The Land Report

A publication of The Land Institute / Number 81 / Spring 2005

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Our Mission Statement

When people, land and community are as one, all three members prosper; when they relate not as members but as competing interests, all three are exploited. By consulting nature as the source and measure of that membership, The Land Institute seeks to develop an agriculture that will save soil from being lost or poisoned while promoting a community life at once prosperous and enduring.

Cover: Judd Patterson.
Peregrine falcon.

Above: Judd Patterson.
Snowy plover eggs.

The Land Report is published three times a year.

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ISSN 1093-1171

Three Simple Questions

Jerry Glover

It's an awful thing to lose a river. It's worse to lose several.

In 1897, my great-great grandfather, Thomas Jordan, retired from farming and bought the Champion Flour Mill, powered by the waters of Frenchman Creek in Champion, Chase County, Nebraska. The mill's foundation was laid in 1886 with stone salvaged from an abandoned cattle corral. That foundation nicely symbolizes the region's transition from a sustainable economy based on native grass to a doomed one based on extraction. A few rainy years in the early 1880s, which settlers mistook as the norm, plus the nutrient riches of freshly plowed prairie, yielded bumper crops that sparked further sod busting. Ranches were displaced, corrals abandoned and flour mills built to accommodate wheat.

The Willises, a farm family, were neighbors to the Jordans. Maude Jordan, my great-grandmother, married her brother's best friend, John Willis. My great-grandparents and Maude's brother, Roy, eventually ended up in Holly, Colorado, near the Kansas border, where I grew up in their midst. All three are buried in Holly on a hill overlooking the Arkansas River. Most of the catalpa trees growing in Holly are offspring of those planted in the early 1900s by Uncle Roy and his father at the Champion Mill.

The mill's stone foundation and wooden structure, with its many cranks, pulleys and sieves, remain sound. But the mill, now a state historical site, runs only for brief times each year, to grind souvenir-size bags of flour for tourists—I've bought several myself. The rest of the year Frenchman Creek lacks enough water to power the mill.

Frequent drought and the temptation of federal, production-based subsidies drove many of the area's farmers away from dryland production to irrigation. That irrigation water is pumped from the High Plains aquifer, upon which Frenchman Creek flowed for millennia. The aquifer's level largely sets the creek's, and when the aquifer falls below a certain point, the creek goes dry.

So within a few generations of the first plowing of the prairie, local residents find themselves in possession of a fine looking but largely inoperable flour mill.

The Champion Flour Mill's foundation came from a corral, symbolic of the shift from a sustainable economy based on native grass to a doomed one based on extraction.

Meanwhile they provide grist for the current economy, also built on a seemingly rock solid foundation, but also ultimately inoperable.

On the day my great-great-grandfather bought that flour mill, the High Plains aquifer supported not only Frenchman Creek but also the Arkansas and Smoky Hill rivers in western Kansas. Little more than a century later, the Arkansas and Smoky Hill rivers no longer flow there for much of the year. Ecologists reported in the March 2004 issue of *BioScience* that the sewage effluent from Great Bend, Kansas, 180 miles from the Colorado border, now serves as the headwaters of the Arkansas.

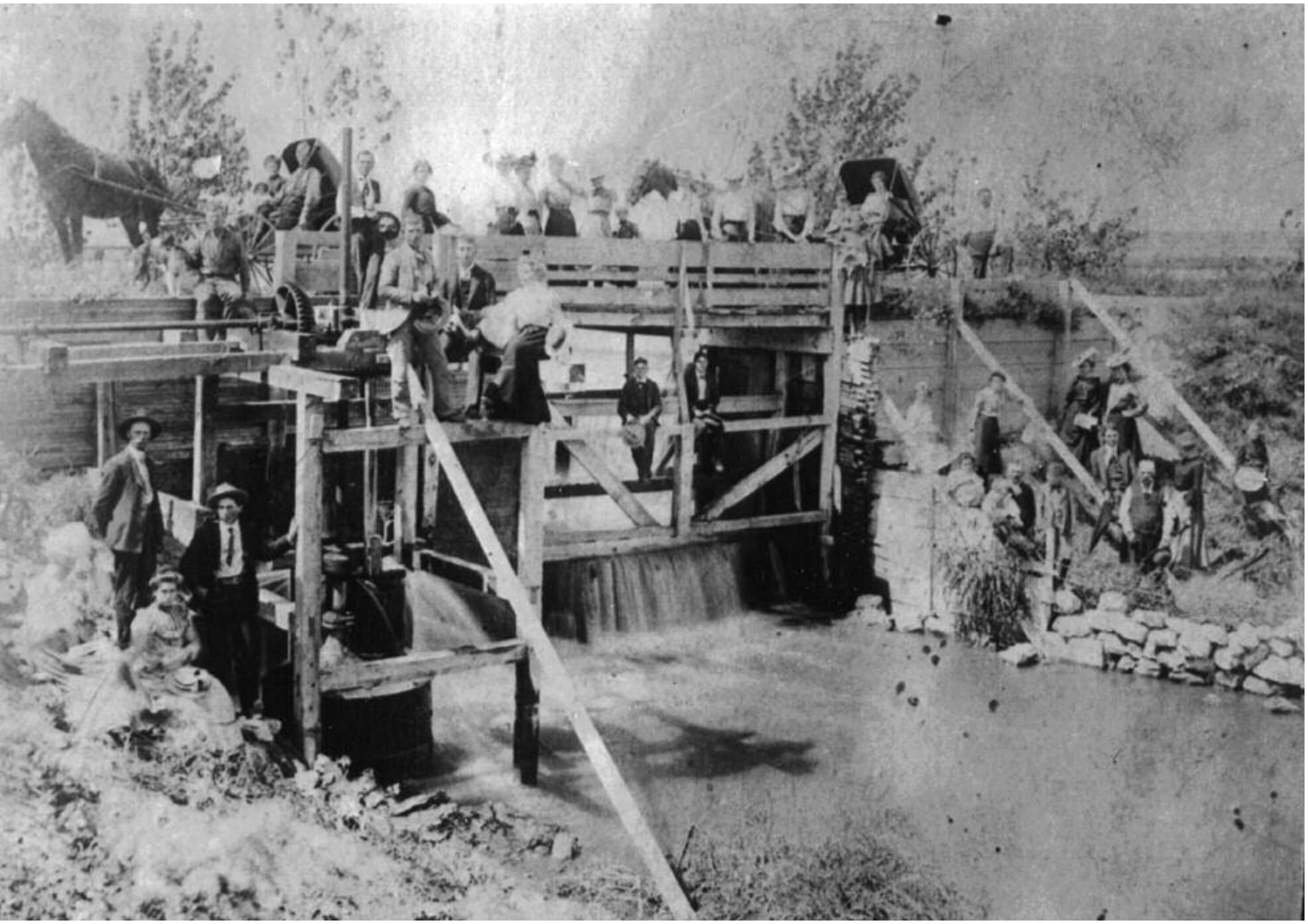
Irrigation wells, each often pumping 1,000 gallons per minute, account for more than 90 percent of takings from the aquifer. More than 80 percent of western Kansas homes depend on the rest removed. But there and in parts of Nebraska and eastern Colorado, the aquifer has fallen 50 to 100 feet, faster than the natural recharge rate of a few inches per year can fill it. The Kansas Geological Survey estimates that pumping would have to decrease by more than 80 percent to be sustainable. This would allow water for homes and livestock but for little else. We now know that the rainy years of the early 1880s were the exception, and that, without irrigation, the long dry spells of the High Plains reduce the growing of annual crops to gambling in a rigged game.

