The Land Report

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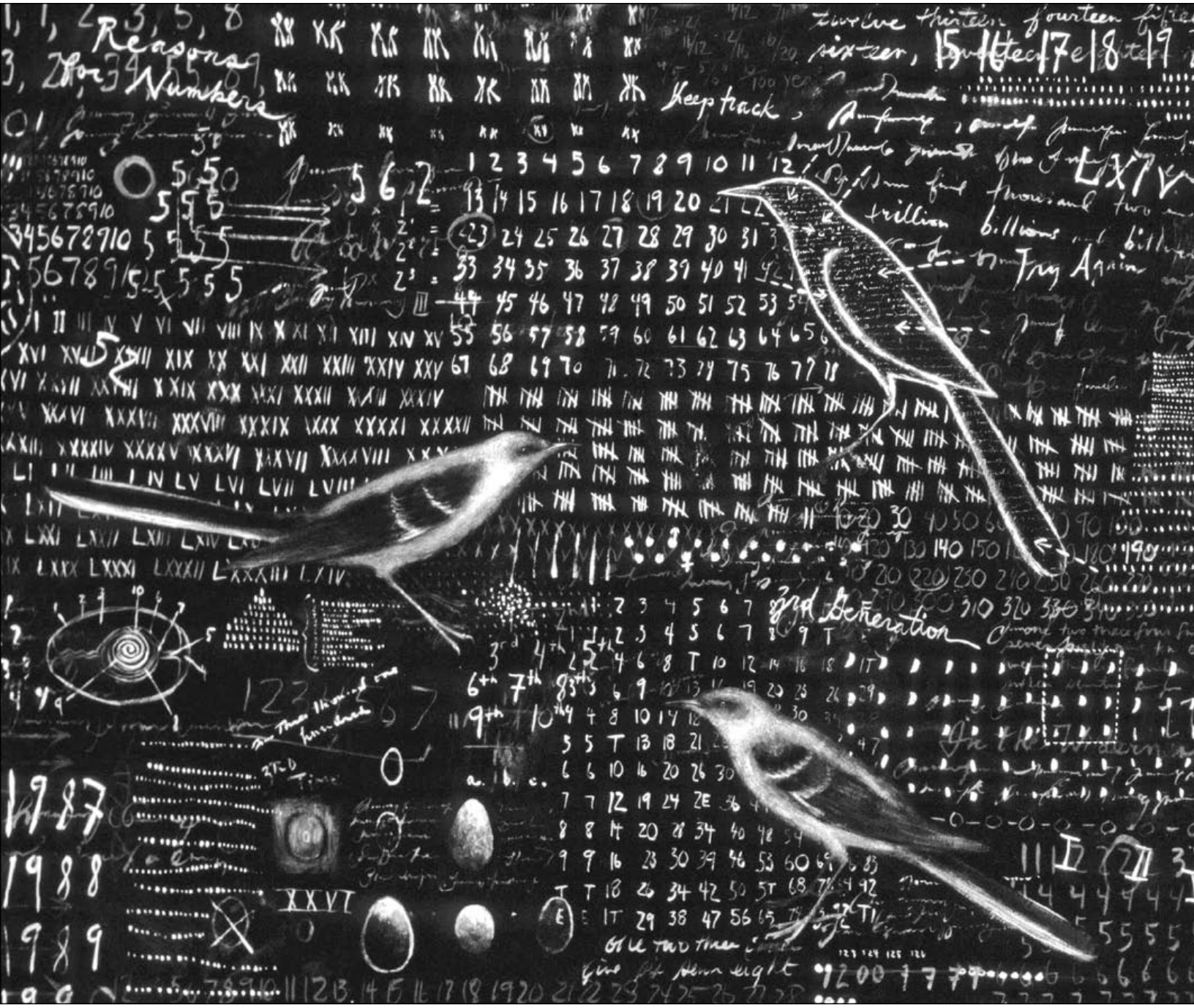

Detail, *Reasons for Numbers*, by Suzanne Stryk.

$2 Million Research Center Planned

Land Institute plant breeders, building on success toward perennial grain crops, in 2008 handled more harvest material than ever. They pressed into service structures put up years ago for other purposes—for example, drying plants in the greenhouse and threshing them in an open equipment shed. Meanwhile, soil continued to be analyzed in part of a former barn, and microscopy conducted in an open room shared with an office. But now the institute has not only the design for a dedicated research center, but a $1.44 million pledge toward the $2 million building.

The gift is from descendants of Joyce C. Hall, founder of Hallmark Cards. It is contingent on The Land Institute raising an additional $600,000. The campaign is Perennials on the Horizon.

The research center will lie low and parallel to the greenhouse, 160 feet by 60 feet, with 10,000 square feet on the ground and a basement half that size. It will accommodate and unify breeding and processing of plants, ecology and soil science, science offices and tornado-safe storage for seeds.

The building aims for the lightest ecological footprint within design and budget limits: engineered metal frame

Architect Warren Ediger's drawing of The Land Institute's new research center. If you'd like to contribute specifically toward the building project, please call Joan at 785-823-5376, or write to her at olsen@landinstitute.org.

with a metal roof and exterior, partial earth sheltering for thermal and storm protection, south side exposed for solar gain in winter. The roof, walls, windows and doors are to be well insulated.

Salina architect Warren Ediger worked closely with Land Institute staff to design space for much more efficient flow of plants through drying, threshing and measurement—same for handling soil samples. The ground floor is partitioned to progress from the dirtiest work, such as threshing, to clean lab and offices. Windows will let visitors observe the work.

The added and expanded facilities are not extravagant, but standard for plant and soil science programs in research facilities, public and private.

The handling of this year's harvest helps show how more and better space will help. As new breeding plants were added daily to the greenhouse, stacks of brown paper bags with drying seeds, which had been carried in by hand after harvest, were carried out again, to a less desirable shed. This year the shed filled. The plants were threshed as weather permitted.

Here's how the process will work in the new research center. A truck backs up to a loading dock and unloads carts

that were filled in the field—no repeated lifting and carrying. Carts roll into tunnels where the plants are dried at temperature and humidity that protect seed viability. From the tunnels' other ends, the plants go to a comfortable but workaday threshing room where fans suck out the dust. In the next workroom, measurements and data are taken, and seed bags are labeled and prepared for storage. Then they go into a lift and down to the basement for short-term storage, or to the climate-controlled seed vault with tornado-proof walls and door.

Back at grade, adjacent to the measurement area, offices for the scientists allow easy professional interaction, but also for work in comfortable quiet. Handy behind adjacent doors will be laboratory space and microscopes now in a former house, former classroom building and former barn scattered 250 yards apart. The new lab will be free of dust, and with space and design for efficient work at plant genetics, plant diseases, biochemistry and soil analysis.

The Crunch of Numbers

For a better idea of the work still to be done after harvest of Land Institute breeding plots in summer and fall, here is plant breeder David Van Tassel's sketch of this winter's

The greenhouse is for growing new perennial grain crop candidates through winter. In fall, Liz Elmore cleared it of piles of bagged plant material that had been drying since harvest. This went to a shed, for threshing when the weather wasn't too cold. The Land Institute's planned research center would make the process more efficient. Scott Bontz photo.

"assembly line" for Maximilian sunflower, a wild perennial that he is selecting from to make a domesticated crop plant.

■ Ran 2,200 grocery sack-sized samples—five stalks cut from each plant—through a thresher, and then through a cleaner that sifts and blows seed apart from chaff and trash.

■ Ran these samples through a second cleaner to remove more chaff, then entered each sample's plot number and seed weight into a spreadsheet.

■ Removed 2,200 packet-sized samples of the same plants—five uniformly mature heads that hadn't "shattered" and lost their seeds—placed them in plastic jars, put 25 jars at a time in a zip-lock bag and tumbled it in a cement mixer for three minutes to knock out seeds, then returned the now shattered seeds to their packets. (Wild plants tend to shatter easily. We're selecting for plants that don't, so they'll hold seeds until harvest and threshing.)

■ Weighed the total reproductive effort—head plus seed plus floral structures; cleaned and weighed the shattered seeds; threshed the heads in a coffee grinder approximately 10 seconds to eject the remaining seed; cleaned and weighed this seed.

■ Ran all the seed from the five heads through a seed counter to calculate the percent that had shattered; entered the data onto a computer to get the weight per 100 seeds, the number of seeds per head and the ratio of seed weight to total reproductive tissue weight.

Similarly, with a different wild plant from the sunflower family:

■ Manually removed seeds from heads and stalks of about 2,000 harvested *Silphium* plants—manually because it reduced the amount of leaf and bract material in the sample, which is difficult to separate from the seed.

■ Ran each batch of seeds and floral material through a food processor to separate the seeds from clinging floral structures, to powder leaf pieces and to remove the "wings," flat seed hull edges that might be important for seed dispersal but which make the seeds more difficult to winnow and which we do not want to credit when we rank the plants by seed size.

■ Ran each sample through a vacuum cleaning system, weighed and counted the pure seed, and entered this data onto a spreadsheet, along with plot number, number of heads per plant and date of harvest.

And with hybrids:

■ Threshed and cleaned seeds from several hundred crosses of Maximilian sunflower, other sunflower species and *Silphium*.

