

The Land Report

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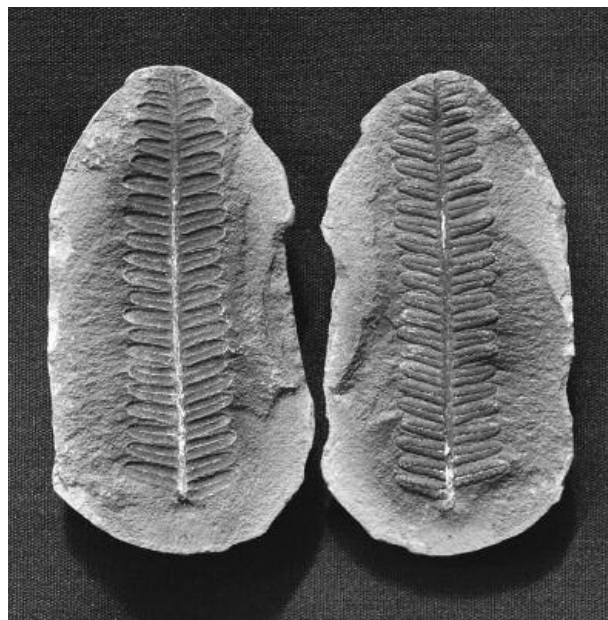


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Cover: John Szarkowski. From *Mr. Bristol's Barn*. Wes Jackson writes about the connection of botanist Liberty Hyde Bailey and his time with the photographs of John Szarkowski. See page 6.

Above: Scott Bontz. Fossil halves of a fern about 300 million years old, found in northern Illinois. Shown about two-thirds life size.



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.

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Can laissez-faire economics, technology, consumption and rule of law replace community, social capital, thrift and the common good?

Civic Agriculture: A Cart In Need of Horses

Bill Vitek

Sociologist Thomas A. Lyson coined the term “civic agriculture” in 1999, and published a book by the same name in 2004. Lyson defines civic agriculture as a “locally organized system of agriculture and food production characterized by networks of producers who are bound together by place.” His short, accessible and informative book covers themes common to readers of *The Land Report*:

- Beginning with the 1862 Morrill Act’s mission to “bring rationality and standardization to agricultural production,” American agriculture has a long history of commodification, concentration and consolidation.
- Like modernization of so many other manufactured products and processes, the winners in industrialized agriculture are financial lenders, large corporations and—if cheap, abundant and relatively tasteless food is the goal—well-fed consumers.
- The losers are small, independent owners and producers, and consumers who want diverse, healthful and flavorful food choices.
- Farming has now gone global, further distancing production from consumption, and increasing the power and influence of fewer companies and those who control them. Lyson cites a study that identifies a mere 138 men and women sitting on the boards of less than a dozen businesses that control half of the food sold in America.
- The larger effects include erosion of the many and varied social, economic and even psychological benefits from the informal networks that put the “culture” in agriculture.
- Finally, the logic of unassailability and inevitability employed by agricultural economists and scientists masks their inability to measure or even to acknowledge social capital and informal economies. Inevitably, what fails to be measured becomes invisible, while its proponents—who also tend to be the severest critics of agriculture’s industrialization—are viewed as irrational, romantic, naive and unpatriotic.

Lyson uses the second half of his book to make the case for civic agriculture’s reality, rationality and viability. He rightly points out that it never disappeared entirely, and that it is now enjoying something of a resurgence, both on the farm and in the academe. He cites influential work by social scientists C. Wright Mills, Melville Ulmer and Walter Goldschmidt for evidence of both the economic and civic value of small-scale farming. From the earlier influences of Alexis de Tocqueville and Karl Polanyi, to a new generation of scholarship, the academe is likewise reinvigorating and reclaiming the relevance of social factors beyond the neoclassical economic indicators of land, labor, capital and management.

The news on the farm is promising as well. Lyson points to the steady growth of farmers selling direct by subscription, restaurant agriculture, farmers markets, roadside stands, and urban agriculture and community gardens. Data on these are harder to come by, but Lyson found trends over the past 30 years in New York state that show healthy growth across the board.