From family conversations, photos and journals, it is clear that Thomas Jordan loved the region, its communities and its people, and expected a long stay for his descendants. But today, only a few generations after the "great plow-up," few of them remain, and none, as far as I know, are farmers or millers. Like millions of others, they largely fled the increasingly industrial landscape and left their communities to fade.

When not occupied by milling, Thomas Jordan served as the first secretary of the Chase County Telephone Co. Were it possible, I would ring up my great-great-grandfather and, after reporting that "No, electric trains never made it to Chase County," ask that he and his neighbors consider three questions in seeking a long-term strategy for living on the High Plains: What was here? What is required of us here? And what will Nature help us do here?

These three seemingly simple questions drive our work at The Land Institute. Nature's ecosystems, nearly everywhere we look, feature perennial vegetation growing in mixtures—the prairie of Chase County, Nebraska, is but one example. With that answer serving always as our reference point, we can take corrective action when

The Jordan family about 1890, from left: Fannie, Maude, Thomas, Roy and Emma. Thomas expected his descendants to stay on the High Plains, but, like others, most have fled the increasingly industrialized landscape.



The Champion Flour Mill dam as it appeared in 1900.

we get the second question wrong. When dryland farming of short-rooted, short-lived annual crops repeatedly failed the High Plains, we should have looked back to the prairie for solutions rather than digging ourselves deeper into the extractive economy.

The prairie would have instructed that from the region's dry, hot winds we protect most of its wealth below ground, as perennial roots. Deep and long-lived, the roots can support the aboveground harvest on which we rely, even during most dry years, whether the harvest is beef, bison or, eventually, grains harvested from the perennial crops being developed by Land Institute plant breeders.

We aren't entirely sure what will be required of future Jordans of the High Plains: Will they primarily be ranchers, farmers of perennial grains or a combination of both? We do know, though, that without a High Plains aquifer and without rivers, Nature won't help them do much. To save that aquifer and those rivers and to develop a strategy for living anywhere, it is critical that the current Jordans—whether on the High Plains or elsewhere—begin asking and answering those three seemingly simple questions.

Working Wilderness

A Call for a Land Health Movement

Courtney White

During a tour of a well-managed ranch in New Mexico, we were taking a break under a large pinon tree when I was asked to say a few words about a new map. I rose a bit reluctantly—the shade being deep—to explain that the map was important for how it showed rangeland health.

The map had been commissioned by an alliance of ranchers concerned about urban sprawl into the 500,000-acre Altar Valley south of Tucson, Arizona. It expressed the intersection of three variables: soil stability, biotic integrity and hydrological function—soil, grass and water. It displayed them in three conditions: stable, at risk and unstable. Deep red meant an unstable, or unhealthy, condition for soil, grass and water, while deep green meant stable for all three. Other colors showed conditions between.

In the map's middle was a privately owned ranch called the Palo Alto. I told of visiting the place recently and being shocked. As writer Ed Abbey would say, it had been overgrazed to being nearly totally "cowburnt."

The blood-red splotch on the map continued well below Palo Alto's southern boundary. But this was not a ranch. This was the Buenos Aires National Wildlife Refuge, land that had been cattle-free for nearly 16 years . . .

That was as far as I got. Offended at suggestion that the refuge might be ecologically unfit, a young Tucson environmentalist cut me off. She said she knew the refuge, having worked hard to heal it from decades of abuse by cows.

I countered that the map did not blame anyone for current conditions, nor did it offer remedies. All it did was answer a simple question: Is the land functioning properly at the fundamental level of soil, grass and water? For part of the refuge the answer was no. For parts of adjacent privately owned ranches, deep green on the map, the answer was yes. Why was that a problem?

I knew why. I had strayed too near a core belief of my fellow conservationists: that the ecology of "protected areas," such as national parks, wilderness and wildlife refuges, could not compare poorly with "working" landscapes. And when the tour resumed, on a ranch that would undoubtedly rate deep green, I saw in the young activist a need to rethink the conservation movement in the American West. From the ground up.

Ethics vs. Knowledge

This thought received a boost a few weeks later around a campfire at the CS Ranch.

I believed, as many conservationists still do, that to end overgrazing would take getting ranchers to adopt something like Aldo Leopold's "Land Ethic," in which he argued that we are obligated to be good stewards of nature. The question for this lofty goal was how.

I decided to ask my host, Julia Davis-Stafford. Years ago, Julia and her sister talked their family into switching to progressive ranch management on the magnificent 100,000-acre CS, in northeastern New Mexico. It was a decision that brought the ranch to flourish economically and ecologically. In fact, the idea for my query came when Julia expressed strong support for a new beaver dam on the ranch. The Davis family seemed to have embraced Leopold's land ethic big time. So, over the crackle of the campfire, I said, "How do we get other ranchers to change their ethics, too?"

"We didn't change our ethics," Julia replied. "We're the same people we were fifteen years ago. What changed was our knowledge. We went back to school, in a sense, and we came back to the ranch with new ideas."

Her point, I now see, is incredibly important. Knowledge, not ethics, is the key to good land stewardship.

In my years as an activist, I have visited many well-managed ranches, and some poor ones, in a wide variety of terrain. I've met a variety of ranchers as well. And they do have an environmental ethic. Often it is powerful. But many lack new knowledge.

The same is true of many conservationists. After all, it has been a long time since many of us were in school, and land management knowledge, like most knowledge, does not sit still for long.

If conservationists could go "back to school," what would we learn? Leopold had an idea: the fundamentals of land health, which he described as "the capacity of the land for self-renewal." He described conservation as "our effort to understand and preserve this capacity."

By studying the elements of land health, conservationists could learn that grazing is a natural process. The consumption of grass by ungulates has been going on in North America for at least 66 million years. Not by cattle, of course, but as domesticates they can be managed to mimic bison, re-creating a relationship between grass and grazer that can be ecologically sustainable.

We could also learn that many landscapes need occasional pulses, by what we see as disturbance, to keep things vibrant. Many of us know that fires can benefit an ecosystem, because they reduce tree density, burn up old grass and aid soil nutrient cycling. But many don't know that small floods can help, as can drought, windstorms and even insect infestation. And nearly all of us fail to understand that grazing can as well.

Traditionally, Western ranchers employ the "Columbus school": Turn the cows out in May and go discover them in October. Left alone, cattle will loiter in and degrade riparian zones before grazing upland grass. This unmanaged grazing has been a chief cause of the region's damage.

The CS and other progressive ranches bunch their cattle together and keep them on the move, rotating them through numerous pastures every seven to 10 days or so. Ideally, no single piece of ground gets grazed more than once a year. This ensures recovery time.

The keys are control, which can be done with fencing or a herder, and timing, in which the moves are carefully planned. In fact, overgrazing is more a function of timing than numbers of cattle.