■ Threshed, cleaned and weighed seed from about 1,500 progeny of hybrids.

Then, finally, it was back to the field on sunny days to score each of the Maximilian sunflower plants for shattering based on how unharvested heads looked and felt. This in-field score will be compared with the cement-mixer shattering score. A shatter-resistant plant in the field might be easy to miss because it attracts birds. But lab measurement of shattering is lengthy, and samples could be falsely identified as shatter-resistant if the heads were harvested when immature. While most of the lab samples were 95-99 percent shattering, a few were as low as 50 percent.

That might mean progress in selecting for shatter-resistance, a top priority. In addition to being necessary for crop plants, solving this problem will allow using The Land Institute's plot combine instead of slow harvest by hand. Incidentally, the sample with the lowest percent shattering so far—the data entry is not yet finished—has the largest seeds.

A Hopeful Sign in Hybrid Wheat

Plant breeder Lee DeHaan saw encouraging wildness in wheat hybrids made in The Land Institute greenhouse this winter. He won't know until next year whether this look of the perennial grasses that were bred with the annual grain crop plants is accompanied by the perennials' ability to grow again after winter. But the chances appear good.

Several years ago he achieved hybrids with yield and seed size nearly equal to wheat, but without dependable perenniality. So the hybrids were crossed again to perennial wheatgrass. The offspring of that effort for the most part produced no pollen. The few that did were crossed with those that didn't, and also allowed to self-pollinate.

The hoped-for result is now in the greenhouse—most of the plants produce pollen and are setting seed, but they have an appearance that indicates greater wildness and therefore a better chance to be perennial. DeHaan is letting all of these plants self-pollinate again, so that in fall he will have seed to plant in the field and evaluate perenniality.

He also is hedging his bets by crossing some plants to wheatgrass again. Although DeHaan lets every plant self-pollinate, he and technicians also cross some heads with those of adjacent wheatgrass plants, or with those hybrids with the strongest perenniality.

The Take Charge Challenge

Six Kansas communities are in a race to the bottom. A race to lower electricity bills, that is.

The Take Charge Challenge, organized by The Land Institute's Climate & Energy Project, is a friendly competition between towns to reduce their electricity use over one year, beginning in April. The winner will receive a wind turbine to power a school, solar panels for a civic building or cash to complete a civic energy efficiency project.

Climate & Energy is working with utilities, city officials, civic organizations, churches and school groups to introduce efficiency and conservation programs that people might not know of, and to plan and cut electricity use. It has held meetings in each of the communities for residents to map their strategy for winning the challenge.

Proposed projects include a "Gimme 5," in which residents sign pledges to replace five incandescent bulbs with compact fluorescent lights. Others include home weatherization drives, programmable thermostats and the "Power Strip Police" program in schools. There, students' homework is to install power strips where each socket automatically turns off rather than feed an appliance on standby mode.

The six communities—Kinsley, Quinter, Wellington, Haven/Mount Hope, Salina and Merriam—span the state and range in population from 800 to 40,000. Some towns have small municipal utilities, while one is served by the largest investor-owned utility in the state. Some are rural towns in the west, while one is a suburb of Kansas City. Different contexts will yield different solutions.

Next year the Climate & Energy Project will report what these Kansas communities managed to save, and how they did it.

In Print

The Land Institute enjoyed excellent media exposure. In an October 12 *New York Times Magazine* essay written as an open letter to the president-elect and titled "Farmer in Chief," Michael Pollan noted the institute's work to make perennial grain crops and wed farming with conservation. Barack Obama reportedly read Pollan's argument for reforming the American food system.

The December 4 issue of the prestigious science magazine *Nature* featured institute soil scientist Jerry Glover as one of "Five Crop Researchers Who Could Change the World." Glover explained the institute's mission to pattern agriculture more after how natural ecosystems of perennials work, and noted that his studies show prairie hayfields yield about as much protein-building nitrogen as do wheat fields, but require the farmer to spend just 8 percent as much energy.

Institute President Wes Jackson and writer Wendell Berry argued for increasing perennial ground cover and a 50-year farm bill toward that end in a January 5 op-ed for *The New York Times*. They said that soil lost to erosion under annual grain cropping "is as nonrenewable (and far more valuable) than oil." But, "Unlike oil, it has no technological substitute—and no powerful friends in the halls of government." For more about long-range land use policy, see David W. Orr's essay on page 17.

Presentations Made

Senior scientist Stan Cox talked in Cincinnati to the Association for Practical and Professional Ethics. Soil scientist Jerry Glover spoke at Miami University in Ohio, and in Chicago to the American Association for the Advancement of Science. Wes Jackson spoke at Clarkson University in Potsdam, New York, and at Kansas State University's annual sustainability conference. Presentations were made in several other Kansas towns.

Presentations Scheduled

April 3, Yale University School of Forestry & Environmental Studies, New Haven, Connecticut—not a presentation per se, but part of panel discussion.

April 4, Beta Beta Beta National Biology Honorary Society regional meeting, Arkansas City, Kansas.

April 7, Cornell University, Ithaca, New York.

April 20, University of Northern Iowa, Cedar Falls.

April 21, Grinnell College, Grinnell, Iowa.

May 6, Delta Omega Public Health Society, University of South Carolina, Columbia.

May 14, Ohio State University, Columbus.

May 14, Sustainable Food Institute, Monterey, California.

August 4, Ecological Society of America annual meeting, Albuquerque, New Mexico.

For more, call or see Calendar at landinstitute.org.

Kansas rosin seed, *Silphium integrifolium*, is a native, perennial sunflower relative with large edible seeds. Like the sunflowers, each seed in the head comes from a tiny flower called a floret. There are many florets in the head that produce pollen but no seeds. Each of the seed-bearing florets has an extra-long petal. The head on the left, with many long petals, will produce many more seeds than the head on the right. As one way of increasing seed yield in our breeding program, we identify and cross-pollinate plants with heads like the one on the left and cull plants like the one on the right. Scott Bontz photo.

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Want to share a story from *The Land Report*? Unless the writer objects, you may photocopy from the magazine or get the piece by e-mail. Write to Scott at bontz@landinstitute.org or our street address in the column at right, or call him at 785-823-5376.

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The Land Institute 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.

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Center pivot irrigation in snow, Natrona County, Wyoming. Martin Stupich photo.

She Poured Out Her Own

Julene Bair

Used to be you could see the place from miles away—not only because my grandfather built a grand house in 1919, but because he chose the highest land around. “High Plains Farm,” he painted in white letters on our red barn. Now all you can see is the silhouette of a center-pivot sprinkler, a giant irrigation rig like those that circle everywhere on High Plains fields.

About 10 years ago the farmer who manages the land for the out-of-town owner bulldozed the house, the outbuildings, the yard trees and the hundreds of elms in our old windbreak. He burned the rubble piles and sold the abandoned implements to a scrap-iron dealer, leaving virtually no trace. He did this reluctantly. I know, because the day I discovered everything gone, he happened to drive up the dirt trail in his late model Ford pickup as I stood gazing in befuddlement at empty air.

Although the clean-cut young farmer was 20 years my junior, he knew the names of my grandparents and father and mother. I was the great-grandchild, he the great-great-grandchild of pioneers, and he could imagine what the old place must have meant to the Carlsons and Bairs. He was apologetic, but powerless. The vacant farmstead had been rendering useless a flat quarter-section that could be planted to corn, a Program crop.

Program crops receive government subsidies, practically guaranteeing a profit. I knew this because my family still farmed. In the 1960s, my parents traded the home place for land closer to their other holdings. Like many other successful farmers in our northwest corner of Kansas, they moved to town, where they built a brick ranch-style house that would blend well in any suburb. From then until his death in 1997, my father commuted to farm his land.

Even though the original farmstead has been erased, every so often I obey the compulsion, as instinctual as a migratory bird’s, to return to the home nest. Last time, walking down rows of ankle-high corn, I found a curved piece of white glass and a saucer shard with a faded orange flower painted on it. I examined both for a long time—this broken lip from the bowl my mother used to mix cakes in, this fragment of a plate I used to eat from. But a more telling artifact lurked in a tall clump of weeds near the pit silo, where we used to burn our trash and throw our junk.

The windmill head lay in a nest of its own bent vanes, some of them buried in the dirt. I used to climb the tower, now vanished, so I could gaze over our windbreak at the sunset. It excited my child's imagination to think how magnificent the prairie must have been in its original state, when buffalo instead of our sheep grazed the pastel hills above the dry creek that meandered through our pasture. The windmill had been a reliable sundial, its shadow clocking each day across our farmyard. Now, in an odd role reversal, my shadow fell across the rusted crankcase and twisted vanes of the bodiless giant.

Inspired to take a rubbing of the embossed print on the gear head, as from a gravestone, I went to my car and grabbed a pencil and a piece of paper. The wind whipped the paper as I tried to hold it flat. This didn't surprise me. I recalled few childhood days when there had been too little wind to turn the mill. I rubbed the edge of my pencil back and forth.