Lyson believes promotion of civic agriculture will come from the bottom up, from individuals and community groups reasserting their rights to healthful food and healthy communities, and from local and statewide efforts that enforce zoning regulations that protect small farmers, educate consumers about community-based farming and promote institutional policies to buy local food.

That’s the good news.

The not-so-good news is that civic agriculture—or whatever we choose to call the varied responses to global-industrial agriculture—is David without a slingshot. Much has been lost from civic infrastructure that made civic agriculture possible, while the opposition continues to grow and to concentrate its political, financial and structural advantages. I want to offer a more dismal assessment of our chances, in hope that by honestly acknowledging the odds, we have a better shot at overcoming them.

A civic agriculture needs both an agricultural *and* a

civic agenda that can respond to the challenges of feeding 21st century Americans—and the citizens of other nations, though not necessarily “the world”—good, healthful food while giving our farmers a good livelihood and protecting ecosystem health. We’ve come a good distance with agriculture, as readers of this publication know well. But we’ve lost ground on the civic front.

“Civic” means “belonging to the citizen.” What, then, do we mean by citizen? According to this country’s major institutions of government, commerce and education, not much early in America’s third century, and less and less all the time.

The constitutional framers ultimately rejected a traditional republic where government has a direct role in creating virtuous citizens. They favored a representational republic of individuated members free to pursue life, liberty and the pursuit of happiness as defined by each of them, and within the confines of the laws designed to keep them apart. In his *Democracy’s Discontent: America in Search of a Public Philosophy*, political philosopher Michael Sandel called it “the procedural republic.” Alexander Hamilton, America’s first Treasury secretary, went even further and argued that the vices of ambition and vanity, when coupled with financial debt, could turn Americans into the hardest working people on the planet, and America into a world power.

Alexis de Tocqueville still saw a vibrant civic culture in the America he visited in 1830, but he also saw a growing selfishness. Writing in the 1990s, Robert Putnam saw a marked erosion of American civic engagement and social capital from just a few decades earlier, as measured by newspaper readership, political meeting attendance, petition signing, writing letters to the editor, socializing informally with friends, joining unions, eating the evening meal with the whole family, donating money as a percentage of income, and working on community projects. (To review Putnam’s work, visit <http://www.bowlingalone.com/data.php3>.)

The civic infrastructure and social and political axioms first explored in 5th century Greece, which identified human beings as social creatures and the city, or polis, as the place where citizens were made, not born, have been on a slow and steady decline that began with the Enlightenment. The likes of Rene Descartes, Francis Bacon, Immanuel Kant, John Locke, Adam Smith and others argued that individual reason was king, and that the liberty of each individual required political protection and an economic system to produce individual kingdoms. John Locke claims in his *Second Treatise of Government* that with the invention of money, the moral limit on consumption and “hoarding” was lifted.

The American Revolution—still ongoing in my view—can be seen as the world’s most ambitious application of the Enlightenment Substitution Project: Can

private ambition, limited government, economic growth, technological advancement, consumption and the rule of law replace community, social capital, public life, thrift, virtue and the common good? The status quo answer to this question has always been an enthusiastic “Yes!” And it has been easy to demonstrate, thanks to the United States’ uncommon and largely unacknowledged blessing of the world’s greatest geological inheritance: soils and the rich ecosystem resources they support, and water, minerals, coal, oil and gas—now all in a steep, potentially irreversible decline. The varied social movements in American history—transcendental, progressive, preservation, labor, women’s suffrage, civil rights, environmental and now civic agriculture—can be interpreted as an enthusiastic but relatively ineffective “No!” They have always been reactions against, rather than replacements of, the status quo, always trying to slow or derail the train rather than replacing the tracks, and because they have functioned, at best, as negative rather than positive feedback loops.

The civic renewal of which civic agriculture could be a part will require, then, more than groups of interested folks who want to bring back local farming. It will require a rejection of the Enlightenment Substitution Project, or at least its main tenets, and it will require a major overhaul and rebuilding of America’s civic infrastructure. It will require a civic architecture, a civic education, civic politics, civic economics and civic democracy, to name a few. Such changes must occur at all levels and stages, not just from the bottom up. Otherwise, what Lyson calls civic agriculture will be just another momentary, nostalgic back-to-the-land speed bump.