The Davis family had expanded their knowledge to maintain their ethic and stay in business. As the campfire embers burned softly into the night, I wondered if conservations could do the same.

Land Health Standard

My friend and fellow activist Dan Dagget tells a story about an environmental studies professor who took students for a walk in the woods near Flagstaff, Arizona.

Courtney White. Which side of the fence is healthier? Which side held cattle? The answer for both: the right side. Cuba, New Mexico.

‘It all comes down to soil. If it’s stable, there’s hope for the future. But if it’s moving, then all bets are off for the ecosystem.’

Stopping in a meadow, the professor pointed at the ground and asked, not so rhetorically, “Can anyone tell me if this land is healthy or not?” One student finally spoke up: “Tell us first if it’s grazed by cows or not.”

A kayaking lawyer told me that a workshop between a ranch and a wildlife refuge rearranged his thinking. “I’ve done a lot of hiking and thought I knew what land health was,” he said, “but when we did those transects on the ground on both sides of the fence, I saw that my ideas were all wrong.”

These two instances illustrate a recurring theme in my experience as a conservationist. To paraphrase a famous quote by a Supreme Court justice, environmentalists can’t define what healthy land is, but know it when they see it.

That inability to define is changing. In 1994 the National Academy of Sciences published a book called *Rangeland Health: New Methods to Classify, Inventory and Monitor Rangelands*. It defines health “as the degree to which the integrity of the soil and ecological processes of rangeland ecosystems are sustained.” It goes on to say, “The capacity of rangelands to produce commodities and to satisfy values on a sustained basis depends on internal, self-sustaining ecological processes such as soil development, nutrient cycling, energy flow, and the structure and dynamics of plant and animal communities.”

Before land can support a value, such as livestock grazing or hunting, its basic ecology must be working properly. Before we talk about designating critical habitat for endangered species or expanded recreation, we need to know the answer to a simple question: Is the land healthy at the level of soil, grass and water? If the answer is “no,” then all our values might be at risk.

Or, as book co-author Kirk Gadzia likes to put it, “It all comes down to soil. If it’s stable, there’s hope for the future. But if it’s moving, then all bets are off for the ecosystem.”

New Mexico rancher Roger Bowe says, “Bare soil is the rancher’s No. 1 enemy.” I think it should also become the No. 1 enemy of conservationists.

Rangeland Health was the touchstone for a new consensus among scientists and ranchers. In 2000 came a federal publication called *Interpreting Indicators of Rangeland Health*, for assessing uplands on 17 points, including gullies, soil compaction and plant diversity. The interagency National Riparian Team developed a similar approach for stream banks and wetlands. And recently scientists at the U.S. Agriculture Department’s Jornada Experimental Range in New Mexico published protocol for measuring rangeland health to support “a range of societal values rather than to support any particular value.”

This was what I tried to communicate to the young activist under the tree that hot summer day—that a rangeland health paradigm as represented by the map could let us heed Leopold’s advice that anything which degrades an area’s “land mechanism” should be curtailed or changed, while any activity that maintains, restores or expands it should be supported. It should not matter if that activity is ranching or recreation.

Land of Contrast

To understand land health better, I visited a fence separating the Navajo Nation, and its cows, from Chaco Culture National Historical Park, an archaeological preserve in northwest New Mexico. Cattle-free for more than 50 years, Chaco’s condition became a teaching tool when a biologist used the boundary to illustrate the dangers of too much rest from disturbance such as grazing and fire.

I invited along Kirk Gadzia, educator and range specialist, to help me see the contrast. We walked slowly up and back along the fence. On the Chaco side we saw many forbs, shrubs and other woody material, some of it dead. We saw few young plants, few perennial or bunch grasses, lots of wide spaces between plants, lots of oxidized, gray plant matter and a great deal of poor plant vigor. We saw both undisturbed, capped soil—bad for seed germination—and lots of evidence of soil movement such as gullies. We saw a greater diversity of plant species than on the Navajo side, more birds, more seed

production, and no sign of manure or overgrazing.

On the Navajo side we saw lots of plant cover and litter, lots of perennial grasses, tight spaces between plants, few woody species, a wide age range among the plants, little evidence of oxidization and lots of bunch grasses. We saw little evidence of soil movement and no gullies. We also saw less species diversity, a lot of poor plant vigor, much compacted soil, fewer birds, less seed production, a great deal of manure and many signs of overgrazing.

"So, which side is healthier?" I asked.

"Neither one is healthy, really," said Kirk. "Not from a watershed perspective, anyway." He noted that the grazing effect on the Navajo side was heavy; plants were not being given enough time to recover before being bitten again. They lacked the vigor that would show under well managed grazing.

However, Kirk thought the Chaco side was worse, primarily because of its gullies, capped soil and lack of plant litter. "The major contributing factor to this condition is the lack of tightly spaced perennial plants," he said, "which exposes the soil to the erosive effects of wind and rain. When soil loss is increased, options for the future are reduced."

"But isn't Chaco supposed to be healthier because it's protected from grazing?" I said.

"In my experience in arid environments around the world, total rest from grazing has predictable results," Kirk said. "In the first few years, there is an intense response in the system as the pressure of overgrazing is lifted. Plant vigor, diversity and abundance often return at once, and all appears to be functioning normally. Over the years, however, if the system does not receive periodic natural disturbance, by fire or grazing, for example, then the overall health of the land deteriorates. And that's what we are seeing on the Chaco side."

Then Kirk placed a caveat. "Maybe land health isn't the issue here," he said. "It may be more about values. Is rest producing what the park wants? Ecologically, the answer is probably 'no.' But from a cultural perspective, the answer might be 'yes.' From the public perspective too. People may not want to see fire or grazing in their park."

Working Wilderness

Not long ago I rode a horse into the West Elks Wilderness, high above Paonia, Colorado. I wanted to see an award-winning cattle operation in action, and to learn more about the compatibility of ranching and wilderness values. I also wanted to see pretty country.

So did Steve Allen, who took his family to Paonia in the early 1970s as part of that era's back-to-the-land movement. Switching from farming to ranching in the late 1980s, he went "back to school" for progressive management. Then he persuaded five other ranchers to herd all of their cattle as one pool in a long arc through the mountains.

Pool riders guide the thousand head with border collies and the occasional temporary electric fence. They move the herd every 10 days or so, which gives the land plenty of time to recover. With no need for it anymore, the ranchers removed hundreds of miles of barbed wire fence, a boon to wildlife and backpackers alike. Steve also employs livestock handling of a gentleness that would make John Wayne roll his eyes.

Forest Service conservationist Dave Bradford also went back to school, and was determined to measure this new thinking's effects. He monitors the range frequently, and publishes the results often. Through quite a bit of research he also uncovered "before" photographs of the range's condition.

Steve and Dave were my hosts for the day, and I was as eager to see the evidence of their labors as they were to show it off.

What I saw was initially shocking. The herd's passage days before left the trail looking tornado-struck: shattered brush, trampled grass, muddy pulp and ubiquitous cow poop. It was not a Sierra Club calendar wilderness.

"This look great!" Dave said while we climbed a steep hill. "Look at all this disturbance. Come back here in a month and you would never know the cattle went through here, it'll be so lush."

