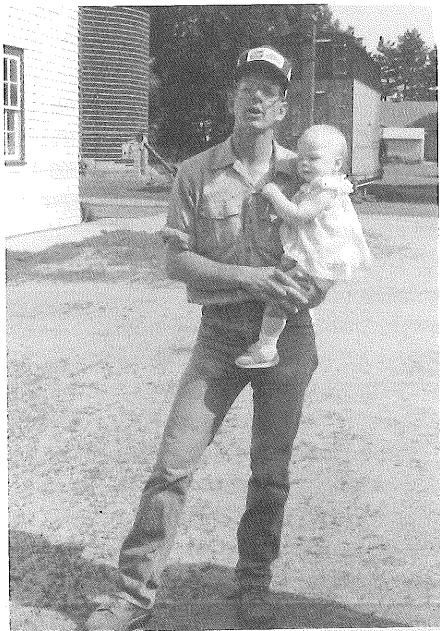
The appeal of linking new and retiring farmers has brought much media attention to the project, with articles appearing recently in *Top Producer*, *Nebraska Farmer*, *The Wall Street Journal*, and *American Way*. The publicity was a boon to the program; now Prosch wants to devote



*Allen Prosch explaining work-in arrangements to a group of farmers at the Center for Rural Affairs' Twentieth Anniversary Celebration.*

his energies to more personal interaction with farmers, as he believes one-on-one exposure is the key to convincing landowners to participate. He plans to hold seminars with other real estate agents in hopes of broadening the audience reached and of integrating the approach into more mainstream realty work.

Land Link is regional in scope, offering its services in Nebraska and Iowa. The idea is spreading, however: Iowa, North Dakota, California, Ohio, Kansas, Minnesota, Wisconsin, Massachusetts (for the Northeast), and South Dakota have programs in place, and several other states hope to start one soon. Many are associated with their state's department of agriculture. Farm Link of Kansas, for example, which publishes an annual directory of prospective and retiring farmers, is run by the Kansas Board of Agriculture. Earl Wright, director of FarmLink, says that in its one year of existence there has been much interest in the program. The Center for Rural Affairs has also written a how-to manual for groups who want to initiate a Land Link-type service. And the existing state programs have formed a consortium called the National Family Farm/Ranch Transition Network.



One of Land Link's matched beginning farmers with his young daughter.

certain trends of contemporary industrial agriculture. Land Link represents a pragmatic approach, and thus far successful one. Such projects are needed actions toward arresting the depopulation of rural America. Hopefully this is a movement that will persevere and grow.

#### References

1. Center for Rural Affairs, 1993. *Land Link*, Center for Rural Affairs, Walthill, NE.

## Farming Under the New Non-System: A Journey Across the Former Soviet Union

Abigail Breuer

*As hard as it is to imagine, I've now made my way across half the world—from the Sea of Okhotsk to the Baltic—discussing decollectivization and the rebirth of private farming along the way. Settlement here in the Former Soviet Union (FSU) ran under a different guise than at home, as well as in the opposite direction. Here, European [Western] Russia, is where the millions exiled during the Soviet period were sent from, to my point of arrival, Magadan. I wrote these words in the fall of 1992, four months into a seven-month journey spent absorbing the way of life emerging under what I came to term the *new non-system* of the post-Soviet world.*

Most of all, in opening my journal to you, I wish to convey a sense of daily life as I saw and lived it, a perpetual houseguest among people from many walks of life. As a coordinator for the Rural Enterprise Adaptation Program International, a non-governmental organization that facilitates information and technology exchange between the emerging farmers of the FSU and U.S. organic farmers, I visited rural settlements in the Baltic Nations, in Siberia, and in European Russia—most of them reached only after several flat tires and a little engine trouble. I met with farmers, collective farm and factory workers, scientists, and various government officials, becoming acquainted with a range of opinion beyond any I'd previously encountered. My job was to translate the needs voiced by local people into a form understandable to Americans wanting to swap farm-related technical skills and other knowledge.

I look back through my journal: *it has again been a privilege that farmers have invited me into their homes—they who have set out against all odds and have created wonder...* Can these people, grappling with the remnants of the Soviet system, also withstand the competition of Pioneer Hi-Bred International introducing hybrid corn? Pioneer's FSU representative is a former Soviet deputy minister of agriculture, likely able to influence those in charge of large land holdings. In the words of Pioneer Vice President Jack Watson: "We've conducted experimental trials in all the major areas of the country over the past ten years. They know what we can do for them, and other areas would like to do business with us. The whole problem is financial—they can't pay... . We provide a lot more





*The Former Soviet Union. (Adapted from Peter Matthiessen, 1992. Baikal: Sacred Sea of Siberia. Sierra Club Books, San Francisco.)*

than the seeds... We offer technology and management as well, and they're all critical ingredients. We tell them when to plant and when to spray. We supply the herbicides."<sup>1</sup> Sadly, the impoverishing cycle initiated when subsistence farmers become dependent on unaffordable off-farm inputs—experienced by farmers in many countries—may soon become the reality for farmers in the FSU as well.

While my words cannot portray the richness of social interactions, I hope my observations will communicate something of the everyday life that goes unrecorded in media accounts of political turmoil. During the late September struggle between Yeltsin and the Parliament, I spoke on the phone with my Russian “mother:” “We’ll live through it,” she said. Her tone implied, “As we’ve lived through all the rest.” Although she listens nightly to broadcasts of each day’s events, her wits and her connections, formed over a life-long residence in Saint Petersburg, are far more powerful in shaping her experience than decisions or tanks in Moscow. If Washington D.C. is well removed from the sphere of the average U.S. citizen, to many Russians the Kremlin may as well be on another planet.

Despite the obstacles detailed in the pages below, the dedication and enthusiasm of FSU farmers is astounding. When I think of the wisdom and strength of the people I met there I am convinced that they will achieve their goals. Within the sadness of present reality there also lies promise. Of necessity, twenty-five to forty percent of vegetables consumed throughout the collective

period were produced on personal garden plots. Today these plots are of primary importance. Even city kids are versed in gardening, hunt mushrooms, and gather wild berries, demonstrating the connection former Soviet citizens still have with their land. The appalling fact that all former Soviets know someone whose child has been sick from nitrate poisoning from collective farm produce means that individuals in the FSU are likely to consider carefully the potential consequences of Pioneer Hi-Bred’s seed and herbicide package. While spending time in cities, where ambient pollution is the norm, I was repeatedly advised to get out to the countryside on the weekend, not only to breathe the fresh air, but also to feel what it is to be out on the tremendous stretch of wild that is Mother Russia.

## The Baltic Nations

*I’m now in Lithuania, a country of four million people that lost five hundred thousand in the process of collectivization. The end of Soviet power has a far different edge here than I saw in Russia. In Vilnius the blockades by the t.v. tower and around parliament remain as memorials, and monuments have been erected to those who died on January 13, 1991, when Soviet troops stormed the tower. That freedom is dearly important is clear to me here in a way that I did not find in Russia. Perhaps it is the double tirade against former Soviet power and continued Russian might that gives me this impression. Russia traditionally supplied oil and gas to the Baltic nations, but is now asking for half*

payment in hard currency from Lithuania and Latvia. As a result, hot water availability to city residents is limited to a few days per week.



The Baltic Nations, western Russia, and neighboring countries. (Adapted from Reader's Digest Association, 1987. Reader's Digest Atlas of the World. Reader's Digest Association, Pleasantville, New York.)

In the three years that farming has been legal, the related infrastructure has remained in government hands. Everything from seed and stock animals to machinery and processing can only be obtained by negotiation with collective farm managers, who are likely to be well-schooled in the old system and in need of convincing by whatever means available. Only those individuals who jumped at the opportunity to get land under the Soviet Peasant Farm Law of 1989 to early 1991 seem to have an edge over the rest. Ironically, soaring inflation has helped some of these farmers to buy equipment.

On one such older, relatively successful farm just outside of Kaunas, the historic capital of Lithuania, one of the cooks hired to feed the seasonal workers wanted to be sure I understood her grief. She damned the Soviet power, saying that all the farm's visible potential could already have been developed, had it not been for the past fifty years. Only five years ago, the farm owners had been obliged to hide the one rickety tractor they had managed to procure. Its ownership, in and of itself, was illegal, forcing the farmers to move it among various hiding spots in the woods.

The part-owner of the only state farm in Estonia that has been partially privatized told the story of his parents' exile to Siberia from 1946 to 1966. He has just reclaimed the land on which their home used to stand. The original house, occupied by Russians during the absence of his family, was burned bit by bit for its own heating. Among other remnants of the Soviet system, the owner group has to retain the forty-five workers previously employed by the state farm. They're trying to wean the farm of those workers they would like to fire by paying them four times less than valued workers. So far, this effort has led to disgruntled employees burning one building down.

Beyond the monuments to those sent to Siberia are the day to day interactions with the remaining threads of the Soviet system to remind the Baltic peoples that they are far from true sovereignty. Only one charitable soul suggested that, if Soviet rule had brought so much destruction to the Baltics in fifty years, surely what it accomplished in seventy in Russia must be terrifying...

## Siberia

Imagine, if you will, a five hundred person settlement town of two-room log cabins, each slightly distinguished from its neighbors by brightly painted shutters or wood detail work. Fences tall enough to hide the door to the house close in small yards, which serve as nighttime enclosures for the family milk cow, a few goats, and perhaps a pig or some poultry. "It's ridiculous to have to live in the

countryside without a cow,” a woman commented, indicating the hardship experienced by the many in her village who do not have their own livestock. A hunting dog is likely to be chained behind the fence, eliminating the need for a doorbell. This Siberian village is typical of those scattered throughout the enormous expanse of the FSU, each formed by the calculation of Moscow bureaucrats to fulfill a plan of rapid industrialization.

“In the thirteenth century, the nomadic Buryat Mongols under Genghis Khan, who was born in the rolling hills south and east of Baikal, ruled most of what is now the Soviet Union... . An estimated 10,000 of the Buryat people perished under Stalin, and almost all their Buddhist temples were destroyed.”<sup>2</sup> *On the west side of Lake Baikal, a Buryat woman in her mid-fifties described the changes in the countryside she has witnessed as*



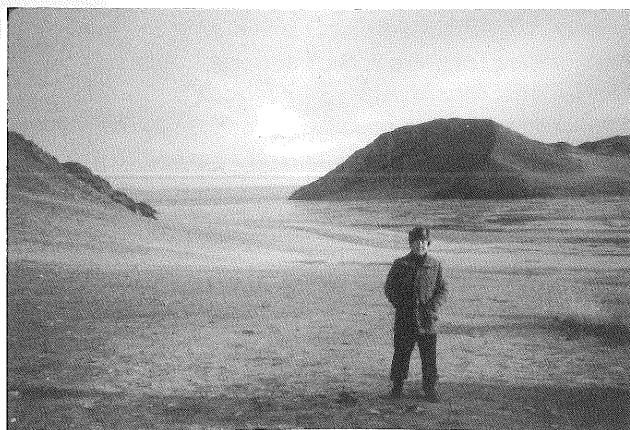
*The wife of a skilled wood-carver stands in front of her home in the Zakamensk region, which borders Mongolia south of Lake Baikal.*

*initial collectives of five farmers were then regrouped into collectives of ten and on until all in her district were finally unified under Kruschev. She remembers a childhood of letniki (summer homes) grouped together to allow for open, common cattle pasture and zimniki (winter homes) set singly in the center of hay fields to allow for easy harvesting and feeding. Vivid in her mind also is that her father, under the direction of Soviet engineers, helped build the wartime turpentine factory for which the woods of her village were cut down. The destruction of the woods, habitat for small game and laden with berries and mushrooms—from which only “as much*

*as was needed and no more” was collected—was followed by other acts of progress. Due to poorly executed land improvements, streams that used to carry fish ran dry and once productive lands were turned into swamps.*

*The hunter-pastoralists of this woman’s village became collective farm workers and were re-settled into the centralized village of the collective. Now this collective, like most, is in the process of reorganizing as an association of farmers. The surviving village residents, who began demanding the return of their land before the disintegration of the collective, have been presented with a catch-22 for its return. They have been given the right to build on their land, but have been told that they will not receive the right of land use or deed until structures are present. Thus, they are unable to farm in order to raise the funds necessary to rebuild their homes. They are prevented from returning to the land where all the dead of the village are buried.*