An example of what happens when infrastructure is ignored appears in a recent report by the American Society of Civil Engineers, estimating the costs of rebuilding America’s roads, bridges and buildings at \$1.6 trillion. (See <http://www.asce.org/reportcard/>.) It would be an interesting assignment to calculate the economic costs of rebuilding America’s civic infrastructures or the social costs of letting them crumble. We need an American Society of Civic Engineers.

This brings us to what supporters of Lyson’s call to civic agriculture can do as educators, activists and agriculturists.

For starters, there is always another book to read. There are three seemingly far afield from the topic, but relevant. The first is T.R. Reid’s *The United States of Europe: The New Superpower and the End of American Supremacy*. Reid offers hope that America’s international monopoly—both industrial and political—will soon have a powerful and friendly rival, though we may have to wait until the European Union constitution is ratified. Then, if the EU can make General Electric and Microsoft heel with antitrust rejections and fines, it may have similar positive effects on global agricultural conglomerates.

The second book is Robert Reich's *The Future of Success: Working and Living in the New Economy*. Reich, Labor secretary under President Clinton, nicely contrasts the assumptions of what he calls the old and new economies. The old economy provided uniform products (and not many choices), job security, a relatively compressed salary range (and a middle class), and a near U.S. monopoly on production. The new economy provides high-value production that gives individual consumers exactly what they want, a mobile work force, wage and job instability (and a collapsing middle class), and global trade and competition. While Reich does not discuss agriculture specifically, civic agriculture may be an example of the new economy, as it provides a network of small sellers supplying niche products to demanding consumers—Lyson's restaurant agriculture comes to mind. The results will be products with higher value and prices, and a greater focus on quality, not just for the food itself but for the producer and the land.

Thirdly, there is Joseph Meeker's *The Comedy of Survival: Literary Ecology and a Play Ethic*. It is an old book, but a wonderful tonic for those who struggle in a tragic mode against the very real and often dangerous forces of industrial agriculture. Meeker reminds us that there is an alternative literary tradition based not on tragedy, but on comedy. As he puts it:

The comic way is the path of reconciliation. When the usual patterns of life are disrupted, the comic spirit strives for a return to normalcy. The comic vision is not polarized, but complex: Comedy sees many aspects simultaneously, and seeks for a strategy that will resolve problems with a minimum of pain and confrontation. The comic way is not heroic or idealistic; rather it is a strategy for survival.

As activists and agriculturists, we should continue working locally to develop civic infrastructure, not just civic agriculture. This means working on zoning, taxes and local economic initiatives both within and outside of agriculture. It also means looking and acting regionally, nationally and internationally. Think broadly.

Imagine for example, what it would take to bring back a vibrant horse-driven economy that would work alongside the current modern one. It would need a heck of a lot more than horses. It would require laws, regulations, horse professionals and educational, architectural and engineering redesigns. It would require a major transformation, and not just local or even regional.

As educators—and we're all educators in one form or another—I think there is quite a bit we can do. First, we should connect civic agriculture to other civic movements. There's a genuine civic resurgence going on across disciplines and across the country. Let's talk about it. Secondly, I think we should be more willing to

offer perspectives outside the traditional enlightenment/liberalism canon that makes up so much of our Western thought about economics, ethics, politics and the social sciences. There is plenty to choose from. I think too that we should be willing to state more explicitly that "civic" notions fundamentally reject individualistic worldviews. With civic agriculture we are not just shifting what, where and how we grow and eat food, but acknowledging a philosophical and political model as old as Aristotle: that humans are social creatures in need of social structures and conventions. It is time to show the weaknesses and dangers in the modern, individualistic conceptual framework, and to offer viable civic alternatives.

Wes Jackson has said that if we do not get sustainability into our agriculture there will be no need to get it anywhere else. We will starve long before we can figure out how to digest sustainably redesigned carpets and cell phones. Thomas Lyson is certainly right to point us toward the theory and practice of a civic agriculture, a culture of food production, distribution and consumption that honors local places, respects the health of consumers and rewards small producers for their commitment to quality and stewardship. It is a big job that begins, of course, with those closest to the soil. But the necessary civic structures that support and make possible the civic agriculturist's successes are in serious disrepair, and they will require the efforts of many hands and skill sets to shore them up.