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As the historian Walter Prescott Webb pointed out in his seminal 1931 history of the Great Plains, until immigrants from wetter climates were able to shed their preconceptions and meet our treeless and virtually waterless savannah on its own terms, it remained the Great American Desert that the explorer Stephen H. Long had labeled it. Many pioneer families, failing to recognize the wind's value, were blown back east. Then gradually, homestead by homestead, as Webb put it, "primitive windmills, crudely made of broken machinery, scrap iron and bits of wood," began to appear. These "were to the drought-stricken people like floating spars to the survivors of a wrecked ship."

In their creation stories, the Apache emerged into their desert via sacred springs. We came up the stems of windmills into ours. I'm speaking figuratively of course. The literal movement was downward, into the wells. Some of the earliest settlers hand-dug their wells, a dangerous enterprise, as the sides could cave in. Later, horses were employed to turn augers and then to hold the weight of the casing as it was lowered.

One pioneer descendant from my home county of Sherman remembers her father being eased down a well on a swing with a sledgehammer in his hands. His job was to steady the casing while the men on the surface clinched the rivets connecting the next section. "I visioned the rope breaking or the case slipping," recalled the daughter. "I was in control of the horses holding all that weight! As it got heavier, my horses began to strain." By the time a fresh team was brought, hers "were stretched on their bellies."

Reading this account in a Sherman County history volume reminded me of the pioneers' heroic accomplishments and perseverance. But lurking behind the story was an unremarked miracle: the water itself.

In 1899, when the geologist N. H. Darton named the Ogallala formation, he was probably thinking of the southern Nebraska town of that name, not the Oglala Sioux who once occupied the region along with other tribes—on my west-central Plains, the Arapahoe and Cheyenne. He may not have known the meaning of the word in Sioux, which I have seen variously translated as "to scatter one's own," "she poured out her own," and "spread throughout." Yet no name could have been more appropriate. The water in the Ogallala is spread throughout the area its tribal namesake once roamed, all the way from South Dakota to the Texas Panhandle, 174,000 square miles.

Completely dependent on that water, we Plains dwellers might have called ourselves the Ogallala people, not after the tribe that lost its home to our invasion, but in recognition of our life source. The name might have cascaded as water does, down stairs of years—the tribe, the town, the aquifer—onto us. Yet the words "Ogallala" and "aquifer" didn't even enter my family's lexicon until the 1960s, when we began irrigating. In the aftermath of the '50s drought, farmers seized on the notion of engineered rain from a source said to be virtually infinite. A similarly "infinite" fuel supply for pumping the wells, along with the postwar technology boom, had finally fulfilled the settlers' belief, that rain would follow their plows westward.

If farmers had identified more closely with their life source, they might have reacted to drillers' promises the way the Hopi Indians did in the 1970s. The Bureau of Indian Affairs wanted to drill a well and install a water tower, bringing running water to Hotevilla, the Hopi's most traditional village. The tribe's elders objected, reasoning that the ability to store thousands of gallons of water would engender a false sense of plenty. Excessive pumping would dry out the spring where they'd gathered water for centuries. When the BIA erected the tower anyway, most people in Hotevilla refused to hook their houses up to it.

The pioneers and we descendants have always acted in the opposite manner, grasping any new technology that would make our lives easier. When I dared to ask one of my father's old sheep buddies, as Dad had called him, if he regretted our having plowed most of the prairie, he said, "Hell, no."

This man, like my father, had grown up in a sod house. "We had it hard. Baloney—good ol' days. Outside toilets, freezin' your butt off. Look at you, Julie. You're sittin' in a pretty nice chair. You're not out in a tepee somewhere, weavin' wool."

Despite cold and a host of other hardships, the Indians, whether they wove wool in Southwestern hogans and stone houses or tanned buffalo hides in Plains tepees, developed

a different set of values. The Hopi were grateful they lived in a desert. In too easy a climate, they were told by their maker, Spider Woman, they would fall into ignorance and irreverence, as they had in other incarnations in the previous worlds they'd inhabited.

Without a spiritual tradition that recognizes the balance of nature and holds it sacred, our relationship to land and its bounty is like a child's in a candy store with no adult present to restrain us from gorging. We don't identify ourselves as natives of ecosystems bounded by natural limits, but as citizens of places demarcated by lines on maps. We conduct ourselves within an economy that depends on the depletion and degradation of the real things that sustain us: plants, animals, soils, air, water.

The Ogallala Aquifer is not limitless, as water-development promoters assured farmers like my father. It is a finite geologic formation—not a lake, but a poorly sifted sandbox filled with water-saturated rocks, clay, sand and gravel. The formation was created 5 million years ago, by rivers flowing out of the Rockies. The rivers braided, unbraided and rebraided themselves, depositing the eroding mountains over the terrain to their east. Glacier melt and rain filled the spaces between the sediments with water. Our friend the wind lay fertile loess soil over the top. Drought-resistant buffalograss took root.

The groundwater system begins in South Dakota and underlies most of Nebraska and part of southeastern Wyoming. Wide in the north, it narrows gradually under eastern Colorado and western Kansas, descends through parts of Oklahoma and New Mexico, and rounds to a tip south of the Texas Panhandle. Overall, the shape is reminiscent of a dust devil, or whirlwind, a common sight on High Plains fields.

Little water from the mountains reaches the flatlands anymore, and the Plains climate is much drier than during the Miocene. Most moisture evaporates, or plants drink it, before it can seep down and recharge the aquifer. Although today's sprinklers use only about half as much water as the flood systems that farmers first installed, the Kansas Geological Survey reports a yearly pumping average of 7½ inches, 15 times more than the most optimistic recharge estimate of one-half inch.

Draining the spongelike sands and gravels isn't like pulling the plug in a bathtub. Declines in one place don't immediately affect water levels in other areas. But farmers are rapidly depleting those parts of the aquifer where the water is reachable and the land suitable for irrigation.

Hydrologists employ disturbing colors to show the declines. In my family's part of Sherman County, the color is mostly orange, for reductions of 15 to 30 percent. A couple counties to the south, the blots darken to almost black, for decreases greater than 60 percent. Irrigation began in the Texas Panhandle 20 years earlier than elsewhere, and consecutive maps of that region reveal how dark areas of high decline started as little freckles and spread like cancers. They gradually enlarged and took over entire counties. These areas and some parts of the aquifer in west-central Kansas are so depleted they can no longer sustain irrigation.

Worse, from the point of view of other Plains life forms, has been irrigation's effect on surface water. Traveling in 1843 through what is today northwest Kansas, the explorer John C. Fremont marveled at those rare oases where the Ogallala poured out her own, forming "birded glens" around ponds and creeks. Ask any older dryland farmer you might know. If he irrigates, he may not be as willing to admit that those precious spring-fed streams he fished and swam in as a kid have dried up, leaving no habitat for water-dependent creatures who lack the means to drill wells.

Our windmill pumped water onto my mother's garden and into our house and stock tanks at about 10 gallons per minute. Today's irrigation rates range from 500 to 1,200 gallons per minute. My family sold our land in 2006, but I used to prepare our irrigation reports for the Kansas Water Office. Doing this, I acquired a disquieting awareness of how much water those high rates factor out to over the course of a growing season. Each summer our farm's five irrigation wells pumped between 100 million and 300 million gallons onto 960 acres.

In dry years, fewer than 200 irrigation farmers in our one Kansas county pump 50 billion gallons out of the aquifer. This is two-thirds the amount of water used by the 1 million people served by the Denver water utility. Altogether, Plains farmers extract 6 trillion gallons each year, more than the entire amount allocated to the 30 million people who depend on the Colorado River for their water.

My father's old sheep buddy thinks he sees the writing on the wall. "You know Denver's gettin' so huge, where in the world are they going to get their water?"

"Where's California going to get *their* water?" his wife put in.

Her husband resettled his cowboy hat. "That's where the water trouble's going to come from, because all those legislators in the cities aren't going to worry much about us out here gettin' a little water or not. They're going to try to tie up all the water they can."

But farmers have political clout. Some minor restrictions have been passed. In overtapped districts such as ours, existing rights have been frozen, no new rights will be issued, and all irrigation wells must be metered, making it more difficult for farmers to underreport their usage. But to date, the serious conservation measures proposed by directors of water control boards and state governors have failed.

A plan called Zero Depletion would have reduced withdrawals from the aquifer until no more would be taken out than rain and snowmelt returned to it each year. "If that Zero Depletion had gone through, you could have shot a bullet down Main Street and not hit anybody," one of our old neighbors told me. He was probably right. The High Plains economy has become dependent on intensive pumping of the aquifer.

Unfortunately, Plains towns are dying anyway, to some extent because of irrigation. The technology increases yields, allowing farmers to compete in a market where commodity prices have varied little over the last 30 years. But to pay for irrigation systems, they've had to "get big or get out," as President Nixon's secretary of Agriculture once famously advised. Irrigation drains the people off the land as rapidly as it drains water from under it. The more old farmsteads like ours that are leveled and planted to corn, the fewer people remain to support the towns.

The population decline will worsen as the water table goes down. Today's High Plains is an irrigation society, built, as the desert writer Charles Bowden puts it, "around consumption of fossil water long buried in the earth." He adds that "these societies, being based on a temporary resource, face the problem of being temporary themselves."

Most farmers would prefer to see the threat as external. The sheep buddy's wife said, "I don't think people in the cities have any idea how important farmers are. They're not going to realize our importance until the shelves are empty at the grocery store."