*For the most part, the new associations of farmers differ only in name from the collective farms from which they evolved. The loss of farming expertise, the difficulty of obtaining land, seed, healthy animals, and equipment as a private farmer, and the industrial scale of existing machinery make farming a heroic task. A representative of AKKOR, a government organization charged with assisting farmers, took me to a collective farm he was helping to reorganize. There, I spoke with three milkers who had each been given ownership of ten cows. They were still using feed that belonged the collective and had no idea what they were going to do when it ran out. Furthermore, they had no ability to store or transport their milk to town for sale. In the dim light and chill of the concrete milking barn, they explained that the best they could do was to churn butter for their own consumption. “How are we going to buy shoes and school supplies for our children?” they asked.*



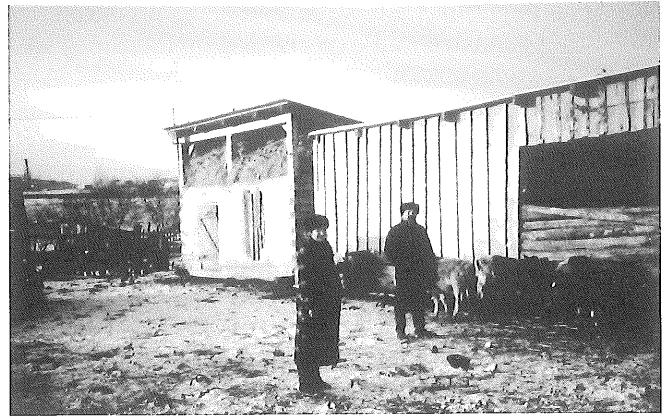
*The grandson of a Buryat shaman stands at the edge of Lake Baikal on the land he and his family, lifetime collective farm and construction workers, have recently gained as private acreage.*

*In the seventy-five years in which collective farm workers were specialized as tractor drivers, vegetable workers, or milkers, integrated farming knowledge has largely been lost. A tractor driver turned farmer I met explained that he now must learn techniques he would have picked up from his grandfather, had it not been for collectivization. He was the first collective farm worker to lease land in his area and has thirty milk cows. Yet, processing remains centralized, so he is able to market his milk only in wintertime, when he can freeze blocks for transport. Only thirty kilometers away, a town of 3,000 has had no milk in its stores for upwards of two years, yet this farmer cannot supply residents during much of the year. His milk simply goes to waste.*

*For farmers and collective farms alike, shortage of animal feed is a recurrent problem. Feed once grown in the southern republics, now independent nations, can no longer be forced to supply feedlots in Russian territory. On Olkhon Island, the largest in Lake Baikal and sacred to the Buryat people, lack of feed means that only 4,000 sheep remain of the 10,000 that once overgrazed this site. Although the largest factory permitted to process omul, the indigenous fish of Lake Baikal, is on Olkhon Island, even island residents may have a hard time buying fish legally in the off-season, when the local catch is shipped elsewhere by mandate of the Moscow-based ministry that controls the factory. I've heard that in winter, when omul are even harder to come by, just a few omul can be traded with the director of the feed supplement supply house for feed to last the season. Such transactions are a prevailing mechanism of survival in the world of crumbling Soviet infrastructure.*

*At the first farm workers' strike, which I witnessed in Ulan-Ude in mid-August, the farm workers tried to explain to their urban counterparts that the outlandishly high food prices in city stores were not the result of profits realized by rural workers. In fact, food prices are higher in rural areas, where workers receive among the lowest salaries and considerably less food is available. Even in cases where processing is close to the farm community, local produce is first shipped to a centralized distribution point in the city before it can be sent back to supply rural residents, and is then sold with the added cost of transportation.*

*MELS, a man named for Marx-Engels-Lenin-Stalin, wishes to develop a traditional Buryat farm like that of his grandfather. He is one of a wide-ranging group of professionals—by training teachers, photographers, scientists—who are spearheading an urban exodus. In an otherwise uncertain world, homesteading can at least ensure basic necessities. Factory workers now find themselves on repeated three-month leaves-without-*



*A teacher-turned-farmer and her husband, who farm on the outskirts of Irkutsk, display their cattle and barn. They were able to obtain sick cattle rejected from collective farms and heal them with home remedies.*

pay due to shortages of essential parts or failing markets, and university professors have been asked to work at half salary. Since gardening and canning have long been a primary source of vegetables for most within the FSU, these skills are readily at hand within the population.

Unlike collective farm workers, who are allotted an eight to twenty-seven hectare (twenty to sixty-seven acre) plot in farm reorganization, urban residents must apply to the State Committee on Land Reform to receive land.<sup>3</sup> Involving connections and bribes, the process of getting land is so all-consuming that performing other work at the same time is impossible, as described to me by several farmers. Even after having a petition for land accepted, a farmer may have to wait months to find out its location. More often than not, in my observation, new farmers are allotted a parcel of relict forest. Requiring would-be farmers who have scant access to machinery to deforest land is outrageous not only because of the difficulty of such a task or because of the offense to one's ecological ethics, but also simply from a standpoint of common sense. All the recently-deforested plots I saw were within a few kilometers of hectares upon hectares of tilled collective farm land left to erode as the system collapses. In addition, local soil scientists have warned that some forest soils are unsuitable for farming. The tilling of such land may lead to rapid soil degradation.

## European Russia

*"When we were young, we learned that so many were concerned and looking out for us, from the school headmaster to the chairman of the local council of People's Deputies and on," a friend in her mid-thirties explained. I cannot fathom the amount of change which she has had to take in stride. When I was a student in Saint Petersburg in early 1991, I*



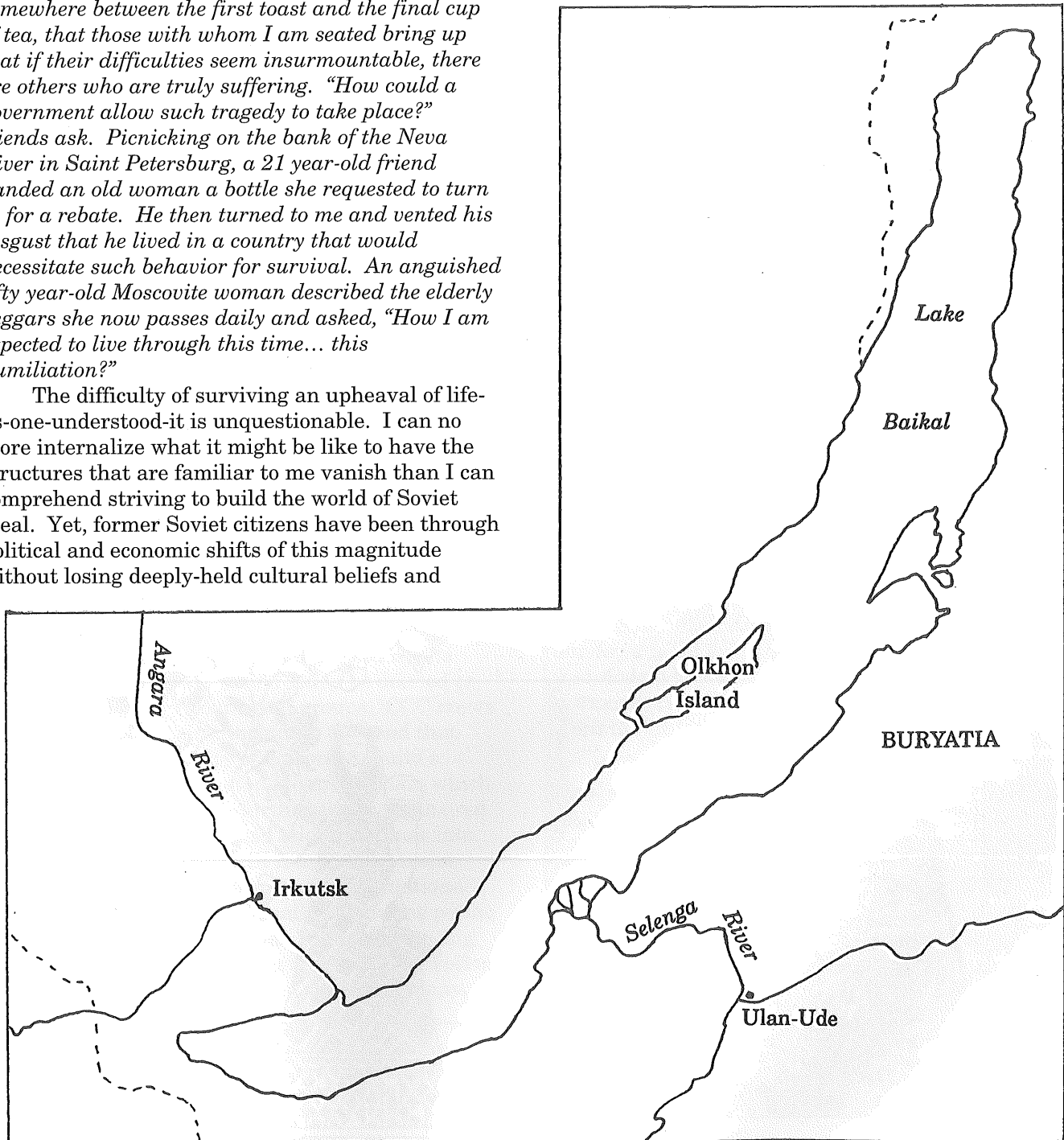
become immersed in a society in which personal connections largely determined access to everything from food to jobs to plane tickets. Now these channels are narrowing and closing. Store shelves once empty are today often, if not always, stocked with staples. But these goods are priced too high for most to afford on a regular basis. Money, which was hardly the object and barely the currency when I was a student, is now of great concern. Despite the restricted freedoms of even two years ago, many, if not most, look to those days as better times.

It is part of almost every conversation, somewhere between the first toast and the final cup of tea, that those with whom I am seated bring up that if their difficulties seem insurmountable, there are others who are truly suffering. "How could a government allow such tragedy to take place?" friends ask. Picnicking on the bank of the Neva River in Saint Petersburg, a 21 year-old friend handed an old woman a bottle she requested to turn in for a rebate. He then turned to me and vented his disgust that he lived in a country that would necessitate such behavior for survival. An anguished fifty year-old Moscovite woman described the elderly beggars she now passes daily and asked, "How I am expected to live through this time... this humiliation?"

The difficulty of surviving an upheaval of life-as-one-understood-it is unquestionable. I can no more internalize what it might be like to have the structures that are familiar to me vanish than I can comprehend striving to build the world of Soviet ideal. Yet, former Soviet citizens have been through political and economic shifts of this magnitude without losing deeply-held cultural beliefs and

concepts of right and wrong. Even in scarcity, if there's something to be shared, you can be sure that your friend will find a way to grant you the more generous portion. "Americans are fair-weather friends, aren't they, compared to us?" I've been asked.

Now the greatest challenge before the peoples of the FSU may be the ability to withstand the onslaught of MTV culture. Marlboro cigarette ads have appeared on the first billboards in the Saint Petersburg metro stations. Cheap American action



The Lake Baikal Region. (Adapted from Peter Matthiessen, 1992. *Baikal: Sacred Sea of Siberia*. Sierra Club Books, San Francisco.)

films and soft porn are shown at every movie theater. Several people who had seen *Pretty Woman* asked if I, too, fly across the country to go to my favorite restaurant. The invasion of mass culture is backed up by the might of transnational corporations. According to a recent article, the "U.S. timber giants Louisiana Pacific, Weyerhaeuser, and Georgia Pacific are known to have entered into negotiations to cut Siberian forests," C. Itoh of Japan "has begun harvesting operations," and Hyundai of South Korea "is said to have contracted to log roughly half a million acres."<sup>4</sup> On a survival level, the lure of the West psychologically and materially may be beyond that which a soul can resist. A farmer north of Moscow who is growing lettuce under contract for McDonald's faces none of the difficulties of his counterparts. He has been provided with the seeds, chemicals, and equipment to provide the desired product. Never mind that the first McDonald's-Moscow sits in Pushkin Square, a disparaging monument to the great poet of the Russian language.

While these signs of Western infiltration are increasing, it is still true that people in the FSU think and perceive fundamentally differently than I do, a child of the Western frame of reference. In Russia, people tend to establish an emotional understanding with one another before getting down to the practical use of any relationship. Traditionally, an individual acted on behalf of a group, whether familial, of friends, or professionally, and was treated as a part of a whole. Whereas everyday business is conducted with brusqueness, even rudeness, so that even simple matters are made difficult, showering friends with hospitality is a responsibility taken at once seriously and with flair. I think of my Russian "mother" in Saint Petersburg saving scrap paper to trade for a volume of a book she desired even as she hosted elaborate dinner parties. How will her world, which honors friendship and frugality, intersect with that of the U.S. business people and government officials



Marlboro ads are the first to be seen in the swift and well-kept St. Petersburg metro.

arriving in Moscow with slick, gold-embossed business cards? I am inspired by the farmer heroes I have met, who are striving to forge new paths and refusing to accept hindrances as more than another challenge. I wish them steadfastness in their beliefs, along with the thorough understanding of the West they will need to achieve self-determination according to the dictates of their traditions.