The new director of a local conservation organization, whom I had invited along for cultural bridge-building, said, "People call me all the time and complain. They're hikers. They don't think there should be cows in the wilderness."

"What do you tell them?" I asked.

"I tell them it's a working wilderness."

Steve led us to a high meadow where we found a small pack of cattle that had broken off from the herd. After lunch we drove them down the mountain in a rush of snapping branches, adrenaline and hard work. It was Steve's sly way—I realized when we reached the bottom, exhausted and exhilarated—of teaching us about values.

But before that, we lunched among the meadow's blooming wildflowers and admired the view. Each of us—rancher, federal manager and activist—shared the same thought: What a treasure this land is! Sitting there reminded me why I became a conservationist: to explore the solace of open spaces; to look and learn, and teach in turn; to celebrate cultural diversity alongside biological diversity; and to revel in nature's model of good health.

And to try to understand, as John Muir did, that every part of the universe is hitched to everything else.

Warning: This Diet is Not for Everyone

Marty Bender and Stan Cox

"Lose That Extra Weight ... While Eating the Foods You Love!"

For decades, such headlines were fixtures of supermarket checkout lanes, to be taken no more seriously than claims of alien abduction. But times have changed. Whatever its benefits or drawbacks, the Atkins diet has become wildly popular for one reason: It offers the prospect of a big, juicy T-bone to frustrated dieters weary of gnawing on rice cakes.

It seems too good to be true, and some critics say it is. The debate is chock-full of meat and potatoes, bellies and thighs, arteries and kidneys. But increased protein consumption is also likely to threaten the health of a planet whose ecosphere our species is already exploiting well beyond its capacity.

Is the Atkins diet ecologically sustainable? We'll answer by asking this: What if it were adopted by everyone who needs to lose weight?

Now, to label as unsustainable any individual action that could not be participated in universally is highly conservative. There could be sustainable societies where some engage in activities that would not be possible for all, while perhaps compensating with restraint in other areas. But when we are faced with a strong trend, asking, "What if everyone did it?" achieves two important objectives: The result is more likely to be globally sustainable than are less conservative approaches that depend on just the right balance being struck. And it is fair, in that no one may do what could not be done by everyone.

If Labels Told All

Throughout history and for most people today, meat has been a luxury, because its production requires more resources than does the growing of food crops. The Worldwatch Institute reports that it takes 68 times as much water to produce a pound of beef as it does to produce a pound of bread flour, and that animal protein is eight times costlier than plant protein in terms of fossil-fuel energy. The industrialized West has managed to put meat and dairy products within reach of even its poorest, but only by drawing on vast reserves of soil, water and energy.

To the extent that the Atkins diet helps shed excess weight, it benefits individuals and, arguably, society as a whole. But a physician might ponder the long-term cost to health care systems if everyone overweight ate enough protein and fat to damage the heart, kidneys and other organs. An ethicist might ask whether people in the West should address, en masse, their own overindulgence by indulging even more lustily in foods that the majority of the world's people can afford to eat only sparingly if at all. And we agricultural scientists can try to predict the environmental consequences.

Let's start with Worldwatch's estimate that 1 billion of Earth's inhabitants are overweight, and assume that they each eat 56 grams of animal protein a day. That is the average in Western countries, and most overweight people eat Western diets. To follow the Atkins Nutritional Approach—as it's officially known—their daily animal protein consumption would rise to about 100 grams.

To let 1 billion dieters claim an even bigger share of the world's current animal protein would be neither fair nor feasible. They already eat, on average, more than twice the animal protein as do non-Westerners. So to supply them with more, we'd have to boost production.

That increase would be steep. The current population of about 6.5 billion people consumes approximately 182 billion grams of animal protein per day. Adding 44 billion grams would require that the world's meat, dairy, poultry and seafood industries increase output by 25 percent.

The dieters would no longer get much of their protein from plant sources—grains being too heavily "polluted" with carbohydrates—so somewhat less land would be required for producing food crops. Still, the net result of the big switch to animal protein would require almost 250 million more acres for corn, soybeans and other feed grains. That's because feeding grain to animals and then eating the resultant meat, milk, eggs or farm-raised fish is much less efficient than eating plant products directly.

Finding a quarter-billion acres for adequate feed-grain harvests would mean at least a 7 percent increase in cropland worldwide, at a time when farmers are already using most of the better land. Much of the newly plowed acreage would likely be marginal, prone to greater erosion and in need of extra-generous applications of fertilizers and pesticides.

A livestock population explosion would worsen the air- and water-pollution by feedlots, slaughterhouses, and poultry and hog confinement operations. Trying to spare the land and squeeze more protein from the already overfished oceans would likely be even more damaging.

And that's not all. Cattle and other ruminants get much of their food from pasture and rangeland. Were their numbers to increase by 25 percent, current grasslands probably could not bear the entire burden. Most of

those lands are already fully stocked, and putting more animals on them would increase overgrazing and degradation. New pasture for, say, half of the additional animals would require 1 billion acres. Most of this additional grassland probably would come by deforestation, which could mean that 10 percent of Earth's remaining forests would have to go.

Overconsumption in the United States and other affluent nations doesn't exactly qualify as breaking news, but the Atkins diet puts a new twist in the old story. Its advocates have convinced millions of people that one of the most highly visible symptoms of excess consumption—an accelerating epidemic of obesity—can best be cured by following a regimen that gobbles up global resources even faster.

Weighing That Pound of Flesh

We realize that the world's entire overweight population is not going to eat this way. Many people lack the desire or the means, or both, to make animal products their primary food, and debates over the diet's soundness remain unresolved. Sales of low-carb products, which had shot up to $1.3 billion by 2003, appear to be leveling off. But the kinds of ecological damage we have described are likely to occur in direct proportion to the number of people who do adopt such diets, and when making decisions, that information should be placed on the scales.

In saying that ecological damage is likely with expansion of high-protein diets, we assume that additional animals will be raised as current ones are. The vast majority of American beef cattle eat a grain-based diet for much of their lives. Half of U.S. grain goes to animals. Sixty percent of that goes to beef and dairy cattle, with most of the rest to hogs and poultry.

With a more rational production system, moderate beef consumption could actually improve the environment. Cattle, unlike chickens and hogs, can subsist entirely on range, pasture and hay. Extensive research shows that rangeland and pasture, which consist almost entirely of perennial plants with large, long-lived root systems, do not wreak the soil erosion and water contamination seen with annual grain crops. This continent's lands and rivers could dramatically improve by taking the 60 percent of grain acreage that feeds cattle and converting it to pasture. Our calculations show that production of beef and dairy products might be maintained.

But without massive deforestation, grass-fed beef still couldn't satisfy 1 billion people on the Atkins diet.

Back here in the real world, increases in beef demand are met largely by stuffing corn and soybean meal into feedlot cattle, and the Corn Belt is not about to become a more ecologically friendly Pasture Belt. In an economy groaning under grain surpluses, cattle are especially prized for their ability to convert 10 pounds of unneeded corn into only one pound of meat, the remainder becoming things like carbon dioxide, methane, manure and bones. It will take changes far beyond shifts in personal diet to make the U.S. meat industry more ecologically sound.