The implication was a familiar one: If city people vote to curtail large-scale irrigation to secure their own water needs, people will go hungry. But as George Pyle argued in his book, *Raising Less Corn, More Hell*, the United States and Europe actually overproduce and undersell grain. The temporary price boom resulting from corn-based ethanol production notwithstanding, we traditionally flood world markets with cheap, subsidized commodities. U.S. and European farm subsidies exacerbate poverty and hunger in less developed nations, where farmers are forced off the land because they can't compete in the artificially suppressed market.

Here in America, corn goes into the bellies of our intemperate cars and only indirectly into our bellies. Instead of grinding it into flour and making cornbread or tortillas, we consume it in high-fructose corn syrup—a key ingredient in soft drinks and our overprocessed food—and in the fat it makes when fed to herbivores. This conversion of grain into animal fat is unnecessary, because tens of millions of bison, elk, deer and antelope once thrived on the Plains without the benefit of grain crops. Native vegetation nourished them, and the Ogallala flowed into those now vanished springs, watering them. Descendants of those original herds could provide the nation with a more healthful source of red meat than corn-fattened beef. We could still be reaping that harvest, and many are, by returning bison to grasslands. Others are fattening cattle on grass and shipping them direct to market, bypassing the feedlots.

Were it not for the government Farm Program, little corn would be grown west of the 100th meridian, the boundary between the High, dry Plains and wetter easterly regions. Of course, I'm not referring to the native varieties that yielded small ears filled with red and purple, jewel-like kernels. Planted by less migratory, pre-horse Indians in those places where the Ogallala poured herself out, those varieties did do fine on the Plains. But GMO and other hybrid dynamos require 2 feet of moisture, about a foot more than rainfall in the region's average growing season. Were it not for price supports, the cost to pump that much water would generate only losses.

High-fructose corn syrup and corn-fattened beef and pork are causing the obesity, diabetes and heart disease

Summer, 1970s: The author's father, Harold Bair, evaluates his wheat for harvest. Julene Bair photo.

epidemics that send us to hospitals and early graves, while corn ethanol yields, by some measures, fewer calories in energy than are required to produce it. Over half the Ogallala's water goes into corn, producing only 15 percent of the nation's crop, which is being misallocated to begin with. Uselessly, we are draining the aquifer and robbing the life that comes after us of the primary substance on which life depends. And we are making it all possible with tax dollars.

I asked one of our former neighbors what he would do to change things if he were boss of it all. "I don't really want to tell others what to do," he replied, with typical Plains humility, then proceeded to outline his own four-year crop rotation system: one season of pinto beans, two of wheat, one of corn planted back into the wheat stubble to conserve moisture. The system relies less on water-thirsty corn, but more on "no-till," a method that keeps weeds down with chemicals instead of cultivation, which speeds evaporation and soil erosion.

He told me that Roundup, a chemical used in no-till, "is only contact. It doesn't go into the ground." A quick survey of the latest studies reveals that the chemical is not quite that innocent. It migrates into streams, harming aquatic life. The European Union classifies it as toxic to aquatic organisms, and studies have shown it to be harmful to amphibians and earthworms. Yet farmers are increasingly choosing the Round-up-dependent, no-till, less water-intensive alternative. They think that they have to. As the depth to water increases, wells become less productive, and pumping costs go up. But it's a no-win choice, between more irrigation and more chemicals. The government needs to encourage genuine conservation that doesn't harm water, soil, wildlife or humans. Those tax dollars that make irrigation lucrative would be better spent underwriting sensible dryland agriculture and the grazing of livestock.

Given the vagaries of markets and weather, farmers might always require subsidies to stay in business. But the only practices that warrant taxpayer support are those that secure our food supply and preserve the land, water and soil, not those that waste or pollute resources essential to the nation's future.

When I suggest that the government should underwrite conservation rather than depletion and pollution, farming friends of my father's like to josh me about being a "greenie."

"We're the endangered species," said the neighbor with the no-till plan. He and another farm neighbor have been thinking about starting an adopt-a-prairie dog program for city folks. "We could send them a picture each month. What Your Prairie Dog Did Today." He cracked a lopsided smile. "They could all be the same picture."

I had to laugh. But I also asked if he'd seen many burrowing owls lately. The odd little birds, now rare, used to stand like sentry soldiers on our pasture's prairie dog mounds. Wasn't their disappearance linked to that of the prairie dog?

Our neighbor continued to grin. "We try to take care of them too. They're hard to shoot though." He made a wavelike motion with his hands. "'Cause of how they fly."

He was both kidding and not kidding, I knew, getting my goat with the truth. For my people, the highest value has always been production and yields, the unbridled use of whatever could advance these, the removal or suppression of whatever got in their way. Yet my grief over the loss and destruction is not, as my Plains friends assume, born of my life among urbanites. The environmentalists I met in college or in Colorado, where I now live, didn't brainwash me.

My conviction in these matters comes from my past on that farm. Had I not sat atop our windmill and gazed over

what still remained of the native buffalograss, I would have no direct sense of what has been lost. I don't know a farm kid who didn't climb their family's windmill and ponder the same things. What we saw sank into us.

Most Plains-born people are not content in other landscapes. When I lived in Iowa, I hated not being able to see far, the humidity, the low, overcast skies and the blatantly green grass. The term "greenie" attaches the wrong hue to my environmentalism. I like the shortgrass prairie as much in its winter-cured, yellow phase as in the summer, when the pale, variegated greens range into blues. The Plains are too intensely green now, almost every inch of the native grass gone, the sod turned and planted to unsustainable crops.

The water our windmills pumped allowed us to live safely within shelterbelts and comfortably on lawns, the fragrance of domestic blooms floating around us, but we were also touched by wildness. June bugs slapped against our screen doors summer nights. Toads hopped amidst us to feast on them. Lizards skittered through yucca litter in our pastures. The ears of kit foxes sailed over ditch weeds. Coyotes yipped from beyond the corral fences. Jackrabbits zigzagged drunkenly ahead of our cars. Prairie dogs and burrowing owls perched on our pasture hills.

We would not have known these creatures had the water not made it possible for us to live where we did and to, by consequence, become who we were, with our particular sense of aesthetics, definitions of beauty particular to that place. We wouldn't have known the luminescent, high evening skies, the glorious sunsets over wheat fields and pastures, the soft pastels of buffalo and gramma grass, the brilliance of snow-covered fields. We would not be us.

From my father's point of view, windmills were bothersome contraptions. He complained of the servicing they required. The pump leathers had to be pulled and replaced every so often, the towers climbed, and the gears greased.

But to most of us, windmills are romantic Western icons. Stark on the remaining grasslands, they seem to grow out of the ground like huge daisies, as if they were natural features, or emblems of our once more natural relationship with land. The difficulty my father complained about constituted right relationship: one family, one tower and some danger in getting what that family needed from the earth in order to survive. Labor is expended, risks incurred that keep the supplicants mindful of their dependence on a resource, and the resource is not depleted, at least not seriously or rapidly. It is only tapped.

FAIRBURY WINMILL CO. The rubbing still hangs over my desk. On its back side is a list of my mother's certificates of deposit, the only piece of paper I could find in my car that day. I had been helping her keep track of her savings, money that accumulated thanks to the Ogallala.

Up the metal stems of windmills flowed the water that made it possible for my family to establish a foothold, then a stronghold from which we further enlisted that resource for our personal benefit. For 42 seasons, the water gushed out of our wellheads. When harvesting our irrigated crops, we harvested the water, transferring it from the aquifer into bank vaults. In inverse relationship to the decreases below ground, the money grew in storage, although there was really no vault and no sheaves of bills.

Our words for money come from actual things. A buck was originally the name given to a deerskin, a common unit of trade during this country's settlement. "Fee" comes from the German *vieh*, meaning cattle. We use the term "shell out" because Native Americans traded in shells. But today our financial system rests on several levels of abstraction. The more years that separate us from the days when we ate our own grains, dairy products, vegetables and meat instead of the processed, pulverized, packaged foodstuffs they are now turned into elsewhere, the higher we have built the tower.

We've removed the supports as we built so that today our system floats on invisible perceptions. No stockpiles of gold back the dollar anymore. As the economist Milton Friedman explained, "The pieces of green paper have value because everybody thinks they have value." Most transactions don't even require greenbacks. Our wealth is in name only, stored in the memory banks of computers.

My mind reels at how this transfer took place on the Plains. We went from actual wealth in natural resources on which all past and future generations depend to the individual abstract wealth of pioneers and a few generations of their descendants. Actual substance that you could touch—real water from within real ground—was, and is still being, transformed into binary code. We can't transform any of it back.

An earlier version of this essay appeared in the book Home Land: Ranching and a West That Works.

The greatest fine art of the future will be the making of a comfortable living from a small parcel of land. —Abraham Lincoln

Eating Away at the Land That Feeds Us

Robin Mittenthal

I recently brought a cake to a friend's party, and several people asked me if I had made it from scratch, which I had. In an age dominated by manufactured, pre-prepared foods, the ability to make a cake from raw ingredients seems to inspire awe in some folks.