*Rural Enterprise Adaptation Program International, which has established six sites in the Former Soviet Union working on sustainable agriculture, needs hosts for touring teams, correspondents, technical advisors and referrals of specialists to go abroad. Please contact: William Mueller, Director, REAP International, 3181 120th Street NE, Solon, IA 52333; phone 319-848-7387, fax 319-848-4524.*

#### References and Notes

1. James P. Gallagher, June 28, 1993. Region reviving Khrushchev's Iowa dream, *The Chicago Tribune*, N1.
2. Peter Matthiessen, 1992. *Baikal: Sacred Sea of Siberia*, Sierra Club Books, San Francisco.
3. In late October, 1993, Russian President Boris Yeltsin issued a decree on land reform which gave Russian citizens the right of land ownership. The procedure to obtain land may now differ from the regulations observed at the time of this writing.
4. Armin Rosencranz and Antony Scott, 1992. Siberia's threatened forests, *Nature* vol. 355, issue 6358.



# Conservation Corps: Past and Present

*Nathan Sayre*

Between 1933 and 1942, as part of Roosevelt's New Deal, more than one million Americans joined the Civilian Conservation Corps, a military-style program designed to put people to work conserving the nation's natural resources. The CCC was shut down as the U.S. entered World War II, but smaller, state conservation corps arose in the '60s and '70s. Despite severe cutbacks in federal funding for corps in the '80s, the number of programs continues to increase—there are some ninety corps programs nationwide, about two-thirds of which are local efforts. Moreover, recently enacted federal legislation promises to give the movement added strength; and twenty-nine corps have started up in the last year alone.<sup>1</sup>

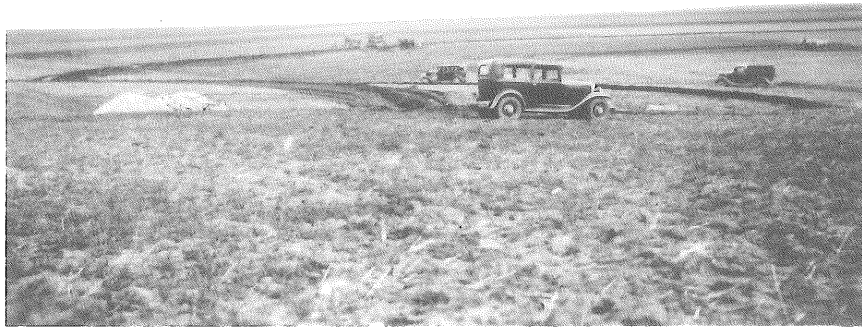
The CCC, unlike some other New Deal programs, has not often been criticized, even by conservatives. Its achievements—more and more of them commemorated by plaques erected decades later—can be seen at hundreds of state parks, national forests, and national parks, and a dedicated alumni organization (the National Association of CCC Alumni or NACCCA) meets regularly in chapters nationwide to, among other things, push for a modern-day "Three Cs." A strong case can be made that the CCC was the single greatest effort ever undertaken by the U.S. government in support of the nation's environment. Which raises the question: Why have the CCC and present conservation corps received so little praise—let alone support—from environmentalists?

The answer says a lot about how our concept of "the environment" has changed over the course of this century. Much of the work performed by the CCC two generations ago would today be decried or at best ignored by environmental groups. CCC crews built roads up mountains, including the road that has enabled the University of Arizona to build a controversial observatory atop Mount Graham which environmentalists fear will further endanger the red squirrel. They built power and telephone lines into the Grand Canyon. They built hundreds of trails, picnic areas, lodges, and other facilities at national and state parks and forests, greatly expanding public access to and use of these areas. Even the planting of an estimated one billion trees and the stabilization of millions of acres of farmland in the Great Plains

and Midwest might today be viewed as federal subsidies to clean up after reckless timber and agriculture industry practices. And if a CCC crew of three hundred men were today to move onto a national forest, clear itself a road, construct bunkers and outhouses, and start hunting the wildlife on its free time, imagine the uproar it would provoke. What once qualified as conservation work now smacks of intrusion and development. Talking with members of the NACCCA, one finds that this evolution in the notion of environment parallels another in social values and political opinion. The CCC was all-male (with a single known exception), and CCC camps were segregated by race. Hundreds of thousands of CCC alums fought in World War II, and they returned perhaps the most fortunate generation of (mostly white) men in modern history: Loved as liberators, supported as veterans, they were poised to benefit from the unprecedented economic growth of the 1950s. It was Horatio Alger writ large: An entire generation, come of age during the Great Depression, moved into middle age on top of the world. And they do not see this as historical coincidence. Looking back,



Nathan Sayre has spent much of the past five years working as a crew leader for the Iowa Youth Conservation Corps and for the Arizona Conservation Corps. He is currently the Southern Arizona program developer for the ACC.



*Terracing on the C.W. Robidoux farm on the Sac and Fox Reservation, c. 1935. A project of the New Deal Federal Indian Program.*

most of them will tell you that “The Three Cs was the best thing that ever happened to me.” They speak fondly of their corps days, and most of them express appreciation for the outdoors. But they are far more likely to tell you about a deer they shot, a near-fatal work accident, or a company dance than they are even to mention pollution, erosion, or species extinction. They are not neo-conservatives—they do care about deteriorating schools, crime, unemployment, and idle youth, and they firmly believe that something like the CCC should be instituted to deal with these problems—but neither are they Keynesian liberals, let alone what we now consider environmentalists.

These parallel evolutions may well ensure that NACCCA members will not get their wish, despite all the problems that would be addressed by a massive, CCC-style jobs-and-conservation program. There are powerful groups opposed (the military and fiscal conservatives, to mention only two), and few people outside of NACCCA and present-day corps have spoken up in favor.

This lack of support points to an important shortcoming in too many environmental groups. More and more, their conception of “the environment” strives to keep people out—off the land and away from the wilderness. There’s no need for a modern CCC, they reason, because manual labor and environmentalism don’t mix: Scientists are needed, and organizers and petition-signers and occasionally marchers are needed, but large numbers of unskilled workers need not apply. Of course no one comes out and says it like that, but too often that is exactly what their

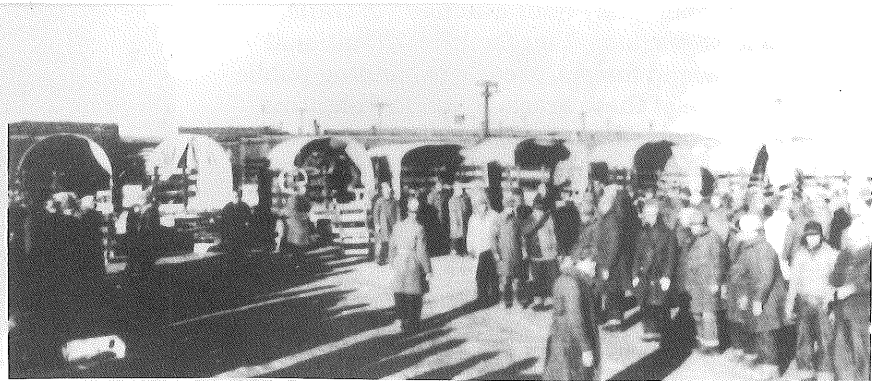
demands would mean if they were realized. No wonder they’re disdained by ranchers, auto workers, and Perot supporters. George Orwell once criticized vegetarians for hurting socialism by their righteous indignation; the danger in this strain of environmentalism isn’t just righteousness, it’s outright misanthropy.

The strength of present-day conservation corps is in their capacity to bring jobs and the environment together and thereby to broaden and deepen ordinary peoples’ appreciation of nature. What any rancher or farmer knows that most hikers and perhaps some naturalists don’t is the satisfaction of working hard, for days on end, outdoors in the presence of

nature. Places that look ordinary to the traveller passing through take on a depth and beauty that I believe—and I admit that I speak from my own experience alone—only comes from returning many times to work, to do something other than simply visit. To be sure, this “work/nature appreciation” (for lack of a better term) varies tremendously from person to person and from one type of work to another, and it is neither identical to nor incompatible with an environmentally conscious land ethic. And I doubt if a bulldozer driver experiences it in the way I’m thinking of. But it most certainly includes human beings as an integral part of the natural world.

Present-day corps are not nearly as similar to the CCC as many NACCCA members seem to believe. They are coeducational. They are much smaller and more diverse. They do as much work in urban areas as in the wilderness. Many local corps are termed not “conservation corps” but “service corps,” dedicated to helping the elderly, the homeless, schools, and community centers. Projects

*MORNING WORK CALL, VCCC CO. 1779, BURROAK FORMATION BEFORE LEAVING*





include cleaning up abandoned lots, renovating low-income homes, and building playgrounds as well as trail work, fencing, and recreational development in the mountains. Community service, educational development, and teamwork are the common threads in a highly varied collection of programs across the country.

These activities work with a broader sense of "the environment" than is common, one which I think environmental groups ought to embrace and support. It places as much importance on cities as on wildernesses, on the human species as on endangered species. It does not fall prey to beautiful but imaginary visions of a nature unspoiled by humans, nor does it allow esoteric knowledge about natural systems to crowd out concern for social systems. Environmental activism is desperately important, don't get me wrong. That is precisely why we need a more socially conscious, inclusive sense of what the environment and environmentalism mean.



*Six-mule team drawing a Corsicana eight-foot terracing machine, c. 1935.*

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#### Notes

1. These figures are taken from the National Association of Service and Conservation Corps' *Youth Corps Profiles 1992*, which profiles existing corps and lists corps that were in the works as of late 1992.

## Conservation and Service Corps in Kansas, 1993

The Kansas Community Service Plan was recently rated top in the country in a review made by the Commission on National and Community Service. When the first Kansas programs were initiated two years ago, officials decided to support the formation of autonomous corps projects based on local needs rather than institute a state-wide program. Currently, the Kansas Office for Community Service helps support a year-round Kickapoo Youth Conservation Corps (on the Kickapoo Reservation in northeast Kansas), with ten crew members; and a Topeka Youth Project, with twenty-four crew members year-round and over fifty crew members in the summer. A new Garden City Corps is scheduled to begin next summer. Corps programs are for youth ages 17-21 (17-24 on the Kickapoo Reservation) and pay minimum wage, with post-service benefits available to those who serve for a full year. The programs are diverse both in membership and in the projects they take on, but are designed to be distinct from job-training programs: the primary emphasis is on service to the community.

Pat Kells, executive director of the Kansas Office for Community Service, says that so far the Kansas programs have been fortunate in obtaining federal funding; in fact, she reports, implementation of the upcoming National Service legislation will result in a reduction in their funds because it requires that federal monies be divided equally among the fifty states. On the other hand, her office has a new opportunity this year to help set up specific Flood Relief Corps, in part with extra work-study money allotted to Kansas colleges with large numbers of students from heavily flood-impacted areas. The Office hopes to be able to continue to expand their programs in spite of potential funding difficulties. In particular, Kells reports, they would like to see the formation of a Wichita Corps, in part because of the success the Topeka project has had in reducing gang activity.

For more information on corps programs in Kansas call 913-575-8330; or write Kansas Office for Community Service, P.O. Box 889, Topeka, KS 66601.

—LS

# Promoting Sustainable Agriculture and Reducing Hunger: Progress from the Lone Star State

*Jennifer Katcher*

The Sustainable Food Center (SFC), located in Austin, Texas, is ambitiously working to develop a more sustainable and equitable urban community. Founded in January 1993, the SFC was founded specifically to promote actions that both reduce chronic hunger and reverse the growing farm crisis in Texas. While it is still a young organization, the SFC has already done much to demonstrate the interconnectedness of local agriculture and local hunger and to move in directions to improve the situation of both.

The founder and director of the Sustainable Food Center, Kate Fitzgerald, first became involved in sustainable agriculture in Texas through her work at the Texas Department of Agriculture (TDA) under Texas's former Secretary of Agriculture Jim Hightower. Because of Hightower's support of sustainable agriculture, much of Texas's initial organized efforts for sustainable agriculture centered in the TDA. When Hightower left office in early 1991, there was a gap in promoting sustainable agriculture state-wide. Organization of the Sustainable Food Center was intended to help fill this void.