With all factors considered, diets emphasizing plant products are more likely to be ecologically sound for the

Where's the beef: Eating up land for carb-fed, calorie-wasting cattle to give us protein.

world than are ones based on animal protein. And it is possible, with considerable ingenuity and effort, to achieve Atkins protein, fat, carbohydrate and fiber levels on a vegetarian diet. But few if any plants in their native state can satisfy those requirements, so vegetarian low-carb diets are heavy in isolated, processed vegetable proteins. And the Atkins diet owes its widespread popularity to the absence of just such foods. Only if you're a deeply committed vegetarian could you eat "the foods you love" a la Atkins.

Eco-conscious low-carb dieters who expend time, energy and money in seeking out soy sausage or grass-fed beef are to be applauded. But to follow any highly selective diet is to exercise a privilege typically reserved for the few. Graham Greene put it best in his novel *The Comedians*, in which Mr. Brown, the narrator, consoles the altruistic Mr. Smith regarding Smith's failed proposal for a "vegetarian center" in Haiti: "I don't think they are quite ripe here for vegetarianism. Perhaps you must have enough cash to be carnivorous first."

Chopped Liver and Metabolic Rifts

Walk the aisles of any supermarket, and you will see that Atkins has not only increased resource consumption but also provided countless marketing opportunities.

For comparison, let's pursue a second thought experiment. This time, the world's overweight population follows a well-known, tried-and-true route to better health:

- Eat less.
- Eat out rarely.
- Cook using food in its least-processed form: whole-grain flour, eggs, moderate amounts of healthful oils, dry beans, home-grown vegetables, rolled oats, etc.
- Limit consumption of animal products.
- Drink mainly water.
- Avoid between-meal snacks.
- Whenever possible, walk, run or bicycle instead of drive.

Following this prosaic advice may or may not result in weight loss, and it may or may not be ecologically sustainable. That depends on the many assumptions and variables within it. But we can be confident that it would cause less environmental damage than current Western eating habits.

Furthermore, it would not generate friction between the rights of humans and those of other species. It would call attention to the ultimate dependence of humans on natural systems. It would be more affordable for rich and poor alike.

And it would probably trigger an economic collapse. Were hundreds of millions of people to stick to this highly effective weight-loss program, they would dam up the vast rivers of capital that currently go into agribusiness and the food industry.

Today's global economy owes its existence to growth in consumption, a need that is served well by the Atkins diet. Such nutritional plans emphasize not food, but the individual compounds into which food can be broken—sugars, starches, proteins, fats, fiber, vitamins, antioxidants—and so open up new vistas for capital accumulation.

The atomization of food is the latest in a series of "metabolic rifts," to use Marx's term, that have torn through agriculture in recent centuries. The first came with the Industrial Revolution, as essential soil components like nitrogen, phosphorus and organic matter were exported from the land in food for city dwellers, whose nutrient-rich excreta became waste lost to rivers and oceans. In the early 20th century, using fossil fuel to make nitrogen fertilizer provided a short-term fix.

A second rift came with the rapid growth of feedlots and indoor animal confinement operations. Animal husbandry and crop production, formerly woof and warp of the same agricultural fabric, were ripped from each other, creating further crises of pollution, soil degradation and poor human nutrition.

Now the very concept of food is fading away, as what we eat increasingly is regarded as a simple agglomeration of nutrients in various proportions. Current low-carb oddities like bunless submarine sandwiches, crustless pizzas and pies, "mashed potatoes" made of isolated soy protein, breadless Thanksgiving stuffing, and, of course, pork rinds, are leading us down a slippery slope, at the bottom of which we may find the Jetsons' meal-in-a-pill.

With each successive rift in the networks of soil, water, microbial communities, insects, wild plants, crops, livestock and human beings, we have tried to impose the factory model on living systems, with ruinous consequences for the ecosphere. As a way to protect and improve the human body, the Atkins diet joins a long parade of profitable but ecologically harmful products that displaced something more benign. In recent decades, we've substituted workouts in fitness clubs for a few hours of hauling hay bales, shunned once-safe tap water for pricey bottled stuff, fought allergies with air conditioning, and allowed the Atkins diet to triumph over simple restraint. Design a product that combines luxury consumption with notions of health and vitality, and you can bet—sorry, Dr. Atkins—that it will sell like hotcakes.

The first, short version of this essay was for The Land Institute's Prairie Writers Circle and sent to newspapers around the country. This is the preliminary for an expanded revision to appear in a collection of various writers' essays, The Atkins Diet and Philosophy*, to be published by Open Court.*

The Fountain of Experience

The Formica counter and stainless steel syrup pumps came to Hunter Drug Store's fountain in the 1950s. So did Richard Huckriede. For 52 years he's served up malts, shakes and floats at the Greensburg, Kansas, business.

He pumps the syrups, in flavors like cherry, lemon and vanilla, to mix with soda water and fine ice for soft drinks. Adults tell children, "You're not getting this out of a can."

Counter regulars need not say what they want. Huckriede knows them well. But they talk: "Oh, yes … quite a bit of that."

Resting travelers might remark about the patterned metal ceiling of the drug store. It was built in 1917, and has always been a drug store. Maybe they visited another attraction in Greensburg, the world's largest hand-dug well at 32 feet wide and 109 feet deep. They might ask Huckriede to sign a copy of the book *Soda Fountain Wisdom*, in which he and the Hunter appear. If they use a cane or walker, the 75-year-old will help them with the door.

Huckriede stretches his lunch breaks now. But you can still find him working the fountain and clerking six days a week. He has no plan to retire.

Aaron Paden

Toward an Ignorance-based Worldview

Wes Jackson

At The Land Institute several of us get a great deal of joy from looking for the relatedness of the seemingly unrelated. Here is an example: In 1859 Charles Darwin's *Origin of Species* was published. The same year Colonel Drake drilled the first oil well in Pennsylvania. And John Brown was hanged at Harper's Ferry. Now let's connect the dots.

Darwin's idea of evolution through natural selection was sponsored by coal. If it hadn't been for coal and the infrastructure that gave slack to this country gentleman, the idea would have had to wait. Its refinement was sponsored further by coal, and by oil and natural gas. The important ideas in ecology really took off after 1859.

What about John Brown? Coal again. The industrial North could afford to be pretty self-righteous about opposing slavery in the much more sun-powered plantation South. Before the fossil carbon era, slavery of some form or another was widespread.

The slack from energy-rich carbon pools is what has made civilization possible. First it was agriculture and soil carbon, later the cutting of forests. The king of Tyre struck a deal with Solomon for the cedars of Lebanon to build the temple. The Greeks had already done in thousands of acres of their trees. By the time of Charlemagne the onslaught against Europe's forests was well under way. Carbon pools exploited. So it went, and so it goes today. Our fossil fuel epoch—some 250 years old—is dependent on highly dense and vast pools of coal, oil and natural gas.

We tend to think that the ideas of humanity arise rather intrinsically. We seldom pay attention to their sponsorship, to the slack made available by our species skating from one energy-rich carbon pool to another.

Why is this a prologue to what I have to say about ignorance? Simply this: Before agriculture, long before the industrial revolution, we could afford to be very ignorant about what supported us. We didn't need to know about nutrient cycling and energy flow within the ecosystems of the ecosphere. We didn't need to know that the earth goes around the sun—and still don't.