Back when I farmed, the ability to grow food from scratch — just seeds, soil and tools — earned me similar admiration. I appreciated this then, but now that I do agricultural research, growing food from scratch seems more than a little troubling.

Let me explain.

Nature rarely mixes interdependent plants and animals from scratch. Instead, the Earth is carpeted with complex communities of organisms that don't change much over time. These communities are stable, partly because they're built around perennial plants: trees, shrubs and grasses that live for many years.

Perennials typically have deep roots. Both the roots and the aboveground parts are present year-round, keeping wind and water from carrying soil away. Perennials also can capture more — and waste less — water and nutrients.

Unlike most of nature, our food depends largely on annual plants, which grow, make seeds and die in one year. The typically large and numerous seeds of annuals like rice, wheat, corn and beans are what we eat to provide most of our calories. This almost certainly was an important reason our ancestors worked at learning how to grow annuals. These plants also must have attracted attention because the extra energy in their large seeds gives them a head start in growth over smaller-seeded perennials, especially — as early farmers discovered — if the starting line is bare soil.

But in the wild, bare soil is rare. This means that if we want to grow particular annuals, we have to get out there and clear lots of ground, and we have to do it every year. The huge, recurring expanses of bare earth that result are something I call "unnatural disturbances."

To be fair, there are natural forces that leave soil bare. But even what we call natural disasters change things on a tiny scale compared with growing annual crops. The eruption of Mount Saint Helens in 1980, one of the largest recent natural disturbances, buried 6 square miles outright and dusted ash over another 22,000. But American farmers clear 500,000 square miles with machines and chemicals every year.

What's so bad about bare soil? A quick recipe for soil erosion would say, "Expose soil, then wait for wind or rain." In the upper Midwest, we follow that recipe to the letter not only every spring at planting time, but also from October through May, when the annuals are all dead and gone. Even during the growing season, annuals shield too little of the soil with their leaves and hold too little of it with their roots. This means that any significant amount of rain washes soil from every field. This soil is irreplaceable, and our supply of the stuff is running out.

We don't rely on them nearly as much as we could, but there are time-tested ways to get more of the food we need without relying so much on annual plants. One would be to grow more alfalfa, grass and other deep-rooted perennials that we can't eat but which animals like cows, sheep and goats make into meat and milk. We also could shift annual cropland to fruit and nut trees.

Another option would be to coax perennial plants into making more, larger seeds than they do in the wild. This way we can continue our reliance on grains but without the faults of annuals. Plant breeders are progressing toward this, but achieving competitive yields with perennials will take decades. Such sustained effort will require big commitments from government and the private sector.

However we end up "perennializing" our agriculture, one thing is clear: While cooking from scratch may be great, growing food that way is not.

The Land Institute sends Prairie Writers Circle commentaries to about 500 newspapers around the country. All of the essays are at landinstitute.org, under Publications. They are free for use with credit to The Land Institute.

With fuel and fire, then, almost anything is easy.
—William Stanley Jevons, *The Coal Question*

From *Genomes and Daily Observations (wasp)*, by Suzanne Stryk. Mixed media on paper, 14 by 10 inches.

Climate Change and Land Use Policy

David W. Orr

Environmental histories are cautionary. They tell us that our land planning must extend ahead more than a few decades. Even a few centuries may be insufficient. We must work on a really long time frame. —Gary Snyder

The last time we in the United States tried to do anything at the national level about land use policy was in 1973. That limited effort was a bill introduced in the Senate by Henry Jackson that aimed only to provide funds for those states bold enough to engage in land planning. Toothless though it was the bill was defeated with much patriotic chest thumping. And the Republic still stands—or more properly, sprawls—having reportedly lost an average of 1 million acres to badly planned "development" each year since and another million or so to soil loss.

In truth, we barely keep track of such numbers, preferring to take comfort in the total land reservoir of 2.2 billion acres that has so far buffered us from the consequences of bad judgment and the absence of intelligent planning. But the true costs of land lost to development and agricultural mismanagement are considerably larger even than the little we do count.

First, sprawling development requires more roads, wires, pipes, concrete and materials than more condensed development or "planned unit development." A 1974 report by the President's Council on Environmental Quality concluded that "planned development of all densities is less costly to create and operate than sprawl." Second, sprawl requires a lot more energy because more people and goods have to move longer distances, which thereby commits this and other land-use intensive nations to use more oil than they otherwise would need, leading to foreign policies predicated on dependence and in turn to belligerence or begging. Third, sprawl was financed primarily on a foundation of sand that is now washing away in a tsunami of bad debt and insolvency. Fourth, sprawl is bad for our health. Children cannot walk to piano practice or school, which begins a vicious cycle that leads to obesity and future health costs in the form of type 2 diabetes, heart disease and less familiar ailments. Fifth, sprawl tends to disconnect children from nature, causing what Richard Louv calls "nature deficit disorder" and mental problems that arise from the lack

of healthy contact with living things. Sixth, sprawl destroys natural habitats and is a main driver of the loss of species. Sometimes smarter development can lessen impacts on wild habitats, but the aggregate effect of any new development is probably never positive. And finally, sprawl contributes to the use of fossil fuels and to the loss of carbon sinks—including forests and soils—that are driving climate change.

According to the Fourth Assessment Report from the Intergovernmental Panel on Climate Change, we have already raised the temperature of the Earth by 0.8 degrees Celsius and are locked in to another 0.5 to 1 degrees in coming decades no matter what we do in the meantime. Twenty percent of the excess carbon dioxide now in the atmosphere will still be there 1,000 years from now. Assuming we summon the wit to cap the warming below a 2 degree increase, land-use changes, nonetheless, will be dramatic, if still somewhat conjectural. Sea levels will continue to rise, perhaps for another 1,000 years, inundating coastal regions. Larger storms will batter coasts, and bigger storm surges will reach farther inland. Midcontinental areas will likely become hotter and drier, possibly leading to the abandonment of millions of acres that were once "breadbaskets." Rainfall events will become larger with more floods such as those in Iowa in June 2008. More-frequent tornadoes will stress our emergency response and rebuilding capabilities. Some inland lakes will lose much of their present volume, radically altering shorelines. Lake Erie, for one, is projected to lose 40 percent of its present volume by 2050. Forested regions will be degraded by larger and hotter fires until there is little left to burn. Climate change, in other words, is not so much a problem to be solved once and for all as it is a worsening condition that we will have to endure for a long time to come.

John Locke and others from whom we derive our foundational ideas about land law reckoned with none of this. For Locke, land became private property once someone in the distant past mixed their labor with the land. More than three centuries after Locke, defenders of private property, such as legal scholar Richard Epstein, proposed that property rights ought to be essentially inviolable. The right of governments, then, to take privately held property ought to be confined to a small number of instances in which the taking redounds to the larger good, not just to a larger government. The upshot for Epstein and others of his persuasion is that the property rights of farmers, developers, private landowners and corporations engaged in mining, logging and energy extraction ought to be beyond the reach of government except in the most extreme cases of public need. Epstein's objections notwithstanding, the law has in fact been excessively kind to the rights of individual and corporate owners of land under the presumption that seizure of privately held land for public purposes ought to be compensated as an otherwise unwarranted taking proscribed by the terms of the 5th and 14th amendments to the Constitution. But the institution of private property, despite its many virtues, has often sacrificed community goods under the guise of protecting freedom.

Property law and land policy built over the past three centuries presumed that climate would be relatively stable and that climate was God's business anyway, not ours. Human-driven climate destabilization, however, will dramatically challenge our views of land, private ownership and public necessity. Global warming will lead to the inundation of coastal areas and larger and more frequent storms. These will create demands for expensive remedies, including massive earthworks built on land taken from private owners and funded by raising taxes. But at any more than a 1 meter rise in sea level millions of people will have to be moved inland, and flooded property along low-lying coastal regions will be worthless. So, too, land in midcontinent areas that will likely dry out under prolonged drought and heat will be abandoned. It is difficult to imagine where climate refugees will go to find relief or whose property is to be taken to provide land for housing and new infrastructure. Complicated and bitter disputes will attend proposals to transfer water from, say, the Great Lakes to the Western United States, which is suffering permanent drought. Liability issues pertaining to mounting damages from climate change will grow increasingly contentious, rather like the tobacco lawsuits, only more so. Like the tobacco companies, no company engaged in extraction and sale of coal, oil, or natural gas can say they did not know the consequences of what they were doing.

John Locke's view of property rights has been particularly influential in the development of property law, but there is another, and less appreciated aspect of Locke. He argued that

> [f]or this *Labour* being the unquestionable Property of the Labourer, no Man but he can have a right to what that is once joined to, at least where there is *enough, and as good left in common for others*. (Emphasis added.)

He believed men were entitled only to

> [a]s much as any one can make use of to any advantage of life before it spoils; so much he may by his labour fix a Property in. Whatever is beyond this, is more than his share, and belongs to others.

In a mostly empty world such caveats were conveniently overlooked. But in a "full world" they will become more important, and they raise many complexities. For example, ownership of land, whether by corporation or individual, is singular, but "as much and as good" applies less clearly to any single entity, hinting at something more such as collective rights of a community or even later generations that Locke did not discuss.