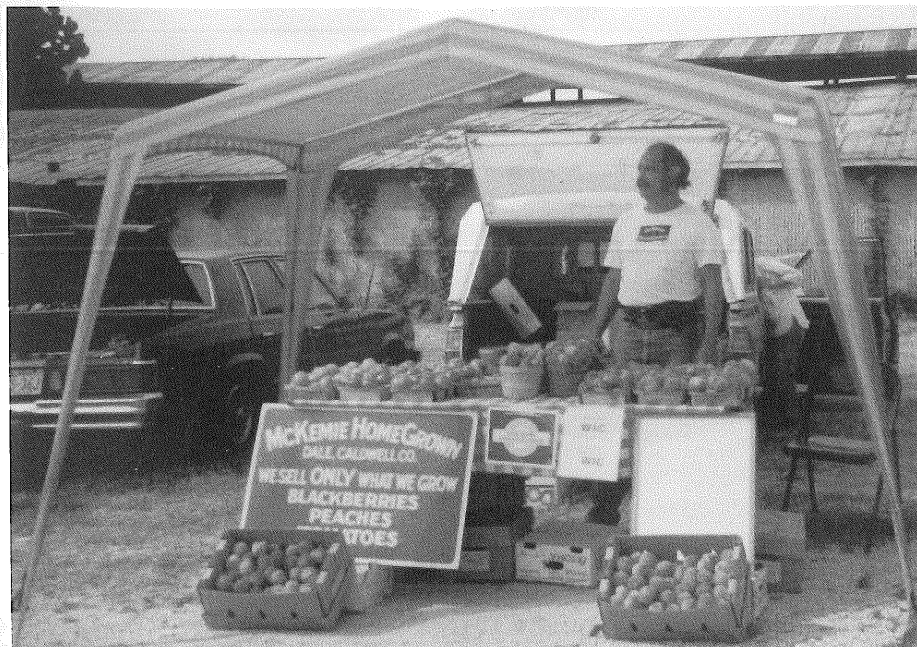
To appreciate the importance of the solutions being implemented, it is first necessary to understand the magnitude of the problem. Over 4 million Texans are hungry, and 1.2 million of those are children under 12. Moreover, almost 25 percent of Texas children live in poverty—higher than the national average—and children of poor families frequently do not receive adequate nutrition.<sup>1</sup> Numerous studies link improper nutrition in childhood with reduced cognitive abilities. And government programs

providing food assistance are often insufficient. The average food stamp benefit in Texas is just \$67 a month, and only 60 percent of those eligible for the food stamp program are enrolled.<sup>2</sup>

To make matters worse, access to fresh, nutritious food is limited in poor neighborhoods. In general, large chain grocery stores offer the best selection of fresh food at the lowest prices, but they usually locate in relatively affluent suburban areas in order to avoid the increased vandalism and insurance costs of operating stores in poor urban neighborhoods. The small "Mom and Pop"-type markets that do serve poorer areas often have higher prices and lower selection, especially of fresh foods, because they can't buy in such large quantities as the chain supermarkets. Residents of low-income urban areas pay 10-30 percent more for their food and spend an average of \$400-\$1000 annually just on transportation to buy food.<sup>3</sup> Convenience markets and "mini-marts" in gasoline stations fill a certain gap in food marketing, and are extremely profitable in low-income areas, but generally have even higher prices and offer an even more limited selection of fresh staples and produce. Because of lack of access to other shopping, some people do their weekly grocery shopping at these convenience marts.

In order to make fresh, nutritious food readily available to those who need it most, the SFC has organized a farmers' market in Austin's low-income

east side community. Managed by the SFC's VISTA (Volunteers in Service to America) volunteer Marielle Anzelone, the market features a large selection of locally-grown produce, much of which is organic, and the farmers who sell there accept food stamps and

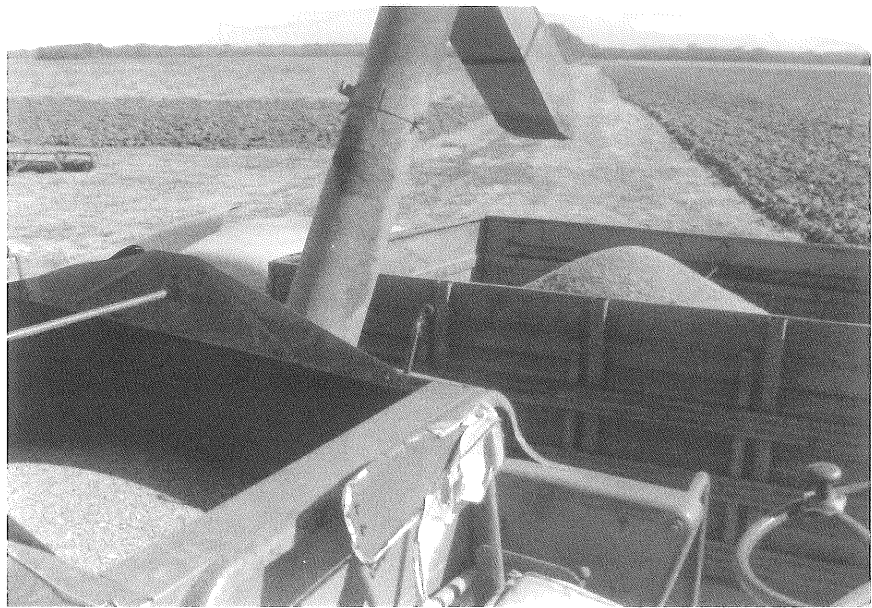


WIC (Women, Infants, and Children) coupons. Despite the paperwork, the participating farmers seem pleased with the idea of selling to people on food assistance. Larry Butler, an east side organic farmer who sells at the market, finds satisfaction in providing healthy food to people who otherwise might not get any. He asks, "Do you want people to eat poisons, or do you want to see people eating your food knowing it's a good, safe product?"

By aligning with those on government assistance, moreover, the farmers have gained a group of customers they would probably not have had otherwise. In 1992, through a regional WIC program, WIC recipients in Texas received a total of \$120,886 of assistance that could only be spent on fresh produce at farmers' markets.<sup>4</sup> A number of the farmers sell their food for less at the east side market than at other farmers' markets, making it more accessible to the low-income shoppers. The market also provides free recipes and nutritional information for children and adults, in order to help people maximize their nutrition from a set amount of food assistance dollars. The residents of east Austin now have access to fresher, more healthful food at prices comparable to those in large chain grocery stores.

Another key element of the SFC's work involves aiding farmers through advocacy and education. Nessa Richman of the SFC is coordinating the work of a newly-created Texas Sustainable Agriculture Working Group (SAWG). Modelled after other state and regional SAWGs, this is a network of approximately forty farmers, consumers, public policy workers, and environmentalists. Collectively, the Texas SAWG decides on the most important issues in sustainable agriculture for Texas and formulates unified strategies to achieve positive change on those issues. According to their published mission statement of October 8, 1993, "The Texas SAWG is committed to developing agricultural policies in Texas which will sustain the family farm and our rural economies while maintaining and improving the quality of the state's natural resource base."

The Texas SAWG's "Success Stories" project is a *New Farm*-like approach to educating Texas farmers about lower-input farming and ranching methods. Each story will highlight a Texas farmer or rancher who has been economically successful with more sustainable operations. These stories are intended to accentuate the positive and to illustrate that sustainable agriculture can be done profitably. The first of these stories will be published in



*Milo harvest at The Land Institute*

January 1994 and distributed to the Texas press and agriculture publications.

The Texas SAWG is also pursuing change through work with Texas A & M, the state's land-grant university. The Texas SAWG hopes to give a voice to those in academic and extension circles who have interests in sustainable agriculture but may not receive support for those interests from their colleagues and supervisors. At a state agricultural summit held at Texas A & M October 26-28, 1993, the SFC was one of only a few organizations present representing alternative agriculture, among the many conventional agriculture and agribusiness representatives.

The success of the Sustainable Food Center demonstrates how the dedicated work of a few people can create real results. At this time last year, there was no farmers' market in Austin's low-income area, and there was no Texas SAWG. The SFC has shown that linking the promotion of more sustainable farming to the reduction of urban hunger and malnutrition is a logical and just approach to creating more sustainable urban and rural communities alike.

*For more information on hunger, nutrition policy, and sustainable agriculture in Texas, contact the Sustainable Food Center, 1716 E. 6th Street, Suite 200, Austin, TX 78702.*

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2. Texas Department of Human Services, 1992. *Annual Report*.
3. Community Food Resource Center, 1993. Personal communication.
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# Natural Connections

## Ecological Determinism vs. the Jeffersonian Ideal

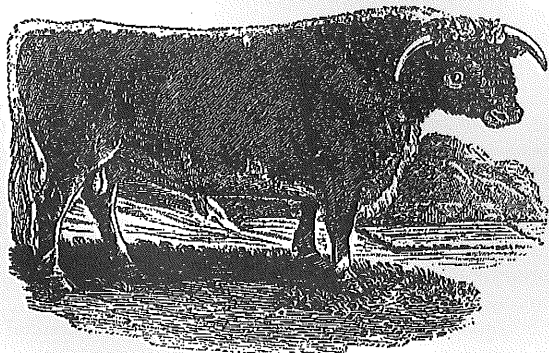
Wes Jackson

The summer I was fifteen going on sixteen, I abandoned myself to the prairies of South Dakota to work on a ranch belonging to an eccentric and childless first cousin of my mother and her Swedish immigrant husband, Andrew. Ina was Andrew's second wife; his first had been her sister Bertha. Andrew and Bertha homesteaded one half section and Ina another. When Bertha died, Andrew and Ina married and joined their holdings. This was near the Rosebud reservation, and on Sundays I sometimes rode with half breed kids over those prairies, hearing such stories as to how their Indian grandfathers had trapped eagles on this hill or that. Andrew, Ina, and I would go to White River on Saturday afternoons. Some of the Rosebud Sioux would lie in the shade of the stores and as the sun moved, they would pick up their belongings and move to the shade on the other side. Out on the ranch Andrew would cuss and swear about how the Indians never did anything with the land. In town, the Indian from whom Andrew and Ina were leasing some land regularly charged groceries to their account. Andrew always paid, for to fail to do so meant that a neighboring rancher would be only too willing to lease that land next year, perhaps forgetting that he, too, would be trapped into buying a bottle of whiskey at the liquor store, and that he,

too, would have to tolerate coming upon what was left of one of his steers butchered by the same redskins.

I fell in love that summer at a Saturday night dance. She was a beautiful white girl then and her magic was so overwhelming that I swear I failed to sleep the entire night after I met her. Thirty-five years later when I saw her, she was seriously overweight, had lost most of her teeth, her slip was showing, and she neither recognized nor remembered me as she lugged one of her grandchildren into the bar. I think it was the same bar where, as a teenager, I learned more interesting content at lower tuition than anytime before or since. For it was there that I had scrutinized, with the civilized eye of a Kansas River Valley Methodist, drunk cowboys, married or not, who hugged and smooched young natives and from time to time disappeared into the shadows of the dusty back streets of White River.

The landscape was mostly unplowed then and still is today. The horse, central to that way of life then, is less so now. Out on the ranch, besides the moon and stars, the only lights were of Murdo and Okaton across the river twelve to fifteen miles distant. It was a summer of branding, castrating, fence fixing, dens of rattle snakes to discover, pond bass to catch. Many evenings on the ranch I'd drive out on "the point" in a Cadillac coup or the pickup to shoot prairie dogs or to see the one hundred head of horses in the bottoms or out on the range. "Junk horses," Ina called them, for in the dry '30s she'd pumped water for hours for the cattle, only to have fifty to a hundred head of Andrew's horses show up,



This essay is taken from a lecture delivered October 6, 1993, at Mountain View, California. The lecture series, sponsored by the Peninsula Open Space Trust and presented in honor of Wallace Stegner, was entitled "Land and the American Dream."



run the cattle away, and drink all the water. Andrew justified keeping these mostly wild creatures around on the grounds that it was horse trading that had made it possible for him to be so solidly positioned. Now I am amazed to think of the slack Andrew and Ina enjoyed to be able to afford those hundred head of mostly unbroken horses.

I lived in a small wooden hillside shack set up on steel wheels, a shack Andrew had bought from Millette County, which had used it to house the county road crew. It had been pulled by horses, perhaps the same horses used to pull the grader blade. Andrew and Ina lived in a small two-room house with a large attic which bowed from the weight of such old magazines as Andrew's *Life*, *The Saturday Evening Post*, and Ina's *True Stories*, a magazine devoted to idealized romance. There was no electricity, only cistern water which was used at least twice, the last time always to water a small backyard garden or the chickens. Some evenings Andrew and I would sit on his porch, which overlooked the White River a half mile away, and Andrew would cuss Roosevelt, cuss the Yalta Conference, cuss Indians and neighbors and everybody but Ike the President—who happened to be Ina's first cousin, or I suspect Ike would have caught it, too.