History's Play on Light and Shadow

Wes Jackson

When *John Szarkowski: Photographs* opened at the San Francisco Museum of Modern Art, exhibition curator Sandra Phillips asked me to be on the opening day program, *The Lens on the Land*. She said she would like me to include comments about the work of botanist Liberty Hyde Bailey. That was a relief. As a scientist, I can hide behind what Bailey wrote: "The arts and sciences are to interact together." Also, I can say a lot more about the grand old dean at Cornell University than I can about photography.

My friend Terry Evans warned me that photographic artists don't want their work regarded as mere documentary. I struggled with this, and after looking at more of Szarkowski's photographs, it came to me that the best documentation of an era is represented in its highest art. And, taking comfort in Bailey's notion that "the doctrines of pure science or pure art are both bad doctrines," I hit upon the notion that the highest art opens the windows that allow the metaphysical reality of the time to shine through. John Szarkowski's photos do that.

Szarkowski says Liberty Hyde Bailey's writings inspired him. Bailey must have inspired thousands. But I know of no artist other than John Szarkowski who so explicitly stated that he had drawn so much from Bailey. I had admired Szarkowski's photographs for many years, but now I had an assignment that caused me to ask this question: What reflected light from Bailey's life shows in them? And because it is hard to think of light without thinking of shadows, there came another question: What darkness of Bailey's era informed Szarkowski's shadows?

America has always been about transition, and Bailey's era was no exception. I think that it saw the greatest transition to date. Bailey was born on March 15, 1858. He was in his 97th year when he died on Christmas night in 1954. His birth is close to when the subject of the Szarkowski book *Mr. Bristol's Barn* was built in East Chatham, New York. In the next calendar year, 1859, John Brown would be hanged at Harper's Ferry, and in Pennsylvania Col. Drake would drill the world's first oil well. There is a third event in 1859 connected to the life and thought of Liberty Hyde Bailey: Charles Darwin's *Origin of Species* appeared in London bookstores.

That Civil War era barn that John Szarkowski photographed was probably built by a Yankee, but, more importantly, it was built in a world powered almost entirely by the sun. Coal was helping run Northern industry, while a larger percentage of the South ran on muscle power, much of it from slaves. But here still was

architecture informed by a sun-powered world and wedded to traditional barns.

Here also was an America caught up in the first great questioning of this political experiment, this new nation. The Civil War forced these people to ask why "the last, best hope of earth," the United States of America, was endangered. By naming him Liberty, Bailey's family must have been continually reminded that 600,000 men and boys "gave the last full measure of devotion." And when Liberty was 7, the first great political crime in America happened, the assassination of a president.

And the bloodletting was not over even though our economic relationship to one another was to have been raised with the elimination of slavery. Now the guns of government were used to kill Indians. In the same period and place an estimated 60 million bison were nearly wiped off the face of the earth. The big trigger puller against both natives was that huge abstraction: Manifest Destiny.

What *The Origin of Species* introduced to the thought of Bailey's time was another matter. A quarter of a millennium before, Copernicus and Galileo had jerked Earth from the center of the universe, to be replaced by the sun. Our home was now a run-of-the-mill planet circling around what we would later learn was a run-of-the-mill star. And now here was Darwin, drawing on his fascination with geology and natural history, to make us reconsider our relationship to other beings. Darwin said that we and all other life forms were shaped by the forces of natural selection rather than by the hands of God, as we understood both hands and God.

I think that when Bailey wrote *The Outlook to Nature* and *The Holy Earth* early in the 20th century, he was describing our relationship to creation with a deep understanding of our embeddedness in its ecology. Bailey may have felt suffocated by a growing scientific establishment devoted to the reductionism of Bacon and Descartes, and the implications of Galileo and Newton's discoveries. About that I don't know. What I do know is that a darkness of spirit came out of the Enlightenment. The souls of many shriveled when told that we are neither the center of the universe nor the direct creation of the hands of God. Bailey was almost certainly not ignorant of Darwin's writings. His major professor at Harvard was Asa Gray, Darwin's primary defender in America and America's first great plant taxonomist. Bailey must have known that Gray believed Darwin's findings were compatible with belief in an intelligent



John Szarkowski. From Mr. Bristol's Barn.