What does it mean, for example, for one generation to leave as much and as good for later generations? What might that standard imply for land law largely built on the rights of the living? Application of that standard leads to consideration of how to preserve land and its health for subsequent users and of the conditions that affect land such as temperature and rainfall presumed by Locke to be outside our control and responsibility. It is not difficult to extend the argument to include limits on activities that violate the standard of "as much and as good" more broadly to those factors that threaten subsequent generations' access to food, water, and security against storms magnified by the climate forcing actions of earlier generations.

This leads to a broader interpretation of "takings" applicable to cases in which future generations could be deprived of life, liberty and property without due process of law. The law as currently interpreted provides grounds neither for solace nor recourse against intergenerational takings, partly because of the complexity of assigning liability, establishing harm and adjudicating the interests of the parties, one of whom does not exist and the other being too diffuse to name. But such perplexities do not diminish the reality of the deprivation.

If one accepts the possibility of intergenerational takings *and* the limits of remedy available in the present law, the proper course of action is in the arcane and much depreciated activity called planning and in its enactment as effective policy. In plain language we—the present generation—would have to decide what is properly ours and further decide not to transgress that line. We would have to further decide the policy means by which to enact those restrictions on all levels of land ownership. In economist James Galbreath's words, planning to prevent the worst of climate change requires "empower(ing) the scientific and educational estate and the government . . . it must involve a mobilization of the community at large, and will impose standards of conduct and behavior and performance on large corporate enterprises."

The idea of national planning is not as far-fetched as it might first appear. We developed comprehensive national plans to mobilize and fight two world wars. Now we face larger challenges. Climate change, the end of the era of cheap fossil fuels, population growth and ecological degradation are converging to form a global mega crisis for which there is no precedent. But the present policy and legal apparatus for managing land, air, water, energy and atmosphere in the United States and globally is fragmented, incremental, reactive and short sighted. It is imperative that we extend policy and legal horizons to deal with larger systems over longer time periods, much as envisioned in 1969 in the National Environmental Policy Act. This act requires federal agencies engaged in activities that have the potential to significantly harm the environment to assess environmental impacts that include potential harm to later generations and identify "irreversible and irretrievable commitments." The NEPA was a step toward the kind of integrated and systemic policy planning that we urgently need, but to our great detriment it has been largely relegated to obscurity and ineffectiveness. The principles of NEPA ought to be dusted off, updated with current scientific knowledge and serve as the basis for reconsidering land-use law beginning with management of the roughly 700,000,000 acres of farm, rangeland and forest lands.

As the grip of climate change tightens, however, we may discover that present law is inadequate to protect either the present or future generations. It may be that the entire system of ownership will have to be extensively modified in favor of what Peter G. Brown calls "the trust conception of government," which draws much from Locke's "as good and as much" standard. Brown and others, including legal scholar Eric Freyfogle, propose that land law be broadened to include the wider community of life and extended in time to include the rights of future generations. In important respects this is a return to the traditions of English law embodied in the Magna Carta, which included two charters. The first concerned the political and juridical rights of the nobles; the second, and lesser known, called "The Charter of the Forest," guaranteed the rights of people to use the forest and all of its resources as common property. It was an economic document that rested on the obvious fact that political and legal rights are meaningless unless undergirded by guarantees of food, water and materials.

The English commons was eventually whittled down by the conversion of common lands into private property, a process known in history as enclosure. In our time the age-old struggle between enclosure and public access to the commons continues, but at a global scale. The battle is now being fought over control of the common heritage of humankind including forests, freshwater, the oceans, minerals, genetic resources, the atmosphere and climate stability. In each case the powers of exploitation propose to fragment whole systems into pieces, extend the rights of private ownership over common property resources, preserve the domination of a single generation over all those to come, and shorten our policy attention to a few years. The challenge, as noted by Gary Snyder, is to create the policy and legal basis that works "on a really long time frame" so that there will be as much and as good for others.

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From *Genomes and Daily Observations (cicada)*, by Suzanne Stryk. Mixed media on paper, 14 by 10 inches.

Springtime in the Country

Dana Wildsmith

"In Spring, at the end of the day you should smell like dirt."
—Margaret Atwood

It's not the crocuses by Mama's side porch, or grape hyacinths under the big cedar or yellow jonquils flagging Georgia's roadsides which announce the coming of spring to me—it's the southern wood violet and how its arrival affects the way we walk around Grace Farm. Some early morning in March or even late February, one of us will glance down to watch for ankle-twisting stump holes, stop in our tracks and moan, "Oh, no. Look!" There it is: the first teeny patch of violets. Lovely they may be in their miniscule daintiness, but we know their power. Our violets have won the queen's heart and her protection. Mama can't bear to lose a single tiny blossom. She would as soon stomp on kittens' heads as crush these miniature wildflowers, and we are all shamed into compliance through her example. For six weeks or more to come, we won't so much walk our 40 acres as lurch, leap and sidestep inch-high clusters of violets.

When our yard grass grows tall enough to warrant the season's first cutting, we mow it not in soldierly lines, but patchily, shearing only those sections where no violets bloom. Passersby must think us a family of springtime drunks. They imagine us so enraptured by March's lushness that we take to our woods for hidden bacchanalia, culminating in a rite of clan-wide disfigurement of the turf. Here a cut, there a tuft, everywhere a really weird cut. It can't be helped. By Mama's decree, her side yard remains off limits so long as one violet blooms. The horse pasture? Off limits. The path up the right-of-way? Verbotten. The crape myrtle row? Don't even go there. And we don't. Like all good enablers, we avert our eyes from uncontrolled grass growth and try to focus on the positive.

The positive side of being thwarted in any designs we may have had on Bethlehem's Lawn-of-the-Month award is that my family is doing our small part to uphold the Southern tradition of each community having its oddball characters. That's a good thing, because I don't want small-town Georgia to lose its character—either of the human sort or in our landscapes. I can't remember any of the towns I've lived in not having an old man who covered his

fence posts with Nehi Orange bottle caps, or a woman who wore a heavy wool coat through Savannah summers, or her daughter who never married but carried a dog tucked under her arm every waking moment, or falling-down cracker houses with three generations of sofas on the front porch. The Southern right to inter a worn-out sofa onto your porch was recently challenged in Athens, to great uproar and protestation against loss of personal freedom.

I've been thinking a lot about personal freedom since I came back to the farm to live, partly because of my ongoing battle against ATVs. These fat-tired motorized rhinos have claimed our dirt road as their weekend racetrack. Or, rather, their drivers have. It gets worse every month as more and more subdivisions pop up around us. People who used to live in one of the counties immediately surrounding Atlanta proper are abandoning paved-over, congested Gwinnett County and Dekalb County in favor of Barrow County.

I can only assume these new Barrow Countians consider a dirt road walled by woods as public green space. "It's just an old dirt road. Why shouldn't I play on it with my dirt bike or ATV?" *Because it's illegal to ride any off-road vehicle on a public road, that's why.* "Nobody's living in these woods. Why shouldn't I ride my ATV through them?" *Because they're not your woods, that's why. And because the weight of your machine is killing my Queen Anne's lace, my fleabane, my pipsissewa, even my southern wood violets.*

Not that I would ever present that last listing as argument to any of the cami-garbed guys I stop midroad. *You can't ride that ATV here.* "Why not, lady?" *Because you're crushing the violets.* "Oh, God, sorry! I didn't know. I'll call my buddy to bring his pickup to get me." Nope, what I do is stand in the middle of the road with Fred on his leash and my cell phone in my other hand. Fred is a big dog who hates anything with tires. When he sees an ATV (or motorcycle or F-150 or tricycle) he lunges and slathers (always an effective combination of deterrents) while I call the sheriff with my free hand. Dogs, sheriffs and an angry landowner—the great Southern trinity of law enforcement. Make that one crazy-haired lady landowner who is rapidly gaining a reputation as a weirdo, and I can usually put the skids on ATV play, at least for right then.

But do I have the right? Legally, yes. In Georgia, in Barrow County, it is illegal to drive or ride any off-road vehicle on a public road. This comes as a rude surprise to many new arrivals. They have moved to the country to get away from urban sprawl, to have a little ease from restrictions. Isn't that sort of freedom also my desire and aim? Yes, but I prefer to gain ease from life's restrictions by blending into the quiet of my woods, by letting nature take the upper hand. So far as I can tell, ATV-ers want access to undeveloped land to destroy it. They want into my woods so they can kill all the small life growing on the floor of my woods, so they can kill the stillness, so they can kill the smells of reindeer moss and pine needle beds and wet white clay. They would disavow this, of course, and with sincerity. After all, how can someone be held accountable for setting out to kill what they don't know is there? You can't see reindeer moss when you're sitting atop a quarter-ton of fiberglass and steel. You can't hear a forest's various modes of silence over a gas engine's howl. Wet clay's cleanly sharp odor is smothered by gas emissions as thoroughly as new puppies drowned in a sack.