With Ina on her buckskin Dickey and me on Bonnie or Violet (names I picked from two of my girlfriends back home), we rode the range from one dam to another, where poles were kept with lures so that we might catch some bass on the way home. Or we might go to the abandoned school on the school section for some cotton seed cake to distribute somewhere across the nearly four thousand acres of paradise. I didn't want to go home and had it not been for high school football in September, I might have stayed. The place became my American dream. And yet, looking back, even though Lewis and Clark's Missouri River was only fifty miles downstream, I now see that little of Jefferson's vision was there beyond the section lines and the system of laws. Here the land determined, for no yeoman farmer could exist here. Even so, I loved everything about it. The Indians, the rodeos, the Danish and Swedish immigrants delighted with their land holdings, the rattle snakes, even the colorful prejudice and the way the natives got a little bit even with the butchered steer, the grocery bill, and the whiskey.

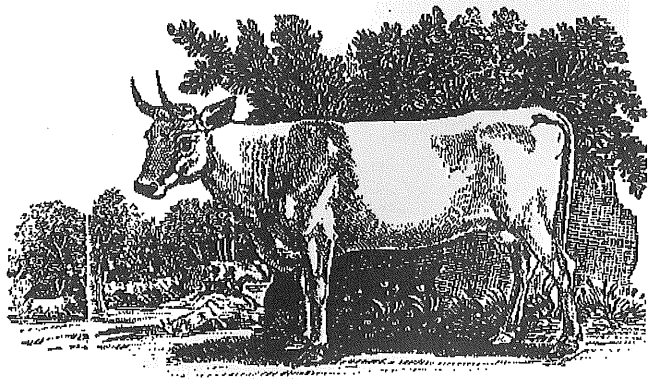
In the Kansas River Valley it had been another story. We were farmers there. Hoeing was endless during the summer, what with watermelons, sweet potatoes, cantaloupes, strawberries, peonies, phlox, sweet corn, potatoes, tomatoes, rhubarb, asparagus, and more. It was a relief to put up alfalfa hay or harvest wheat, rye, and corn (my dad won the county corn growing contest at least three years).

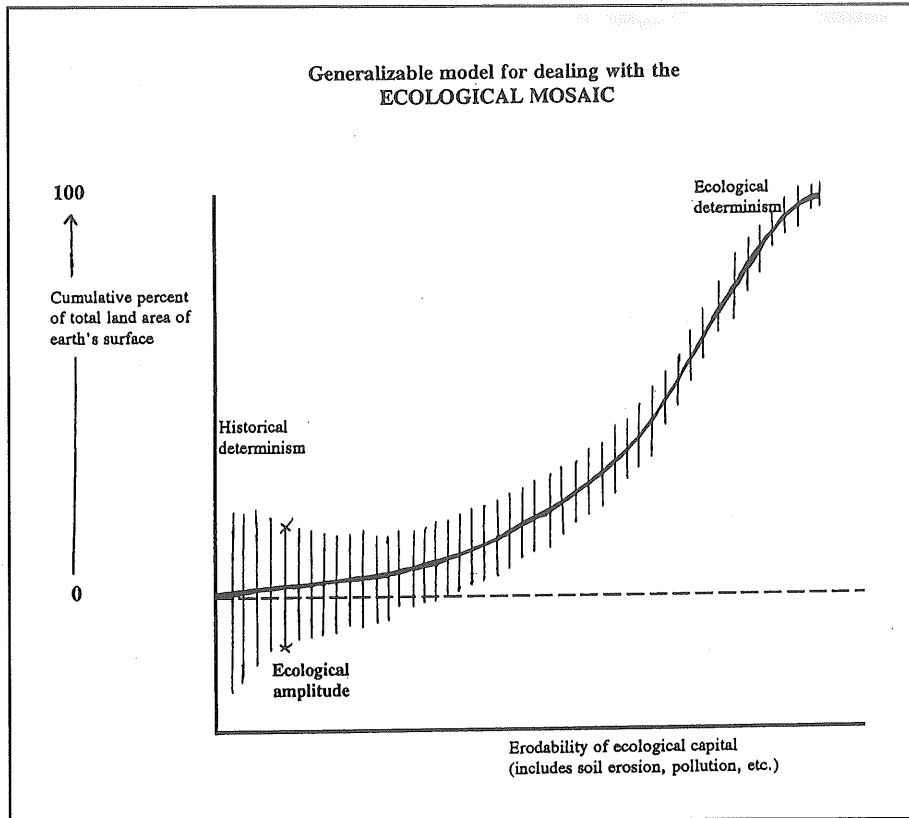
Our market was along Highway 24 and 40, a two-lane highway called the Pacific Highway—a subconscious naming, I suppose, because the nation looked westward. Six children were born to my parents. I was the last in 1936, a sister the first born in 1914. Dad was 50 that year, my mother, 42. They were Jeffersonian agrarians—fiercely so, I see now. They were also Methodists and Congregationalists: don't waste time, motion, or steps. Don't drink pop, alcohol in any form, or eat out. The contrast between that truck farm and the South Dakota ranch was striking. The row crops required cultivating and hoeing. Sweat of the brow, good manners, and quotable scripture went together. And in that market, with people stopping on their way from coast to coast, I now sense that we were countrymen then in a way that we are not now. No bad jokes about either California or New Jersey then. We all inquired into one another's well being.

Here was an agriculture—row crop variety, of course—that I knew and, I will say, loved in a certain restricted sense. But it did not compare to the life of the range, with the juxtaposition of natives and grassland, ranchers and rodeos. I made up my mind I would have that South Dakota ranch one day, or one like it. But Andrew died of prostate cancer and Ina died of injuries sustained in a wreck with her pickup. The ranch was sold and the money willed to one of Ina's nephews who within a year paid it all out in a lawsuit due to being at fault in a car wreck.

Football and love kept me in college in what must have been one of the most misspent youths in history. And what smoldered in me were two experiences with land: the Jeffersonian agrarian, where sod had been busted, and the life of the cattleman. I preferred the latter.

One of my great-grandfathers had entered Kansas the first day it was legal, May 30, 1854, the day the Kansas-Nebraska Act was ratified. Twenty-six years old, he had already been to San Francisco by way of Panama. Fifty miles into Kansas, he broke tallgrass prairie sod and set right to farming his 160 acres, Jefferson-style, interrupting normal





good to him, would give up his cattle to farm. I think I know. He had come from the Shenandoah valley of Virginia. A Virginian! An agrarian! He must have been an unconscious Jeffersonian. He played the role and he played it well for he and his family were well-off when he died in 1925. As a school board member, he convinced his neighbors that the new school should be completely paid for in the year it was built. It was a fine well-built school, two rooms for eight grades. My mother and I both went there. How could the community pay such a debt so quickly? I can't speak for the neighbors. I know that Granddad never expanded his income by expanding his acreage, though it was said of him that no matter what he did, things turned out right. I suspect that the explanation can be found in an offhand statement my mother

made once. She said that he would lean on his scoop shovel or against the barn for a half hour or more, watching his hogs eat the ear corn or the soaked oats or the boiled potatoes he had raised. As much as his experience was a reflection of the times, it was also a combination of joy, sympathy, art, and love rolled into one and tuned to the demands of his place. Here was the Jeffersonian dream, as imperfect as it was, at its high water mark. The actuality or reality of that dream has been compromised and in decline ever since, and since World War II at dazzling speed.

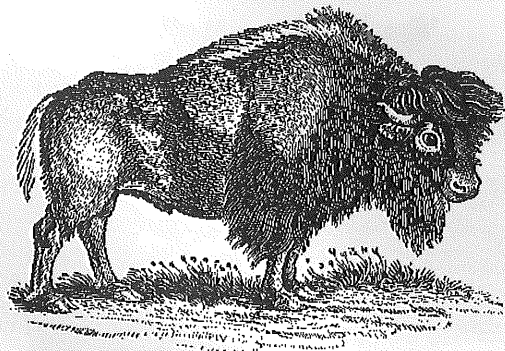
In fact, now it seems as if the Jeffersonian dream is like what Aldo Leopold once said about conservation, "a bird which flies faster than the shot we aim at it."

life to fight with John Brown against proslavery forces at Black Jack Creek on the Santa Fe Trail in 1857. But a man who was to become his son-in-law, one of my grandfathers, arrived in Kansas in 1877, one day before turning twenty-two, with \$300 to his name. He felt lucky not to have put his money in the bank, for it closed the next day. He thus preserved his grubstake and threw himself out onto the Flint Hills grasslands of Kansas to run cattle on more or less free grass. By the end of ten years he had enough to go in with a partner and purchase 160 acres of sandy loam in the Kansas River valley on the second bench, thereby assured of no more than a flood or two per century. In five years he had bought his partner out.

I was born on that farm, love those soils, love to plow them, love to smell them. But I have wondered why that grandfather, when the grass had been so

The point here is that on the South Dakota ranch ecological determinism is the major factor (see graph). The original vegetative structure must stay intact or a steep reduction in carrying capacity will shortly follow the loss of ecological capital. The loss of biotic diversity will be followed by the flow of nutrients down the White River, downward toward the river Jefferson's emissaries opened up—the mighty Missouri. On the Kansas river valley soils, however, historical determinism rules and Jefferson's ideal can be a reality again. Across the ecological mosaic of this continent exists a range between and beyond these two extremes. Each piece of that mosaic will have to be evaluated as to where it falls on that scale.

I was born on that farm, love those soils, love to plow them, love to smell them. But I have wondered why that grandfather, when the grass had been so



# Perspectives on Sustainability: The Changing Environment of Chase County, Kansas

*Eric Karlstrom*

Developing more sustainable forms of agriculture requires that farm communities be preserved. Toward this end, The Land Institute is in the process of developing something called ecological community accounting in Matfield Green, a small, declining rural town in Chase County, Kansas. The idea is to approach the human community as an ecosystem and to monitor the flow of energy and materials through the boundaries of Matfield Green and Chase County. On approaching this endeavor, we are well advised to consider the local environment carefully.

Chase County is located near the center of the Flint Hills Uplands. Eighty-five percent of the county consists of never-plowed prairie on relatively flat uplands; the remainder is forested riverine bottomlands. Elevations range from 1100 to 1500 feet. Cattle are the county's economic mainstay: Approximately 80% of Chase County's half million acres are used as range for the 100,000 cattle which graze here annually. Wheat, sorghum, alfalfa, corn, and soybeans are cultivated in the bottomlands, mostly for cattle feed. Only about 3000 people live here.

During the past months, as I've explored this beautiful and relatively unspoiled region and watched the prairie turn from rich green to orange-brown, one quality of the landscape has seemed most striking: change. Rates of change vary dramatically among phenomena, but everything here is ephemeral. Weather disturbances such as cold fronts and tornadoes bring drastic changes within minutes and hours, streams flood and ebb within hours and days, vegetation cycles operate on a seasonal and yearly basis. Cultures appear and disappear within hundreds and thousands of years, most species come and go in a few million years, and mountains rise and crumble into the sea in tens to hundreds of millions of years. The earth and life sciences now allow us to begin to see the landscape through its fourth dimension: time. Viewed through this lens, the entire landscape appears evanescent and alive.

The physical geography of this landscape is the unique product of several mutually adjusting, continuously changing, and extremely complex factors: climate, landforms, soils, and organisms, including humans. Here, I examine these factors as they exist today, consider their rates and magnitudes of change in the past, and briefly reflect upon the implications of these changes for our concept of sustainability.

The Flint Hills derive their name from the thinly-bedded, cherty ("flint-rich") limestone beds which form a series of nearly flat-lying erosional benches separated by intervening, slope-forming shale

units. These Lower Permian (about 290 to 270 million years old) rocks comprise the Chase Group of the Wolfcampian Series.<sup>1</sup> Marine fossils in the thin limestone beds, including sharks and hundreds of fishes, indicate the region was once covered by a series of shallow seas. Terrestrial fossils in the shales include ferns, salt-loving plants, and extinct fin-backed reptiles. Other geologic evidence indicates that at about this time: 1) this area was located near the equator and had a tropical wet-dry climate, 2) all the world's continents were coalescing into one supercontinent, called Pangaea, and 3) glaciers existed near the South Pole.