Cornell University Library.
Liberty Hyde Bailey, right, and
Junior Extension Group at the
Tompkins County, New York,
school picnic, 1905.

creator. Gray wrote a series of articles for the *Atlantic Monthly* in 1860 that impressed Darwin to provide this motto for an English edition: “Natural Selection not inconsistent with Natural Theology.” But in the fall of 1860 Darwin withdrew, saying, “I grieve to say that I cannot honestly go as far as you do about design.”

Whatever the source, in Bailey’s writings we are encouraged to not adopt any alien and distanced view of the earth. We will do better if we root ourselves in the world of nature unfolding around us:

“The worm that burrows, the field mouse that scoots under the grass, wild fowl winging across heaven all add meaning to life.”

“Nature is the norm. In agriculture, adapt one’s work to nature.”

“Live, in right relation with nature is the lesson a wise farmer learns.”

This is the light that shines from Bailey’s writings. They are beams directing away from the pitfalls of reductive thinking at the time, the “we-are-nothing-but mentality.”

Bailey and the barn in Szarkowski’s photos were born before John Brown’s body would begin its molding in the grave, born before the pumping of liquid fossil carbon that had been squeezed out of bodies born long ago in geologic time. These are the bodies that would change the world in death perhaps more than when they were alive. They sponsored the industry that provided the slack that gave Darwin time to sail around the world, to explore for five years, to investigate, think and write for another 23, and to finally publish his thoughts in 1859.

Fifty years after Darwin’s book came a moment grossly overlooked. It was a turning point in the history of agriculture, indeed, the history of the world, which came midway through Bailey’s life. In 1909, two Germans, Fritz Haber and Carl Bosch, invented the process that made it possible to use natural gas to turn atmospheric nitrogen into ammonia. Now, through an understandable alchemy, we could make a fertilizer that doubled, tripled, even quadrupled crop yields. Without Haber-Bosch, according to Vaclav Smil, one of our foremost scholars on nitrogen, 40 percent of humanity would not be here.

Until that discovery, and even for another 50 years, farming relied primarily on practices that drew on natural fertility. Note the manure spreader in the 1957 photograph by John Szarkowski on the opposite page. It is probably coming from the lower story of the barn with straw bedding rich in manure and urine. Bailey had the science for this sort of farming down, and during the first half of his life a sophisticated science developed around traditional agriculture running almost exclusively on sunlight. But on that Christmas night in 1954 when Liberty Hyde Bailey died, industrialized societies were poised for rapid acceleration in the use of commercial fertilizer featuring nitrogen. The manure spreader would soon become a relic.

With the passing of Bailey and a few others from his time, particularly Albert Howard and J. Russell Smith, the most articulate, knowledgeable and well-known minds directed toward farming within the earth’s natural limits were gone.