Who in a motorized world notices the small and the silent? I do, as Emily Dickinson did:

> "A little bread—a crust—a crumb—
> A little trust—a demijohn—
> Can keep the soul alive—"

I need a dose of wildness to keep my soul alive. We all do. Any head-butting which goes on between me and ATV owners has its origin in our differing ideas of what "wildness" is. ATV wildness comes at the world from the outside, in the form of a deafening gas engine carried along by ecosystem-flattening tires entering undeveloped areas in order to enjoy by destroying. This is pleasure through conquest. I am of the pleasure-through-conjuncture school. Conjuncture: "a combination; as of events or circumstances." Have you ever had a relationship in which strong love spilled over into strong desire, and vice versa? Then you know what I mean by conjuncture—you submerse yourself in someone or something outside of yourself and find not that you lose yourself but that you emerge as more than you were before.

I find all too many people lately believing in the progression to a stronger, more assured self through accumulation of goods. It's like that advice our TV announcers give before the harshest day of winter: Dress in layers because layers give greatest protection from the cold. Our popular culture wants to assure us that our greatest protection from anomie will be gained through the layering on of possessions. If those possessions in some way mimic sentience—if beeps and roars and whistles make them *sound* alive; if response to some signal on our part makes them *act* alive; if movement and heat and breathlike exhalations make them *look* alive—we are even more disposed to accept BlackBerries and iPods and ATVs as indicators not only of self-worth, but of character presentation.

The truth is that our individual character becomes most evident when we are most stripped of our accoutrements, when we are what we are, and not what we possess. As a child of World War II-era parents, I wonder from time to time how I would have fared had I been a victim of the Holocaust. Perhaps never in history have humans been so robbed of everything as were those souls transported to concentration camps. How did they do it? I wonder not so

much how their bodies survived—that was usually a luck of physiology and circumstance—as how their spirits kept from calling it quits.

I would not have made it. I would have destroyed myself with anger at the injustice of it all. But someone like the writer Corrie Ten Boom possessed the sort of temperament which allowed her to set aside anger as irrelevant, to focus on the positive. Finding something positive about life in Auschwitz seems to me like trying to teach an opera to a chorus of tone-deaf illiterates, but Ten Boom managed. Once when her sister (a person obviously with leanings more like my own) challenged Corrie to find something—anything—good to say about body lice, Ten Boom replied that their infestations of lice kept sadistic camp guards from bothering them! Corrie Ten Boom had character of the sort which needs no ornamentation or supplementing.

This morning when I stepped out into early spring's frosty world, I wondered how even Ten Boom could bear the cold of a European winter with no way to fight against it. A detail which always strikes me first when I look at photos from concentration camps is the flimsiness of those pajamalike outfits the internees wore, with almost never a coat or hat in sight. How could they come to terms with constant cold? How could anyone live that way?

Georgians did, to a lesser degree, until very recently. There was little nostalgic about spending winter in an old cracker farmhouse. Those high-ceilinged boxes were cold. Cold. I can tell you firsthand how unheated bedroom air grows so heavy with cold during the dark hours that you wake to feel the temperature as a physical weight, heavier even than the seven or eight quilts mounded over you like dirt over a new grave. And I have come to believe many cases of failing bladders among folks my age and older can be traced back to early morning hours spent carefully motionless in a farmhouse bed, arguing against an obvious call of nature, so great was the bladder-owner's unwillingness to step out of bed into that black lake of icy air.

Passing the night in a frigid bedroom under quilts piled on and tucked in by a grandmother or mother most likely never killed anyone, though, and it gave the added benefit of Building Character. I've written those last words with capitals because that's how my mind's ear hears them after a lifetime of being informed any odious situation will "build character." *Dry the dishes; it builds character. Finish your calculus homework; it builds character. Admit to your sister she was right and you were wrong; it builds character.* First baby has colic for three months? *It builds character.* The Navy gives your husband back-to-back deployments the same year your daughter turns 14 and begins to wear all black (clothes, lipstick, attitude)? *Builds character.* You receive a $500 windfall on Tuesday and on Wednesday your radiator needs replacing to the tune of $500, exactly? Yep: Character.

What do you do with all that accumulated character? Each spring, I use it to hold my anger gauge at steady when yet another clump of abandoned puppies blossoms on the side of the road where some bubba left them to their own devices. The point here, of course, is that 3-week-old pups don't have devices. Someone takes care of them or they die. There are no other options, so my family takes up the slack.

Fred and the other dog, Max, know the drill by now: I come home with an armful of wormy babies and dump them in the sink for a flea bath; each pup gets handed off to Mama who is sitting by with thick towels on her lap. Rubbed dry, they go into the pen with warm milk and dog food mush. Max and Fred always seem delighted by the whole process, maybe because it's like watching a home movie of their own beginnings. In Max's case, enjoyment of the proceedings certainly isn't due to his great love of puppies, because he considers any furry creature under 5 pounds to be a rat, and rats, to Max's way of thinking, have been put on earth to have their necks snapped. We keep puppies at safe viewing distance from Max.

During the most recent puppy residency, Mama admitted to secretly loving being called on to house homeless pups in the unused dog pen behind her house. It's the perfect way to have all the perks of puppy possession—their infant sweetness, how funny they are when they play together, their puppy smell—without having to commit to lifetime care. Mama steps out her back door and they all come tumbling to the side of the pen to assure her she is goddess incarnate.

I should pause here to paint a picture of this pen, lest you have in your head the image of an 8-by-8 chain link box. No, no. This enclosure encompasses a 15-by-20-foot swath of hilly yard with a huge gnarly apple tree as centerpiece. There are three dog houses therein, two insulated winter residences and an open-sided, roofed sun porch for our dog guests' warm weather pleasure. We keep a store of dog blankets to pad the houses and a basket of toys and bones. They lead a well-deserved happy life while we search for homes for them.

Not every litter can be saved. Once we found a family of nine siblings in the falling-down barn which edges the far western corner of Mr. Edgar's land. Just about the only thing holding that cotton barn up is a thick growth of privet and sassafras and cat brier. They hide it so nearly completely you have to know it's there to know it's there. We know it's there, so we fought our way back that day through bramble and hedge to where we could hear small rustlings and whimpers. No mama, just nine brindled babies so feral, so starved, they had to be caught and "put down," as the euphemism goes. They could never have been domesticated. We still wince over having had to order their death. At least we gave them a quick death, as opposed to slow death by starvation and disease, which had been their first lot.

And at least they had had Mr. Edgar's barn as some sort of shelter against the world while they lived. Where will such orphans go when all old barns and rock-footed farmhouses have been leveled in favor of Home Depots?

And should it matter? Do all things weak and vulnerable forfeit their right of proper care by virtue of their weakness and vulnerability?

If this seems reasonable, if we as a society are hurtling in the direction of respecting only what is new and foursquare, we are also moving toward misapprehending maintenance for care. The greater chunk of our discretionary time is spent maintaining those belongings we believe define us. We maintain, then we discard, then we replace. This is not care. Care involves an expenditure of thought directed solely toward the good of the receiver. The manner of care I have in mind is not precipitated by hope of eventual payoff. It is not virus protection for your laptop or oil changes for your Honda; that's maintenance.

I'm talking about a warm flea bath and soft food and soft words for a puppy who will the following Wednesday be euthanized by the county because he's too puny and homely to be adoptable. I'm talking about Mama choosing to preserve and live in her old cracker farmhouse, with its one bathroom and gaps around the doors big enough to throw a cat through, rather than level 100 years of character in favor of a ticky-tacky house with attached two-car garage. And I'm absolutely talking about us in the family adjusting our walking gait to drunk mode during the month or so each spring when wood violets are blooming in fat nose gays all across our yards.

Why does care of the tiny and valueless matter? Because it takes us out of ourselves. Any time we leave the accustomed confines of our outlook, we are required to incorporate new information about ourselves into our brain's plush folds. Should we leave those puppies to die on their own, or risk briar-ripped arms and puppy bites and ticks and an afternoon's plans gone to bust? The harder choice forces you into a series of compromises with yourself, with society, with the world at large. You come out on the other side of that process of compromise having Built Character.

And the rewarding thing about character is that it is attractive. Local horse owners plan their Sunday afternoon rides to include our road because it's pleasing to see Mama's old house, gray and unassuming, standing just where it has stood for one hundred years, teeny patches of deep purple violets scattered at its feet.

Song

Aubrey Streit

for Faye

A lark flies in my head,
croons an
arpeggio backward—

a chord curved down,
last bite of moon rind,
prelude to the eclipse,

—and leaves to find spring.

Winter comes next:
clouds and mist.
Heavy ice varnishes
each clenched knuckle.

The tips of my outstretched
limbs sag, splay
into roots. Cold
hushes my sap.

I pray for the splash
that means sun has spilled.
Then bent trees will
catapult dew, overhangs
will glisten and rain,
cottonwood leaves will flash
green and gold fish scales.

I stretch east toward Waconda,
where hot springs gurgle
and the native princess
sleeps beneath the lakebed.

But a chill contracts
me with a crack.
The gentle, jolting gush of my life,
kept secret by my skin,
ceases.

Splintered, hewn,
I have broken through
my ringéd years.