Whereas the local rocks are quite old, the landscape itself is comparatively young and has developed mainly as a result of stream erosion during the past few million years. Scattered gravels along the north side of the Cottonwood River may be the remnants of an ancient, much larger stream system which flowed from west to east across the Flint Hills during the late Tertiary (5 to 3 million years ago). J.S. Aber postulates that this "Old Osage River," fed by the ancestral Smoky Hill and Saline Rivers, among others, was one of the principal streams in the ancestral Mississippi River system.<sup>2</sup> He surmises that this drainage system was subsequently dismembered by crustal warping, glaciations, stream piracy and progressive lowering of the sea level during the Quaternary Period (the last approximately 2 to 3 million years).

The Quaternary has been characterized by unusually severe climate changes. During this time, temperatures oscillated widely, glaciers expanded repeatedly over midlatitude continental regions, huge lakes appeared and disappeared, and sea levels fluctuated dramatically, up to 100 m higher and 150 m lower than present levels. Scientists now believe there were as many as twenty major glacial stages separated by twenty interglacials in the last two million years. During at least two of these glaciations, probably between 1.2 and 0.6 million years ago, huge continental glaciers expanded from Canada to as far south as Topeka, Kansas.<sup>3</sup>

Nearly all of Chase County today is drained by the eastward-flowing Cottonwood River and its tributaries. The Cottonwood River heads up in adjacent Marion and Greenwood Counties and joins the Neosho River near Emporia in Lyon County. The bottomlands consist of late Quaternary alluvial floodplains and terraces. Shallow wells in alluvial deposits along the small drainageways and from the gravelly terraces which parallel the main streams yield between 100 and 500 gallons/minute. Surface

Era	Age in Millions of Years Before Present	Period	Epoch	Life Form
Cenozoic	Less than 0.01 0.01-2	Quaternary	Recent (Holocene) Pleistocene	Humans
	2-5 5-24 24-38 38-55 55-63	Tertiary	Pliocene Miocene Oligocene Eocene Paleocene	Mammals
Mesozoic	63-138 138-205 205-240	Cretaceous Jurassic Triassic		Flying reptiles, birds Dinosaurs
Paleozoic	240-290 290-360 360-410 410-435 435-500 500-570	Permian Carboniferous Devonian Silurian Ordovician Cambrian		Reptiles Insects, Fossils Amphibians Land plants Fish
Precambrian	700			Multicelled organisms
	3400			Single-celled organisms
	4000		Approximate age of oldest rocks discovered on earth	
	4500		Approximate age of the earth and meteorites	

*Geologic Time Chart. (Adapted from E.A. Keller, 1988. Environmental Geology, 6th ed. MacMillan, New York.)*

water quantities, however, are dependent on yearly weather patterns. All the streams dried up during the drought years of 1955 through 1957 and nearly again in 1990. During the wet years, severe flooding typically occurs along the Cottonwood River.

Native Americans are reported to have warned the early settlers against building homes along the Cottonwood River because it had been known to flood from "bluff to bluff." Those living in the towns along the Cottonwood—Cottonwood Falls, Strong City, Cedar Point, Saffordville, Marion, and Elmdale—have paid dearly for ignoring this advice: Serious and damaging flooding occurred this century in 1904, 1909, 1923, 1926, 1929, 1941, 1944, 1945, 1948, 1951, 1959, 1965, 1967, 1969, 1973, 1977, 1985, and again in May and July of 1993. The 1951 flood was the granddaddy of them all. At that time, the Cottonwood River did indeed flow from bluff to bluff: the river crested at 36.8 feet at Cottonwood Falls, downtown Marion was under 16 feet of water, and the streets of Florence were 9 feet under water. Whereas the average discharge of the river at Cottonwood Falls is 490 cubic feet per second (cfs), the peak flow during the 1951 flood was an incredible 190,000 cfs! Matfield Green is located along the South Fork of the Cottonwood, far enough above stream level that it has not experienced flood damage this century.

Evidence from fossil and pollen records indicate that biotic communities of the past have repeatedly been disrupted by major extinction events. L.D.

Martin identifies twelve major Land Mammal Ages in the past 28 million years, which seem to coincide with the paleobotanical cycles reported by J.A. Wolfe.<sup>4</sup> Approximately every 2.3 million years major extinction events occurred in which about 40 percent of the vertebrate genera (and a greater percentage of species) died off and were replaced by new faunal assemblages with similar levels of biotic diversity. The end of each cycle seems to coincide with increasing climatic aridity.

Martin and Martin believe that the climate was considerably less seasonal during the Pleistocene (about 2.8 million years ago) than today for most of unglaciated North America.<sup>5</sup> During this more equable climate, in which summers were cooler and winters were warmer, Pleistocene animals and plants of both southern and northern environments expanded their ranges, creating associations and overlaps not found today. Local diversities were much greater than today, and

these very complex community structures have no modern analogs.

Trees were much more abundant on the Great Plains during most of the Quaternary. During the last glacial maxima, about 18,000 years ago, global climate was probably as cold or perhaps even colder than at any other time in the past 350 million years.<sup>6</sup> At this time, boreal forest species such as white spruce, blue spruce, and limber pine dominated this area.<sup>7</sup> Land-snails and small-mammal assemblages inhabited a taiga-like mix of coniferous forest and aspen parkland, such as now occurs in the Rocky Mountains. The southern limit of white spruce today is 360 miles north and 3300 feet higher than it was 18,000 years ago. Occurrence of periglacial features in Montana and Wyoming suggests that average annual temperatures in these midcontinental locales during this period were at least 18 to 25 degrees F. colder than today.<sup>8</sup>

About 12,000 and 10,000 years ago, temperatures warmed abruptly, climate seasonality increased sharply, forests declined, and prairie, treeless steppes, and deserts expanded. At this time, due to the much cooler summers, Pleistocene biotic communities began to collapse and over half of the large mammals, including the mammoth and giant sloth, became extinct. By 8000 years ago, the modern distribution of plants and animals had become established.

These environmental changes must have had



profound effects on the humans who inhabited North America at that time.<sup>9</sup> Food, clothing, and shelter were probably relatively easy to obtain throughout the year in the more equable Pleistocene climate. The increased seasonality of the early Holocene may have forced human groups to adopt seasonal migration strategies. They would also have had to learn to store food and probably set up semi-permanent base camps. Eventually, these environmentally-driven cultural changes led to sedentary agricultural societies, all of which originated in the first half of the Holocene. Although information about the first humans to inhabit what is now Kansas derives from only 27 paleoindian sites at this time,<sup>10</sup> we know they were effective hunters because artifacts are found in association with remains of extinct bison (*Bison antiquus*) and mammoth at some sites. Indeed, some scientists believe that paleoindian hunters contributed to the extinction of these large mammals. In all, archeologists have documented that the Flint Hills were home to about fifteen prehistoric, three proto-historic, and three to four historic indigenous cultures.<sup>11</sup>

In my view, climate is the most fundamental environmental factor and ultimately drives the other factors. Due to its midcontinental location, Chase County presently experiences great daily and seasonal temperature variations. Summers are warm and humid and winters are cold and dry. Recorded temperatures at Cottonwood Falls range from -30 to 118 degrees F. Average annual precipitation is 32 inches, but yearly values have ranged between 19 (1953) and 57 inches (1951). Precipitation is heaviest in late spring and early summer, and violent summer thunderstorms often produce heavy rains, hail, strong winds, and tornadoes. The principal source of moisture for precipitation is the Gulf of Mexico. Snowfall is light, averaging only 17 inches per year. The frost-free period averages 185 days and extends from about April 20 to October 20.

But today's climate cannot be considered "normal." Contrary to contemporary concerns about global warming, long-term climate data indicate that the earth's climate has been progressively cooling and drying throughout the Quaternary, with each successive glacial and interglacial stage slightly cooler than the preceding one. Previous interglacials seem to have been not only more equable but also considerably warmer than the present one. Remains of an extinct giant tortoise (*Hesperotestudo crassiscutata*), which probably could not survive freezing temperatures, are found in Illinois and Kansas, and alligator remains and faunal assemblages comparable to those of the present Gulf Coast are also found in Sangamonian (about 125,000 years old) interglacial deposits in southwest Kansas.<sup>12</sup> In addition, the occurrence of highly weathered, humid subtropical to Mediterranean-type soils in glacial

deposits in Alberta, Montana, and Kansas suggests that average temperatures were at least 11 to 14 degrees F. warmer than present.<sup>13</sup> Taken together, the fossil, soil, and geomorphic evidence suggest that average temperatures in the Great Plains may have fluctuated by as much as 29 to 43 degrees F. between glacial and interglacial maxima.

Although short-term weather fluctuations may appear random, earth scientists have now detected long-term cycles in the climatic record. Dated sequences of deep-sea sediments and loess/soils in Europe and China suggest that the timing of major climate changes is coincident with periodic variations in the earth's orbit around the sun.<sup>14</sup> The climatic cycles are of about 100,000, 41,000, and 23,000 years. Higher frequency climate fluctuations, also discernable in the geologic record, may correlate with lunar tidal force cycles, which peak every 1700 years and have 1100-, 550-, and 275-year subcycles.<sup>15</sup> In addition, astrophysical evidence now suggests that the 2.3 million-year land mammal extinction cycle may be the result of cyclical variations in solar output. In other words, the sun may be a variable star.<sup>16</sup>

Thus, the landscape here is anything but static. Ocean-bound trilobites and sharks, giant land tortoises and alligators, boreal forests, mastodons and mammoths, paleoindians and Pawnee each once held sway in this area. No doubt, equally radical and fundamental changes will occur in the future. And, as in the past, many if not most of the changes will be beyond human control. Seen in this light, no human society or agricultural methodology can ever be considered "sustainable."

The new field of complexity informs us that all complex adaptive systems, including life and climate change, are poised between stasis and chaos.<sup>17</sup> Existing literally on the "edge of chaos," these dynamic, self-organizing kinds of systems never really settle down. However, they do evolve through trial and error (natural selection) toward greater complexity and order. John Holland, one of the pioneers of complexity, has speculated on the implications of these ideas for our concept of sustainability:

Somehow the agenda has been put into the form of talking about a set of transitions from state A, the present, to a state B, that's sustainable. The problem is that there is no such state. You have to assume that the transitions are going to continue forever and ever and ever. You have to talk about systems that remain continuously dynamic, and that are embedded in environments that themselves are continuously dynamic.<sup>18</sup>

Brian Langton, another complexity scholar, adds:

...maybe the lesson to be learned is that evolution hasn't stopped. It's still going on, exhibiting many of the same phenomena it did in biological history—except that now it's taking place on the

social-cultural plane. And we may be seeing a lot of the same kinds of extinctions and upheaval.<sup>19</sup>

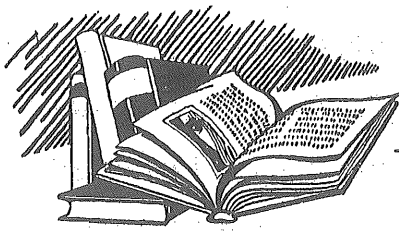
Indeed, our present age is marked by the extinction of many cultures as well as many species. Indigenous groups such as the Aborigines, native Americans, and Tibetans developed environmentally-benign, "sustainable" cultures which lasted for millennia only to be wholly or partially destroyed by contact with industrial societies. Other cultures have failed by exhausting their resource bases, from natural environmental changes, from internal chaos, or from war. Most of the 5000 to 8000 indigenous cultures on the planet are now struggling for survival.<sup>20</sup> And it is probably in our self-interest to help them survive because these cultures are rich storehouses of traditional values and technologies which could inform our efforts to develop a "more sustainable" society.

Thus, although we can see that no humanly-devised system is likely to be sustainable in the extreme long term, we may still legitimately aspire toward developing a society which is more sustainable than our present system. In order to accomplish this, we in the industrialized world need to rediscover our proper role in nature. This will involve grasping the paradox that while we are entirely dependent on the natural environment for our health and survival and will remain so in the future, we are also both the stewards and the co-creators of that environment. By better understanding our connections with and dependence on nature, we can learn new (and old) ways to fit more harmoniously within our particular places and adapt to nature's inevitable changes. Then our co-creatorship can be marked by artistry: we can create beauty which enhances nature's beauty.