Do we really need to know Einstein's equations? How much do we really need Newton's calculus? A harder question. As creatures of the upper Paleolithic we certainly didn't *need* Newton's calculus back then. We don't *need* to know about plate tectonics now, though I'm glad to know about plate tectonics. In fact, I'm glad to know what's come in from the Hubble telescope.

But as a consequence of scientific and technological tampering, we have created ignorance of things we now *do* need to know.

This is part of what led to a conference we held in 2004 called "Toward an Ignorance-based Worldview." The inspiration started with a letter Wendell Berry wrote to me in 1982. Here are parts of it:

> I want to try to complete the thought about "randomness" that I was working on when we talked the other day. The Hans Jenny paragraph that started me off is the last on page 21 of *The Soil Resource*:
>
> "Raindrops that pass in random fashion through an imaginary plain above the forest canopy are intercepted by leaves and twigs and channeled into distinctive burnt space patterns of through-drip, crown-drip and stem flow. The soil surface, as receiver, transmits the "rain message" downward, but as the subsoils lack a power source to mold a flow design, the water tends to leave the ecosystem as it entered it, in randomized fashion."
>
> My question is: Does "random" in this (or any) context describe a verifiable condition or a limit of perception?
>
> My answer is: It describes a limit of perception. This is, of course, not a scientist's answer, but it may be that *anybody's* answer would be unscientific. My answer is based on the belief that pattern is verifiable by limited information, whereas the information required to verify randomness is unlimited. As I think you said when we talked, what is perceived as random within a given limit may be seen as a part of a pattern within a wider limit.
>
> If this is so, then Dr. Jenny, for accuracy's sake, should have said that rainwater moves from mystery through pattern back into mystery.
>
> To call the unknown "random" is to plant the flag by which to colonize and exploit the known. (A result that our friend Dr. Jenny, of course, did not propose and would not condone.)
>
> To call the unknown by its right name, "mystery," is to suggest that we had better respect the possibility of a larger, unseen pattern that can be damaged or destroyed and, with it, the smaller patterns.
>
> This respecting of mystery obviously has something or other to do with religion, and we moderns have defended ourselves against it by turning it over to religion specialists, who take advantage of our indifference by claiming to know a lot about it.
>
> What impresses me about it, however, is the insistent practicality implicit in it. If we are up against mystery, then we dare act only on the most

modest assumptions. The modern scientific program has held that we must act on the basis of knowledge, which, because its effects are so manifestly large, we have assumed to be ample. But if we are up against mystery, then knowledge is relatively small, and the ancient program is the right one: Act on the basis of ignorance. Acting on the basis of ignorance, paradoxically, requires one to know things, remember things—for instance, that failure is possible, that error is possible, that second chances are desirable (so don't risk everything on the first chance), and so on.

What I think you and I and a few others are working on is a definition of agriculture as up against mystery and ignorance-based. I think we think that this is its *necessary* definition, just as I think we think that several kinds of ruin are the *necessary* result of an agriculture defined as knowledge-based and up against randomness. Such an agriculture conforms exactly to what the ancient program, or programs, understood as evil or hubris. Both the Greeks and the Hebrews told us to watch out for humans who assume that *they* make all the patterns.

How'd you like to receive a letter like that? It took 22 years to digest it and to finally put together a conference.

As you can imagine, when we announced "Toward an Ignorance-based Worldview," it was a source of great mirth.

To get ready for this conference, I sent out sort of an invitation. Here's what it said: "Imagine an ignorance-based science and technology in which practitioners would be ever conscious that we are billions of times more ignorant than knowledgeable and always will be."

Now, if you know that knowledge is not adequate to run the world, what do you do? What do you do if you recognize that you are up against ignorance?

You ask before launching a scientific or technological venture: How many people will be involved? At what level of culture? Will we be able to back out? Scientists, technologists and policy-makers would be assiduous students of exits.

I have spent a fair amount of my life studying exits, starting with classrooms. How are we going to get out of here in case something goes wrong? Such students of exits would want to know not only how to exit, but also how to not leave irrevocable damage.

Knowledge seeking would not stop, but would, as Wendell Berry has said, "force us to remember things, cause us to hope for second chances and provide an incentive to keep the scale small." Acknowledging ignorance might be the secular mind's only way to humility.

Harvard's Dick Levins, a sort of a mathematical modeler ecologist, wrote, "Structured ignorance is a prerequisite for knowledge." Also, "Ignorance is not passive. It requires energy to sustain it."

By embracing an ignorance-based worldview, at least we go with our long suit. Knowledge and insight accumulate fastest in the minds of those who hold an ignorance-based worldview. Having studied the exits, their imaginations are less narrow. Darting eyes have the potential to see more.

At the conference, Wendell said, "Our purpose here is to worry about the predominance of the supposition in a time of great technological power that humans either know enough already or can learn enough soon enough to foresee and forestall any bad consequences." He said this supposition is typified by *Selfish Gene* author Richard Dawkins' assertion in an open letter to Prince Charles: "Our brains are big enough to see into the future and plot long-term consequences."

Wendell said, "When we consider how often and how recently our most advanced experts have been wrong about the future and how often the future has shown up sooner than expected with bad news about our past, Mr. Dawkins' assessment of our ability to know is revealed as a superstition of the most primitive sort."

Several people brought to the conference something Defense Secretary Donald Rumsfeld said at a news briefing: "There are known knowns. There are things we know we know. We also know there are known unknowns. That is to say we know there are some things we do not know. But there are also unknown unknowns, the ones we don't know we don't know."

Believe it or not, some thought Mr. Rumsfeld was really right on. Mario Rizzo, an author of *The Economics of Time and Ignorance*, said Rumsfeld's distinctions are important: "I know that I do not know Rumsfeld's home telephone number. On the other hand, I may arrive in a foreign country and be completely unaware that there are books or directories available that will tell me where to find other English speakers." So as a result of this uncertainty the poor tourist doesn't know where to search for those English speakers or how long it's worthwhile to keep searching. You can see that soon he'll be wondering how to find the restroom—and studying exits.

The conference then took up a *Harvard Business Review* piece called "Wanted: A Chief Ignorance Officer." It said that ignorance management is arguably a more important skill than knowledge management.

What interests me the most about ignorance is the kind that The Land Institute is willing to embrace as we think about building an agriculture based on the way a natural ecosystem works.

I think I can help you understand by reading from an Aldo Leopold essay called "The Last Stand." It describes a forest in the Alps that had produced quality

timber since the 1600s by selective harvesting. A contiguous forest of the same kind of timber was clear-cut in the 1600s and never recovered, despite intensive care. Here's what Leopold says:

> Despite this rigid protection, the old slashing now produces only mediocre pine, while the unslashed portion grows the finest cabinet oak in the world; one of those oaks fetches a higher price than a whole acre of the old slashings. On the old slashings the litter accumulates without rotting, stumps and limbs disappear slowly, natural reproduction is slow. On the unslashed portion litter disappears as it falls, stumps and limbs rot at once, natural reproduction is automatic. Foresters attribute the inferior performance of the old slashing to its depleted microflora, meaning that underground community of bacteria, molds, fungi, insects and burrowing mammals which constitute half the environment of a tree.
>
> The existence of the term microflora implies, to the layman, that science knows all the citizens of the underground community, and is able to push them around at will. As a matter of fact, science knows little more than that the community exists, and that it is important. In a few simple communities like alfalfa, science knows how to add certain bacteria to make the plants grow. In a complex forest, science knows only that it is best to let well enough alone.