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We must have time to think and to look and to consider. And the modern process—that of looking quickly at the whole field and then diving down to a particular—was reversed by Darwin. Out of long consideration of the parts he emerged with a sense of the whole. Where we wished for a month at a collection station and took two days, Darwin stayed three months. Of course he could see and tabulate. It was the pace that made the difference. —John Steinbeck, *The Log from the Sea of Cortez*

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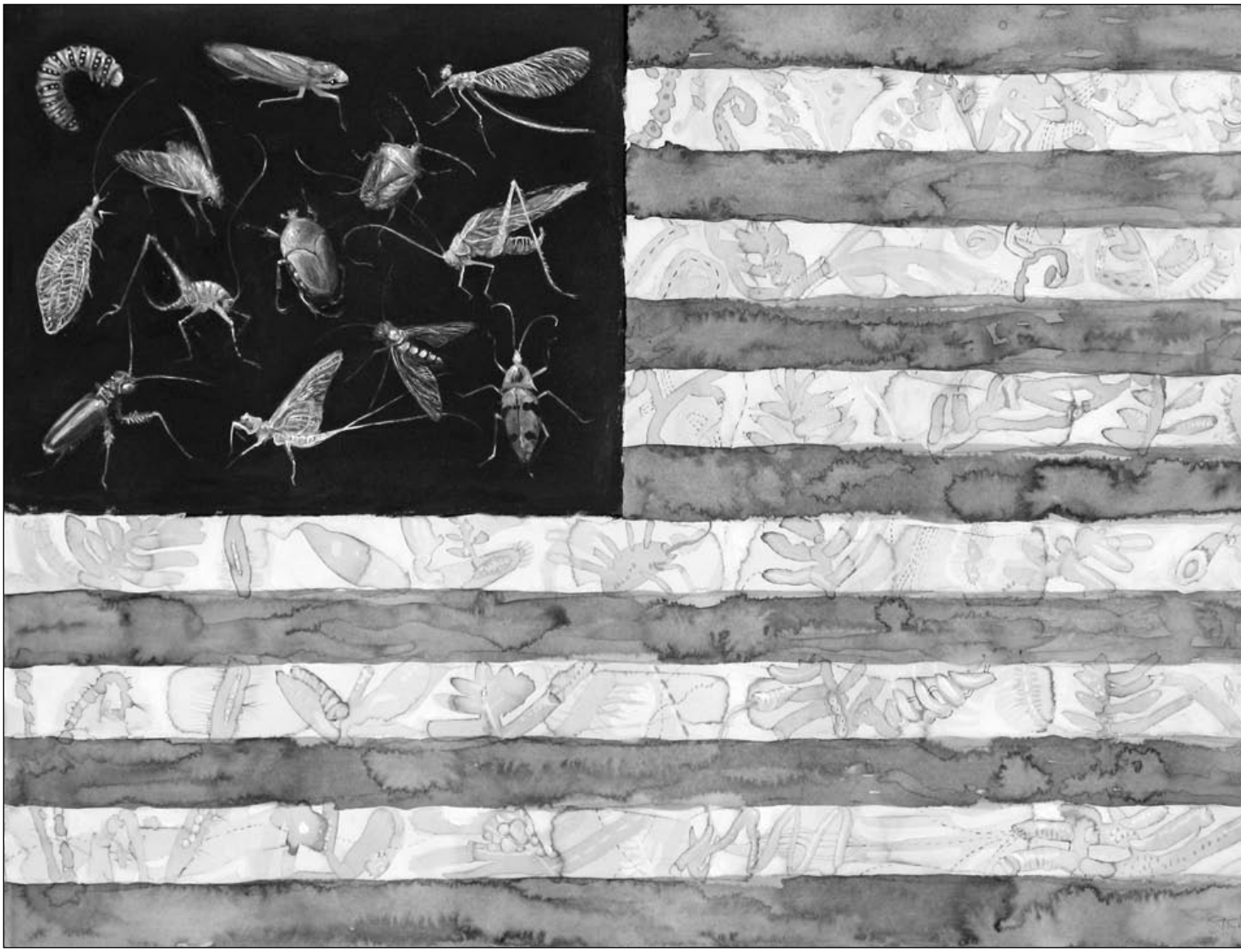

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The Writers and Artists

Julene Bair is author of *One Degree West: Reflections of a Plainsdaughter.* She will soon complete *Where Rivers Run Sand*, a personal account of the crisis facing the Ogallala Aquifer. Her Web site is julenebair.com.

Robin Mittenthal was a Land Institute intern, has worked on farms, taught high school biology and now pursues a doctorate in entomology at the University of Wisconsin.

David W. Orr is a professor of environmental studies and politics at Oberlin College. His books include *Earth in Mind* and *The Nature of Design*.

Aubrey Streit is a native of Tipton, Kansas, who serves as director of communications at Bethany College in Lindsborg, Kansas.

Suzanne Stryk, of Bristol, Virginia, has shown her paintings at exhibits throughout the United States, including at the National Academy of Sciences. Her paintings are in the permanent collections of the Smithsonian Institution and the Taubman Museum of Art in Roanoke, Virginia. Her Web site is suzannestryk.com.

Martin Stupich is a photographer based in Albuquerque, New Mexico. His new book, with the writer Annie Proulx as editor, is *Red Desert: History of a Place*, about a Wyoming landscape that has been undeveloped and a refuge for wildlife, but become the target of natural gas mining.

Dana Wildsmith is the author of four poetry books, including *One Good Hand*, and is an English literacy instructor in Bethlehem, Georgia. She has recently completed an environmental memoir about the farm she and her family are working to preserve: *Everything Broken: Finding Home with an Old Farm in the New South*.

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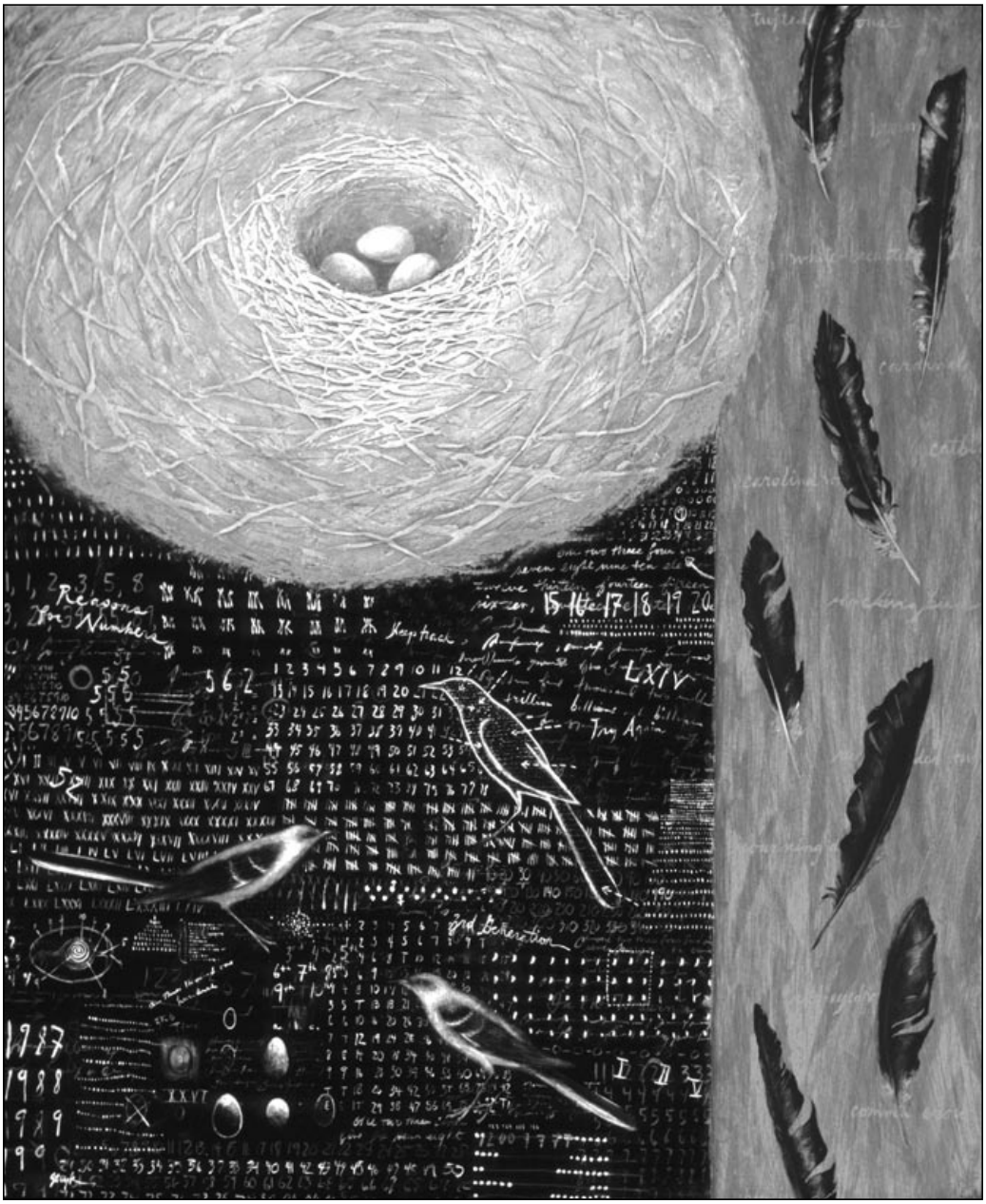

Reasons for Numbers, by Suzanne Stryk. Acrylic and mixed media on birch panel, 28 by 34 inches.

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