Given the tremendous destructive potential of our technologies, the human creation of beauty rather than ugliness in nature probably requires that we extend our concepts of justice and community to include the land and other creatures, as well as other cultures. As Aldo Leopold stated, "We abuse the land because we regard it as a commodity belonging to us. When we see the land as a community to which we belong, we may begin to use it with love and respect."<sup>21</sup> Here we need to go beyond the "nature as measure" metaphor and consult humanity's geniuses, as expressed in the spiritual and moral insights of Moses, Jesus, the Buddha, and others. Based on their wisdom, we may envision that "more sustainable" societies will be characterized by an ethic of restraint, compassion, simplicity, self-sufficiency, and minimum consumption of resources. It is to be hoped that the Matfield Green project will provide one model of land development and community accounting which will foster better stewardship and more artistic co-creation of the environment.

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## Books

### *Complexity: The Emerging Science at the Edge of Order and Chaos*

By M. Mitchell Waldrop

New York: Simon and Schuster, 1992. 380 pp.

Bibliography, index. Cloth \$23.00, paper \$12.00.

### *Toward a Unified Ecology*

By Timothy F.H. Allen and Thomas W. Hoekstra

New York: Columbia University Press, 1992. 384 pp.

Notes, bibliography, indexes. Cloth \$45.00.

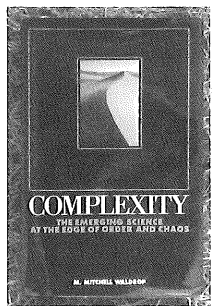
### *Hawks in Flight*

By Pete Dunne, David Sibley, and Clay Sutton

Boston: Houghton Mifflin Co., 1988. 254 pp. Cloth

\$17.95, paper \$10.95.

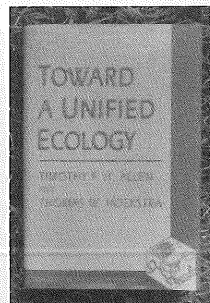
Reviewed by *Dave Sing*



For the past three hundred years the relationship of our species with nature has been dominated by the natural philosophy of science—an amalgamation of Baconian, Cartesian, and Newtonian philosophies, influenced strongly by the industrial values of an increasingly urban world. Based on reductionism, objectivism, and positivism, the scientific paradigm has pro-

duced a wealth of short-term positive change for humans—by increasing food production, by lowering infant mortality and combatting disease, and by developing technologies that facilitate “better” lifestyles for more people. Unfortunately, the long-term ramifications of this paradigm and the extractive economy it supports are now glaringly apparent: the pollution of air, soil, and water, the depletion of resources, overpopulation, urban sprawl, and, in general, a loss of the human understanding of nature’s complexity that had established sustainable local ecologies long before the advent of modern science.

As these long-term problems have become more



evident, and as solutions to them have become more elusive, some scientists have begun to question the reigning scientific paradigm and to explore a new philosophy of nature. This is the new science of complexity. These scientists believe that complexity may hold solutions to some of the stubborn, fundamental problems in nature and culture that haven’t been thoroughly examined—because they couldn’t be properly explained—by the conventional sciences: problems like increasing returns in economics and the evolution of life out of simple molecules in the earth’s primitive oceans.

Complexity is a conceptual model that addresses nature as a whole entity composed of complex systems which contain many different, yet equally important, interactive parts. Proponents claim that it is applicable to a wide range of phenomena, from the life of a thunderstorm and the patterns of bird migration to the genetics of common diseases and the fluctuations of the economy. The ideas of complexity have arisen from many sources: from Einstein’s theory of relativity and Heisenberg’s uncertainty principle, from chaos theory and other more recent scientific inspirations, from advances in computer science, and from new awareness of the diversity of natural ecosystems and the philosophies of indigenous cultures.

For the scientist, complexity challenges many of the basic precepts of established scientific philosophy. For the average reader, exploration of the terrain offered by complexity can be a frustrating journey. However, understanding complexity need not be an intimidating exercise, nor one reserved only for academics. Recently, a number of excellent books have appeared describing various aspects of this burgeoning paradigm shift. Each of the three books reviewed here addresses complexity from a different viewpoint: *Complexity* is an energetic historical account of the people involved with the development of complexity as a science or group of sciences; *Toward a Unified Ecology* is an ecology textbook that relies heavily on the language and concepts of complexity; and *Hawks in Flight* is a guide to raptor identification that promotes a “holistic” method of field observation. Together, these books provide insight into the basic premises and methods of complexity and demonstrate its potential as a natural philosophy for the 21st century.

M. Mitchell Waldrop’s *Complexity: The Emerging Science at the Edge of Order and Chaos* is essentially a biography of the Sante Fe Institute, a think tank founded in the mid-1980s and devoted entirely to the study of the sciences of complexity. The book introduces us to the principal players in the complexity game at the early parts of their careers and then follows them down the separate paths that led to their eventual convergence at (and founding of) Sante Fe. The characters form an impressive roster of modern scientists: physicists Murray Gell-Mann and Philip Anderson, economists Kenneth Arrow and Brian Arthur, evolutionary

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biologist Stuart Kauffman, computer scientist John Holland, and many others. Waldrop invites us to join these people as they each began to notice, from their divergent perspectives, that the world was not a linear, reducible place where things followed predictable rules of order—that there was a great deal more going on, in ways that conventional science could not sufficiently explain.

Waldrop succeeds in presenting the occasionally difficult material through the personal struggles of the scientists themselves, allowing the reader to share in both the puzzlement of a new problem and the exaltation of a discovery. In the chapter entitled “Life at the Edge of Chaos,” for example, computer hacker Chris Langton describes his “night of epiphany” in 1971 when, while working on a computer program called *The Game of Life* (a program designed to create a “universe” of interactive parts that simulates a living system), he had an intuition about the processes that create and sustain life:

It was one of those things where you have this flash of insight, and then it's gone... The actual mental image itself was no longer really there, but it had set me up to feel certain ways about certain things. Things would come along that just smelled right, that would remind me of this pattern of activity. And for the rest of my career I've tried to follow that scent. (p. 203)

Waldrop continues in this chapter to describe the trail of Langton's “scent” through his years as a struggling musician and underachieving undergrad to his Ph.D. work on the evolution of information and his development of the concept of Artificial Life, which led to his involvement with the Sante Fe Institute.

This book is valuable not only for introducing and explaining much of the terminology of complexity, but also for giving us insight as to how and why the language developed. However, this reader wished at times for more insight into the actual scientific theories that lie beneath the intriguing concepts and people. For all the rich historical value of the book, I wanted to learn more about the everyday applicability of the concepts, about how I as a thinking person could use these theories to better my worldview.

This is where T.F.H. Allen and T.W. Hoekstra's *Toward a Unified Ecology* comes in, taking the language and knowledge of complexity the next logical step, into the classroom. *Toward a Unified Ecology* is the second volume in Columbia University Press's *Complexity in Ecological Systems Series*, which attempts to integrate concepts of complexity with the more established methods of biology in order to “present a conceptual framework for a more coherent view of ecology.” With the aid of an array of illustrations, photographs, and other graphics, Allen and Hoekstra carefully deconstruct current ecological science and offer a well-organized and innovative approach to studying the complex hierarchy of ecological systems.

In the first chapter, “Principles of Ecological Integration,” the authors describe the relationship of the observer to the observed phenomena and discuss in detail the problems of an observer-based, or “filtered”

science: “The filter chosen by the observer is as much a matter of human decision as is the definition of structures. We cannot measure anything in infinite detail, and so differences too small for the instrument to detect are filtered out of the data” (p. 18). In this way, the authors argue, much current science fails to connect with the entirety of the observed phenomena. If a study fails to incorporate the physical size and temporal nature of the subject, important aspects will remain unobservable: “If one waits long enough almost all processes that at first appear to be a linear progression will emerge as cyclical.... Should the temporal framework of a study be too short to include a full cycle, then phenomena associated with those temporal extents cannot be seen” (p. 20). In a direct attack on reductionism in ecology, the authors use the old anecdote about not being able to see the forest for the trees. Even if we knew everything about all the trees, they observe, our knowledge of the forest would still be very limited: “The very human feeling that tangibles like trees are part of an ultimate reality is seductive... ecology is plagued, not helped, by the familiarity of its subject matter” (p. 25). In this way Allen and Hoekstra prepare us for the remainder of the book, which seeks to redefine many of the ways in which the ecological sciences regard nature.

The majority of *Toward a Unified Ecology* is devoted to the different scaling methods, or “criteria,” offered by the authors as the main body of this redefinition. Each criterion receives its own chapter (except the biome and biosphere criteria, which share a chapter), in which the value of each method is presented as a means of defining a proper context for scientific inquiry. Significantly, these criteria are “independent in that they need not be held in a rank order prescribed by the conventional biological hierarchy” (p. 54). Instead, each different criteria can be applicable to almost any biological system, as long as the scientist incorporates the scale and system-type being observed. By these methods, the way in which a scientist may filter his or her data in order to observe a phenomena can be more generalized, reducing the possibility that certain data may remain unseen because of a contextual problem of the study design. By using different criteria for observing nature, instead of trying to fit the observed phenomena into its “place” within a rigid, deterministic scaling system, the scientist can more easily move across perceptual and contextual boundaries, creating a more robust and, hopefully, a more complete view of the complexity of nature.

Allen and Hoekstra stress that the language they use in their book is necessarily arbitrary, because there can be no “right” or “wrong” way to define nature in a general sense. Still, in order to create the proper context for their book they feel the need to define their terminology in detail, and the coherence of *Toward a Unified Ecology* owes much to the great care the authors take in this regard. For example, when describing emergent properties (a concept that describes unexpected phenomena that appear at “higher” levels of organization in complex systems) the authors strive to make this idea an essential part of our philosophical landscape; “There is nothing mystical about emergent



properties.... Without emergent properties in the entities it studies, science would have no generality; it could not be predictive, and it would only reflect the happenstance of how observations are made" (p. 164).

*Toward a Unified Ecology* is in essence a textbook: it is dense with information and worthy of intense study. However, because of its meticulous attention to definitions, the book could also be valuable as a reference source, a sort of glossary and grammar to the language of complexity. This book would make a fine addition to the classroom or to the library of anyone interested in natural philosophy.

Pete Dunne, David Sibley, and Clay Sutton's *Hawks in Flight*, finally, takes complexity into the field. *Hawks in Flight* is the result of a kind of evolution in field ornithology, from the original "Audubon" method, of killing birds and inspecting and cataloguing the remains, to the "Peterson" method, of observing birds with binoculars and then referring to generalized illustrations, to the authors' "Holistic" method, which emphasizes observation of the shape, size, and movements of birds at great distances. The book has no color photographs or illustrations; instead, all the graphics are in black and white—the way most flying raptors look from afar. As the authors point out in their introduction, "Portrait shots of perched (or even flying) raptors are beautiful but often bear little resemblance to a bird of the same species flying a quarter-mile away" (p. xvii). While the book rarely uses the terminology of complexity as defined by *Complexity* or *Toward a Unified Ecology*, the influence of complexity infuses the text and method of *Hawks in Flight*. We are asked to re-learn our bird watching skills, to look not at minute details of plumage but instead at the way the bird acts, the way it holds its wings and body in flight, the places where we find it soaring.

The book divides its chapters to match the different families of raptors, and then subtitles each chapter with a general statement about the family. Buteos, for example, are subtitled "The Wind Masters," and emphasis is placed in that chapter on the soaring abilities of each Buteo species. The accompanying illustrations depict each species from a variety of angles and point out the important differences between them. The text performs this same task, describing the distinguishing actions and field marks of each species relative to other similar species. When describing the subtle differences between the Sharp-shinned Hawk and the Cooper's Hawk (a conundrum infamous in ornithology), the authors choose to detail the differences in behavior, body shape, and flight pattern, essentially de-emphasizing the subtle plumage discrepancies between these birds that have stumped and enraged birdwatchers for years. By providing methods that any of us can use whenever we see a hawk in the sky, the authors succeed at defusing the esoteria often associated with bird-watching; and perhaps more importantly, they provide an example of how the complexity of the relationship between observer and observed can be incorporated into one's continuing relationship with nature.

As time passes the concepts of complexity may begin to weave their way into our everyday language

and experience. With the enormous amount of information offered by our ever-expanding technologies, and with concern for our environment becoming increasingly acute, it is refreshing to discover that new natural philosophies are emerging from using the complexity of nature as a model. New insights into these new philosophies, and into improving our relationship with nature, should emerge from reading *Complexity*, *Toward a Unified Ecology*, and *Hawks in Flight*. Enjoy!

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## *Shaping Modern Times in Rural France: The Transformation and Reproduction of an Aveyronnais Community*

By **Susan Carol Rogers**

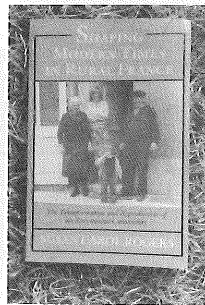
Princeton, New Jersey: Princeton University Press, 1991. 231 pp. Appendixes, bibliography, index. Cloth \$45.00, paper \$15.95.