What we are acknowledging here is the integration of nature's life forms over a long evolutionary history, and that the entropy law has forced the efficiencies inherent to those natural integrities. We can't keep track of this. We have not even named most of the fungi or bacteria. To plow this information-rich world and simplify it and then treat it as though there's only phosphorus, potassium, manganese, iron, calcium and so on, and then presume you can just keep on, is acting as though knowledge is adequate to run that world.

We live in a very exciting time, but we need a different way of thinking. That means we need a kind of house arrest on the destructively dominating thoughts from the architects of the Enlightenment and beyond, to the Greek and Hebrew dualists. For example, in the early 17th century Rene Descartes' *Meditations on the First Philosophy* said that we can remake the world in the interests of humanity with no discussion of negative consequences. Imagine if in the 21st century we could see the end of the idea that knowledge is adequate to run the world. This would cause us to feature questions that go beyond the available answers. We would learn patience, and we would enjoy a kind of yeastiness for thought. I think this also would do the absolutely necessary job of driving knowledge out of its categories.

I have an example. Several years ago in the *New York Review of Books,* Harvard zoologist Dick Lewinton told about how he and Carl Sagan visited a church-related college to take the evolutionist view in debate with a creationist. The creationist had a doctorate in zoology from the University of Texas—not a creationist department, but he was teaching in the church school. Afterward they asked for a show of hands, and found that the creationist won overwhelmingly. Lewinton wrote that in the cab going back to the airport, Sagan said this was obviously a problem of education. Lewinton said it was about cultural and regional history. Then he told how Sagan spent his life trying to change things through education.

I've been around a fair number of universities, and I've witnessed friends and the children of friends from creationist homes go to college and graduate, some of them cum laude, and they're still creationists. Cultural and regional history overrode education.

I give this example because here is a question that goes beyond the available answers: Why? If cultural and regional history overrides educational power, what do we do? If education isn't good enough, what do educators do?

Well, maybe it's time to start with a certain amount of humility and say we're fundamentally ignorant about the way minds change. Acknowledging that we are fundamentally ignorant, we now can ask a question that goes beyond the available answers, and that's going to force knowledge out of its categories.

We would be fundamentally respectful of our original relationship with the universe. There might even be a more joyful participation in our engagement with the world.

Adapted from a talk at The Land Institute's 2004 Prairie Festival.

Judd Patterson. Canada geese.

At the Land

Perennial Grain Breeding
We've begun developing a research station near Corrientes, Argentina. This will allow fall-harvest seed from Kansas to be sown in the Southern Hemisphere's spring, doubling the generations grown in a year and so speed our work. A new staff member from Argentina will spend the growing season at The Land Institute, then return home in November to carry out our work there.

In winter, many of the plants that we are breeding rested dormant. The fields were wet or frozen. But in the greenhouse were hundreds of bright green crop plants and their wild, perennial relatives. We transferred pollen between maturing plants to combine the best traits of each. We tried new hybrids and, with our earlier success, pursued further improvement. There was less test-tube nurturing of embryos than early in this process. More of our plants are setting seeds, and more of these seeds are vigorous.

Threshing and cleaning seed from thousands of plants busied research assistants.

Now yields that they measured go to a new computer program for tracking traits and genetic pedigrees. We have also converted old data and developed standard procedures. We have many generations of plants—and people—to think about.

Agroecology
Our long-term agroecology research trial is two years old. This 20-year test will help us understand the benefits of perennial cropping and how to manage it for expansion across the agricultural landscape. Seed yield, soil properties, water use and root development are studied in 45 plots over 15 acres of annuals and perennials. We use prototype plants for perennial grain crops, and will add new perennials until they are fully developed, high-yielding crop species.

We began complementary research on nearby bottomland prairie meadow. This will help tell how mixtures of native perennials can yield abundantly for years without added chemicals. We're converting part of the meadow to annual crops for a six-year comparative study of soil, productivity, and water and nutrient use. Cropland and prairie have been compared before, but not studied during conversion.

These studies are on farmer Jim Duggan's large bottomland north of The Land Institute. Such native areas are rare and valuable to our research.

Staff
John Schmidt saw our ad "Hiring for a Big Idea" and joined us in December as development director and added to our fund-raising staff. Before, he directed development and alumni relations at the College of Forestry and Conservation for the University of Montana Foundation. And before that he worked at Rocky Mountain Elk Foundation and Ducks Unlimited. He earned a doctorate in wildlife biology from Colorado State University, where he taught and was associate dean of the College of Natural Resources. Schmidt was born and raised in Kansas.

Cindy Cox joined us early this year as a research scientist. She was one of our graduate student fellows, and recently earned a doctorate in plant pathology from Kansas State University. Her research for development of our mixed perennial grains is in disease management and chromosome biology. Cox's history with us began with research of disease resistance of perennial wheat for a master's degree in plant pathology at Washington State University. Before that she taught math for the Peace Corps in Central African Republic.

Graduate Fellows Workshop
We'll hold the annual workshop for our Natural Systems Agriculture graduate school fellows June 23-29. Land Institute staff and visiting scholars give students intense and diverse lectures, with breaks for talk and presentation of the students' experiments.

Each year The Land Institute gives stipends of $3,000 to $9,000 each for 15 to 20 graduate students at universities around the continent based on what we see as their potential to shift farming toward our aim of mixed cropping of perennials. Their studies include ecology, botany, agronomy, soil science, plant pathology, environmental science and plant breeding.

For more, see www.landinstitute.org or write to Jerry Glover at glover@landinstitute.org.

Short Course
Our weekend Natural Systems Agriculture course for undergraduate students will be May 27-28 in Salina. Call, write or see www.landinstitute.org for attendance qualifications and application.

Green Lands, Blue Waters
We signed on with a large and ambitious effort called Green Lands, Blue Waters. This connects universities and non-governmental organizations to move farming in the Mississippi River basin toward more perennial plants and continuous living ground cover, even as The Land Institute develops mixed perennial grains for use years from now. The cover will include trees, shrubs, grasses, hay crops and annual plants grown in combination, as well as cover crops between rows. Cropping of annuals now exposes much of the U.S. breadbasket's soil to erosion and water degradation for much of the year.

Green Lands, Blue Waters aims for better land health to benefit wildlife, human health, farming options and profitability, and rural community.

Our partners include the University of Illinois, Iowa State University, North Dakota State University, the University of Minnesota, the University of Wisconsin, the Audubon Society, The Nature Conservancy and The Practical Farmers of Iowa. This effort is too complex for any one group or government, and pulls together diverse partners.

For more, see www.greenlandsbluewaters.org.

Presentations Made
In Seattle we presented our work in a full-day symposium for the joint annual meeting of 4,000 agronomy, crop and soil scientists. Wendell Berry spoke at our symposium, and gave the keynote address for the week-long conference. Also speaking was Steven Jones, who is developing perennial wheat at Washington State University.