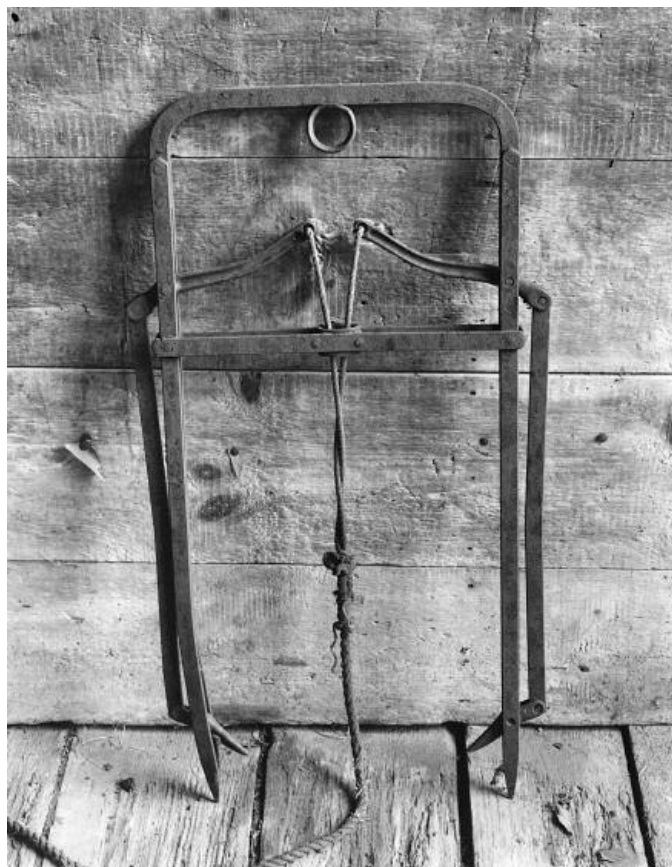


Farm near Caledonia, Minnesota. From *John Szarkowski: Photographs*.

Bailey lived during the most dramatic transition in the 10,000-year history of agriculture. From the first oil well in 1859 until he was 80 years old in 1938, only 3 percent of all the oil burned to our time had been used. A person 48 years old today has lived through 90 percent of all that oil burning. A 23-year-old has lived through half of it. John Szarkowski's photographs show the sun-powered world disappearing, along with its ideals and cultural wisdom. As Wendell Berry has said, animal husbandry would become animal science. Agronomics would become crop science. Agriculture would become agribusiness. High energy sponsoring both fertility and traction combined to destroy both biological and cultural information in the largest energy war among life forms in the planet's history.

I can't tell how many of Szarkowski's photographs stand alone to show Bailey's insights and values. But a good place to begin is *Mr. Bristol's Barn*, with Szarkowski's pictures plus his selections from Philo Blinn's diary, written as a family pursued daily living in an age marked by the Civil War.

This barn, in its intricacy and fine workmanship, is a memorial to the sun-powered farm.



John Szarkowski. From *Mr. Bristol's Barn*.

Here we see the fork that dropped down on a wagonload of loose hay, caught a bunch by releasing the tongs, and then was lifted up to the mow with a combination of ropes and pulleys powered by the same team that had pulled the hay rack in from the field. Men and boys pushed this loose hay around in the loft with hay forks and muscle power.

The barn loft was the farm's fuel tank. Below, in the barn's stalls, draft animals ate oat and hay for muscle that gave the farm its traction. They bedded down for a New England winter night in straw from the grain crop, and left their manure and nitrogen-rich urine to be forked into the manure spreader and returned to the fields.

When diesel and gasoline tanks arrived, the loft that housed sunlight captured on the farm was no longer needed. And with arrival of the anhydrous ammonia tank, sponsored by natural gas, neither was the lower story of the barn as nitrogen collector.

The practitioners of modern science marked this industrial revolution on the farm by calling for better days through better ways. It was a heady time.

We see another part of the story in Norman Rockwell's *County Agent*, which appeared on the cover of *The Saturday Evening Post* in 1948. For models Rockwell had used real people in Jay County, Indiana. I made phone calls to find out what had happened with them. The picture's focus of attention, the county agent, had died. So had the father, the man off to the left in the shadows with the cat on his shoulder. The boy with the poultry project farmed until he died in 1988. The dutiful girl holding the calf and her 4-H record book left the farm to marry and raise children. So did the girl with the sewing project. They never farmed. Neither did any of the children of the kids in the painting. Rockwell painted what would get writ large in American agriculture. Expertise and youth are central. Tradition and experience are peripheral.



Norman Rockwell Family Trust.



Mr. Anderson and Son, near Sandstone, Minnesota. From *John Szarkowski: Photographs*.

That message is very distant from the one in this Szarkowski photo from 1957. Here we have a father and son side by side on their Minnesota farm. This is one of my favorite Szarkowski photographs. No expert stands between them, or needs to.

They are in front of a crib designed to dry corn on the cob. That crib is probably gone, and the corn picked on that same farm today probably is shelled in the combine and immediately sent to the elevator to be dried

with natural gas. The farm has probably been drenched with chemicals designed to kill the pests that threaten crops. I would not be surprised to learn that there was a milk cow pasture that has been plowed and planted to row crops, and that the soil erodes, and the nitrogen heads downstream to choke life in the Gulf of Mexico.