## *A Life of Her Own: A Countrywoman in Twentieth-Century France*

By **Émilie Carles**

New Brunswick, New Jersey: Rutgers University Press, 1991. 271 pp. Translated by Avriël H. Goldberger. Introduction, illustrations, afterword, glossary. Cloth \$19.95, paper \$12.00.

Reviewed by *Laura Sayre*



In my files I have two newspaper clippings from 1992: one is an AP story that appeared in the *Salina Journal* in midsummer, when a group of over three hundred French farmers organized a tractor blockade of Euro Disneyland; the second is a lone photo run in the *New York Times* in the fall, showing a crowd of farmers from near Besançon standing around a burning Coca-Cola vending machine. Both events were demonstrations organized by French farmers in order to protest proposed reductions in European Union farm subsidies in conjunction with the General Agreement on Tariffs and Trade (GATT) negotiations.

These two items drew my attention because of the incredible degree of politicization among French farmers they seemed to indicate. Although the French farming population is not substantially larger proportionally than the U.S. farming population (amounting to less than five percent of the total population in each country), the discussions and events surrounding the GATT talks over the past two years have made it clear that French farmers are a political force to be reckoned with.

In some respects, this power is similar to the significance attributed to the Iowa caucuses in the U.S.—half of all U.S. farmers live in the Midwest, and the rhetoric surrounding the Iowa caucuses tends to reiterate the idea that farmers possess a kind of moral ballast for the nation. In many ways, however, the impressive political clout of French farmers seems altogether different.

When I saw Susan Carol Rogers's anthropological study of a contemporary rural French community, therefore, I was immediately interested. Virtually all discussions of sustainable agriculture imply or state that farmers should be more actively involved in determining the conditions by which they farm: the government programs, trade policies, regulations governing the introduction of new products or management practices, zoning laws, and other factors that affect costs and prices. Surely, then, these out-spoken French farmers may possess useful ideas for the improvement of the agricultural situation in this country.

Rogers is trained in French rural history, and her approach is historical. Her thesis is that in spite of the widespread academic and popular idea that modernization has meant homogenization in rural communities everywhere, in the community she studied, although modernization has indeed brought changes, in effect the local traditions have been reproduced rather than transformed. This is a more powerful conclusion than it may at first seem. The rather pessimistic assumption that diverse cultures around the world are inexorably giving way to a single global culture runs very deep, especially among liberals, and the idea that this may not be true is at once realistic and wonderfully hopeful.

The Aveyron is a *département* (the intermediate level of French administration) in south central France. Today, it is a prosperous, predominantly agricultural region. "Sainte Foy," as Rogers refers to the village she studied, is so thoroughly a community of well-to-do farmers that it has paved roads to every outlying farm. Most of the local farmers raise Lacaune sheep to produce ewe's milk on contract for the Roquefort cheese company in nearby Roquefort. Farm families also sell milk lamb at a substantial premium, raise small amounts of grain and cattle, and produce geese livers for pâté. The village of Ste Foy is small but active, with schools, the church, bistros, cafes, and other shops and services, including a monthly sheep auction and outdoor market.

Ste Foyan life, as Rogers explains, is impossible to understand except in terms of what is called the *ostal* system, a patrilineal and patrilocal form of inheritance by which the *ostal*, or farm, is (ideally) maintained in the family line. According to this "elegant and clearly articulated" system, the eldest son (or, if no sons are produced, the eldest daughter) is singled out at an early age and brought up in expectation of inheriting the *ostal*; the other siblings may reside and work at the *ostal* only until they marry, and the inheriting sibling is obliged to marry and bring his or her spouse onto the *ostal* in order to produce the next heir. The aging parents are expected to remain on the farm until their deaths.

The maintenance of this system (variants of which

are common throughout rural France and Spain) is Rogers's chief example of Ste Foyan cultural integrity in the presence of modern life. Indeed, using local records Rogers documents that although the *ostal* system has been present as an ideal for at least several generations, practical adherence to its rules has actually become *more* common with the rise in standards of living experienced this century and especially since World War II. The Ste Foyans themselves, curiously, claim that the opposite is true, being prone to make statements like "no one obeys the rules anymore."

What is further remarkable about the *ostal* system is that certain of its rules contradict both French law and papal doctrine (Ste Foy, like most of France, is predominantly Catholic). The *ostal* system clearly amounts to primogeniture, which has been officially illegal in France since the Napoleonic Code, and occasionally requires levirate marriage (in which a woman marries her deceased husband's brother in order to produce an heir, because for her to marry an outsider would take the *ostal* away from the family line), in spite of the fact that this is considered incestuous by the Catholic Church. The Ste Foyans, according to Rogers, see no significant contradiction in these facts.

So what relevance does this interesting community have for those promoting sustainable agriculture in the U.S.? First, I want to stress the general value of anthropology for understanding contemporary rural life. Traditionally, anthropology has focussed on exotic and remote peoples, leaving the examination of most of the Western world to the sociologists. But the techniques of the two disciplines are different, as are their respective literatures, and hence anthropology's look at contemporary American or European social and cultural structures provides new insights into the systems we believe we are most familiar with.

Inheritance, for instance, is a classic area of anthropological theory and a critical issue for the preservation of family farms (as Land Link and other beginning-farmer support programs recognize). Better understanding of inheritance practices on farms in the U.S. and their regional and local variations could help policy-makers and non-profit representatives design their programs more effectively. Although one might be inclined to think that rural France is more deeply embedded in local cultural traditions than rural America, Rogers has also studied differences in inheritance and land management strategies based on ethnic derivation of two adjacent towns in rural Illinois, suggesting that this may not necessarily be the case.<sup>1</sup> Hence, U.S. or even statewide statistics on various aspects of farm life today may not tell the whole story.

The situation of agriculture in the Aveyron is also instructive because it provides an example of profitable small-scale contemporary farming. The Ste Foyans recognize that their wealth derives from the success of the Roquefort cheese company, which is relatively free from the instability plaguing most agricultural markets because its product is of high quality and limited quantity, production being dependent on the unique Roquefort caves and the proximity of the ewe herds. (Many French farms and villages have not been so

fortunate). It's possible that this kind of agriculture depends in part on the French attitude toward food—and perhaps in turn this is where French farmers get some of their political clout. Admittedly, the very prosperity of Ste Foy may limit the generality of the conclusion that local culture is not necessarily wiped out by the arrival of modernity, but that line of reasoning does not explain the widespread willingness of French farmers to demonstrate over political issues which touch their way of life.

In typical academic fashion, Rogers ends her book by concluding that social change is a result of historical forces, chance events, and strong individual personalities. On reading *A Life of Her Own: A Countrywoman in Twentieth-Century France*, one comes away with the conclusion that Émilie Carles (1900-1979) is one of those individuals. Her autobiography (the French title is *Une Soupe Aux Herbes Sauvages*) was a best-seller in France when it first appeared in 1977, and was then translated into several languages but, as translator Avriël Goldberger notes, inexplicably not into English. While it offers less theory on the interaction of farming and social change, it provides a more intimate and vivid historical view of life in a rural French community.

Carles writes about the tiny mountain village of Val-des-Prés, in the Haute-Alpes *département* on the Italian border. Here she was born, grew up, and lived most of her adult life. Like everyone else in the village, her family are peasants, but she did well in school, earned her *brevet supérieur* in Paris, and became a teacher. After losing a brother-in-law and her favorite brother in World War I, she became an ardent pacifist, objecting particularly to the way in which war led the state to use its peasantry as so much cannon-fodder, peasants who at that time knew little of the world beyond their valley. In 1928, she married a free-spirited, self-educated painter and carpenter who shared her political views. Together, in addition to their respective jobs, they managed her family's farm, raised four godchildren and two of their own children, and opened an inn that served as a rural enclave of leftist thinking. During World War II they suffered for their political opinions, and twice had to flee into the mountains, but they stood their moral ground. Towards the end of her story, Carles writes:

I remember what happened here over fifty years, from 1928 to today. There was one Communist vote at first, Jean Carles's, then two, then three; when women got the vote, that made four and five votes; and finally, with the young people added, there was a record number of thirteen. Thirteen Communist votes in Val-des-Prés: it was a miracle. (p. 254)

Although Carles's prose style is somewhat rough (as we learn from Goldberger's introduction, most of the text was dictated, and Carles finished it just before she died, with little time for revisions), her story is both moving and engaging. Carles's attitude toward her upbringing and culture is remarkable in the strength of its ambivalence. On the one hand she decries patriarchy and narrowmindedness, and recounts several incidents which demonstrate to her how these forces propel good lives to bitter ends. On the other hand, there are many

aspects of her country life that she loves: the thin pure air, the beautiful surroundings, the intimacy of knowing everyone in her village and of teaching in the school where she herself had learned to read and write.

Carles's story is also a good complement to Rogers's study in that she emphasizes the work of farming. Rogers explains that she originally intended to examine the sexual division of labor in Ste Foy; from Carles's account, especially of her girlhood, we learn that although women's and men's work may have been distinct in principle, in actuality the available hands were simply enlisted for the necessary work—and in the early part of the century much of the work was brutal. And while Carles is clearly proud of her honest, hard-working background, her life's goal was to join this heritage with staunchly independent thinking—in herself, in her children, and in her students:

In a backward region like ours, considering the life I had led, what seemed indispensable to me was opening their minds to life, shattering the barriers that shut them in, making them understand that the earth is round, infinite, and varied, and that each individual, white, black, or yellow, has the right—and the duty—to think and decide for himself. (p. 225)

Towards the end of the book, Carles discusses her instigation of a series of political demonstrations in the mid-1970s to prevent the construction of a superhighway through her native valley. Together with other landowners in the village, Carles formed an association, wrote letters, held public meetings, and organized a parade in nearby Briançon with all thirteen tractors owned in Val-des-Prés. She drew her inspiration from an event she witnessed one day when she was travelling to the Riviera and the bus she was riding in was stopped by "a peasant demonstration: 150 tractors filing by in procession and totally cutting off the flow of traffic." The rest of the passengers were angry and impatient, but Carles stood up and reprimanded them: "You don't know what you're talking about! You don't know what it means to be a peasant. Until now peasants have never had the white part of the leek. It's not a shame that they're waking up and demonstrating!" (p. 242)

The peasants of Val-des-Prés won their point, and the highway did not go through their pristine valley. And, although it was barely covered in the U.S. press, French farmers were still protesting in Paris when the GATT negotiation deadline was met in Geneva on December 15, 1993. As my two clippings from 1992 show, in their protests the farmers linked their domestic political goals to wider national sentiment opposing American cultural imperialism, demonstrating their ability to see the preservation of their way of life as connected to their cultural defensiveness. In the final GATT negotiations, protection of French media interests overwhelmed farm subsidies. Nevertheless, I suspect we have not seen the last of the tractors in the streets.

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#### Notes

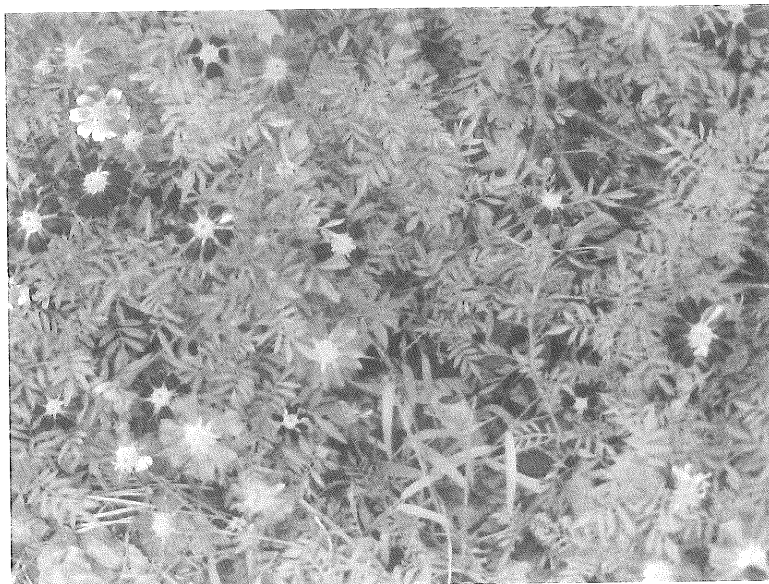
1. See Michael Chibnik, ed., 1987. *Farm Work and Fieldwork: American Agriculture in Anthropological Perspective*. Cornell University Press, Ithaca, NY.

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