Land Institute President Wes Jackson spoke at the San Francisco Modern Museum of Art for the opening of a photography exhibit by John Szarkowski, longtime curator of photography at New York's Museum of Modern Art. Jackson addressed the influence on Szarkowski of agroecologist Liberty Hyde Bailey.

Two staff members attended the semi-annual Mountain Sky Conference in Big Sky, Montana, which brings together the natural sciences and medicine, and one participated in the National Sorghum Genome Workshop in St. Louis. We made presentations at Cornell University, Rutgers University, the University of Manitoba, Burlington County College in New Jersey, the Texas Conference on Organic Production Systems and a Mennonite meeting in Kansas.

Presentations Coming
June 4, Matfield Green, Kansas.
July 22-23, Cedar Rapids, Iowa.
September 8, Springfield, Missouri.
September 20-27, Adelaide, Australia.
September 23-25, Prairie Festival, Salina, Kansas.
For details, see the calendar at www.landinstitute.org.

Publications
Land Institute President Wes Jackson is one of eight people that writer Carl N. McDaniel profiles in a book called *Wisdom for a Livable Planet*.

Prairie Writers Circle
We expanded our market. About 250 newspapers now receive essays by our contributing writers on ecology, farming, culture and related topics.

The latest themes: organic vs. local food, ecology and dairy farming, the theoretical tradeoff between offspring and energy consumption, farming by numbers vs. by story, food origin labeling, river restoration, how anti-GMO laws miss (see page 20), destructive stream cleaning, the institutionalization of hunger, the shortsightedness of an aeronautical innovation, and changing policy to help land and farm.

All essays are at www.landinstitute.org and free for use with credit to the Prairie Writers Circle and The Land Institute.

Electronic Newsletter
Scoop is a brief newsletter e-mailed every six weeks to tell about Land Institute activities**.** You may subscribe by e-mailing olsen@landinstitute.org.

All-American, All-Organic

Deborah Rich

We're working hard chasing down signatures out here in California, but in support of the wrong ballot measures. Instead of backing initiatives to ban genetically modified crops, we should be forcing a vote on whether to require all agriculture to be organic—not only in balmy, crop-diverse California, but in every state.

I agree that genetically modified crops likely jeopardize the intricate web that has evolved between plants, soil microorganisms and animals in ways little understood and difficult to anticipate before being made painfully apparent. Substituting human judgment for the sieve of evolution as the determinant of whether the DNA of different kingdoms of life should mix ought to give us pause.

But genetically modified crops are merely symptoms of the underlying problem of industrialized agriculture and its reliance on chemical pesticides and fertilizers.

Plants altered to produce their own insecticides, or to withstand herbicide applications, are crop chemicals in a new and more convenient form. Like their liquid, granule, dust and gas predecessors, genetically modified crops extend the illusion that we can indefinitely feed, clothe, house and transport our populous species with little regard for the basic tenet of biodiversity and the natural systems of nutrient and energy recycling upon which all life depends. Outlaw GM plants without a fundamental change in our approach to agriculture, and our laboratories will soon spew out different and equally disturbing innovations.

We don't have the time, personally or environmentally, to fan out gathering signatures to counter the release of each new generation of agricultural chemical. We need, instead, to vote once for a system of food production that promotes the health of the land. We need state referendums requiring all agriculture to switch to organic within a reasonable time. By definition, this would outlaw GM crops, and nearly all other forms of synthetic chemicals.

The past 10 years have made a mockery of the original rationales offered for radically altering the DNA of plants: Much of the world is still hungry, we're still bailing out our farmers with a national farm bill that will cost us well in excess of $100 billion, and pesticide use on the major GM crops is increasing, not decreasing.

But during this same decade, we have reached a point of critical knowledge about how to grow our food organically. We could vote, today, to require all agriculture to be organic within 10 years and know that not we, our children or our poor will go hungry due to insufficient crop production.

For 24 years the Rodale Institute in Pennsylvania has conducted the Farming Systems Trial comparing organic farming side by side with chemical-based farming. Corn and soybeans are the staple crops of the trial, just as they are of the United States. The study has shown that organic yields consistently match conventional yields.

Organic has fared well in other tests. Bill Liebhardt, director of the University of California's Sustainable Agriculture Research and Education Program from 1987 to 1998, reviewed studies at seven universities and found organic yields matched or almost matched conventional yields.

Decidedly unbalmy North Dakota grows nearly as many certified organic acres as California—145,500 compared with nearly 150,000, respectively, in 2001.

The National Organic Program, which has regulated use of the word "organic" on food labels since October 2002, provides a good starting point for identifying what practices would and would not be allowed under an organic mandate. A national network of organic certification agencies already exists and, with certified organic cropland in nearly every state, we have a contingent of experienced organic farmers at the ready.

I'd like to think that a president would carry the torch to draft and pass legislation requiring U.S. agriculture to adopt organic practices: "All-American, All-Organic." But few presidents can dare be so bold given the lobbying strength of conventional agriculture and its chemical suppliers. Instead, the vote will have to begin with us, and gather strength state by state.

With the Prairie Writers Circle, The Land Institute invites and distributes essays to some 250 newspapers and web services. All essays are at www.landinstitute.org.

Thanks to our contributors

November 2004 through January 2005

Thousands of tax-deductible gifts, from a few to thousands of dollars, are received each year from individuals and private organizations to make our work possible. Our other source of revenue is earned income from interest and event fees, recently about 6 percent of total. Large and small gifts in aggregate make a difference. They also represent a constituency and help spread ideas as we work together toward greater ecological sustainability. Thank you to you, our perennial friends.

The first section of contributors below lists Friends of The Land who have pledged periodic gifts. Most have arranged for us to deduct their gifts monthly from their bank account or credit card. They increase our financial stability, a trait valuable to any organization.

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Where Is He Now?

Staff members at our day-long November seminar in Seattle for the annual meeting of three science societies met Patrick Bohlen. We were reminded how much fun he is.

Bohlen was a Land Institute intern in 1986. He came from the University of Michigan, then earned degrees at Miami University and Ohio State, and was a postdoc at the Institute of Ecosystem Studies in New York.

Bohlen now directs research at the MacArthur Agro-ecology Research Center in Lake Placid, Florida, where he and his wife, Julie, have put down roots. They have a little boy and girl—and photos at the ready. He has a courtesy faculty appointment at University of Florida, and supervises a graduate student and a long list of research interns—with the experience to be an intern mentor. They produce a stream of published papers. Bohlen's scientific interests include biological regulation of nutrient cycling; influence of agriculture on ecosystems; how plants, soils and microbes interact; influence of earthworms on nutrient cycling; and how grazers, productivity and ecosystems relate.

He has served on editorial boards, and as Long Term Ecological Research Network program reviewer for the National Science Foundation, secretary of the Soil Ecology Society, reviewer for *The State of the Nation's Ecosystems* for The Heinz Center, and for many books, and co-chair of the Sixth International Symposium on Earthworm Ecology in Vigo, Spain.

For you who have supported The Land Institute in one way or another over the years, maybe take a modest amount of credit for "raising" Bohlen. He promises to bring his family to visit The Land Institute some day.

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