Mr. Bristol's barn still stands, an artifact of civilization. What makes it a mere artifact are the oil wells for which that one dug in 1859 was prototype. Those and the later natural gas wells in combination provided the energy that destroyed the information which built that barn *and* the surrounding culture.



John Szarkowski. From Mr. Bristol's Barn.

From this photo it appears that the entire farm is grassed down. It is a beautiful place, and I am glad that the barn and house have been appreciated enough to have been saved. Perhaps at the end of the fossil fuel epoch those who follow us will go to see how those before us did it. I don't mean the post and beam construction so much as the arrangements necessary for a sun-powered agriculture in that particular place.

And then the writings of the grand old Cornell dean will come alive for a culture hurrying to catch up to the past, where discipline, restraint, frugality and thrift are once again part of our everyday action and not just vocabulary. And John Szarkowski will be a text in an indispensable library on how to farm and live well.

Adapted from a talk for the opening of John Szarkowski's exhibit at the San Francisco Museum of Modern Art in February. The show will be at the Milwaukee Art Museum from September 30 through January 1, 2006, at the Museum of Modern Art in New York from February 1 through April 30, 2006, and at the Museum of Fine Arts in Houston from June 18 through September 10, 2006. There is a book of the pictures called John Szarkowski: Photographs.

Americans like to think they have made themselves great, but their wealth has come from their land. And now we desperately need a fresh grip on this reality.

It's the ecology

William H. MacLeish

I've been wondering what it is in America's history and character that makes us at once so successful and so destructive. Oddly, I have come to believe that the beginnings of an answer can be found in the writings of Rudyard Kipling. I say oddly because the title of Paul and Anne Ehrlich's foreboding book, *One with Nineveh: Politics, Consumption, and the Human Future*, comes from a Kipling poem. It is *Recessional*, published in 1897, a prayer for divine support as Britain's power slips away. You know the lines:

Far-call'd our navies melt away—
On dune and headland sinks the fire—
Lo, all our pomp of yesterday
Is one with Nineveh and Tyre!

Nineveh and Tyre, you'll recall, were ancient cities east of the Mediterranean whose cultures, like so many others—including in our hemisphere the Mayan, the Anasazi, the Cahokian—rose to glory and then slid into ruin. Their falls came from a complexity of causes, some of which lay in that they did not know how to—or chose not to—interact intelligently with the natural processes that sustained them.

But what caught my attention in Kipling's work was not a poem but a bit of plain prose. In a dispatch, Kipling remarked on the prevalence of uncontainable pride in country evinced by so many Americans he talked to during a four-year stay here. One stranger refused to get out of Kipling's face until told that there was nothing to equal such patriotism back in the writer's home country. "Always tell an American this," Kipling advised his readers. "It soothes him."

Americans, of course, have always rejoiced in our boosters. How could it have been otherwise? The first whites here left their history, their very continuity, back in their home countries. How could they have maintained a semblance of sanity in their newfound wilderness if they had not carried with them the seeds of what became an oversized view of themselves?

Our self-confidence, and the energy that went with it, kept us going during the few generations we needed to get the hang, not only of survival, but of surplus. We then opened this country like an oyster, and, as we changed it, it changed us. Our faith, once directed more toward spiritual than material rewards, became one that made us feel good when we did well. And well we did. There, in the middle of all those waves of grain and fruited plains, we became masters at blowing our own horn.

I myself retain a certain delight in reading about the ringtailed roarer, the souped-up clown of the frontier who wagged his crooked elbows like the king of chickens and hollered that he could jump the Ohio and wade the Mississippi, that he hadn't had a decent fight in days and was consequently commencing to get wolfish around the head and shoulders and would shortly have to be salted down or he'd spoil.

They have never gone away, those half-horse, half-alligators. They were there to boost the national mania for building roads for the newfangled automobile. One of them crowed that paving over the country would create "one highly organized proficient unit of dynamic, result-getting force electric with zeal." While double-bitted axes and misery whips were taking down the great forests north of Chicago, one child of progress opined that "centuries will hardly exhaust the pineries above us." One century was all it took.

As always, there were clearer heads. A man who had made his pile in those same pineries later had this to say about Manifest Destiny: "The habitual weakness of the American people is to assume that they have made themselves great, whereas their greatness has been in large measure thrust upon them by a bountiful providence which has given them forests, mines, fertile soil, and a variety of climate to enable them to sustain themselves in plenty."

Today, we are so powerful that a little communal cool might seem in order. Yet our boosters and boasters tell us our country is better than any other, that our God

is better than any other, that we are the only people pure enough to bring democracy to the world. Needless to say, the world is not amused.

If we ever slow down enough to look closely at ourselves, we may come to realize that we are no longer the young giant among nations that Rudyard Kipling saw and many here still profess to see. In fact, ours is now one of the oldest governmental systems in the industrialized world. We don't need soothing. What we desperately need is a fresh grip on reality.

I listen to the boosters and an unwelcome question arises: Is it possible that nothing fails like success? Is it possible that its sweet smell will lead us, and with us most of the world, over the cliff? One expert answers with another question: What will happen if in time the world has "twice as many people who might be seeking three times as much food and fiber, consuming four times as much energy in five to 10 times as much economic activity?" It only takes a little reflection to realize that Adam Smith's famous invisible hand is now giving us an increasingly visible finger.

Our impact on the physical world, the world on which we are entirely dependent for our survival, is the product of population, affluence and technological advance. The population problem has already been addressed in many countries with enough success that earlier and more disturbing projections of growth have been reduced. Nonetheless, the new models predict global growth will climb from 6-plus to 9 or 10 billion in the next century or so.

The industrialized countries will escape a lot of the pressure that will devastate so many of the poorer ones, but even among the rich the old saw that there is strength in numbers will no longer apply. Especially on our home ground. Americans now number 290 million. We may grow to over 400 million before countervailing forces apply the brakes.

And something new is being added to the picture: the rise of consumption in countries that are fast developing, like China and India and a score of others. The beneficiaries of economic growth there are demanding the very items that prosperous Americans want, none more so than cars. If in China future car ownership climbs to current American levels, the total number of vehicles in the world will nearly double, vastly increasing tailpipe emissions and with them the pace of global warming.

Scientists have been able to measure the past effects of global climate change by studying the remains of plants and animals that lived during the coming and going of the last ice age, the one that was at its maximum here roughly 20,000 years ago. They find that small temperature shifts affect where living things live. Just a few degrees down or up can send them south or north looking for better digs. Ecological communities

come apart, and individual species often move by themselves to different habitats.

Some parts of the country and the world will benefit from future range change, and some won't. Our Southeast, for example, might lose most of its trees. I've seen projections showing that within a century most if not all of the maple-beech-birch forest I live in and love will be gone from New England, though some of it may remain in Canada. All told, range change in this country, along with other factors, may reach such proportions that within a century half of the American land will no longer be able to support the plants, and therefore the animals, that live there now.

Often such climate change is more rapid than many affected species can handle. And that, the loss of habitat and consequently of biodiversity, is what has worried the eminent sociobiologist E.O. Wilson. Wilson told Congress early in the 1980s that it will take millions of years to repair the damage. "This," he said, "is the folly our descendants are least likely to forgive us."

Glaciers are melting today, from Mount Kilimanjaro to Glacier National Park, and should be gone from these spots in not too many decades. (I wonder what the new name for the park will be. Ice Was Nice, perhaps?) At the poles, sea ice is also melting. In fact, recent evidence from Antarctica shows that the process can be much more rapid than scientists have been predicting. Whether or not that turns out to be true, the meltwater produced, along with the effect of warming on ocean volume, will cause considerable rises in sea level. That is not good news for places like New Orleans and Miami.

We like to call what ails the environment "problems," probably because we are comforted by the fact that problems usually—most Americans would say almost always—have solutions. These are not problems, though, they are trends. You don't solve a trend, you try to alter its course.

A main objective in such alteration is to ease our pressure on the various environmental "services," a somewhat anthropocentric term for functions without which mankind would have gone missing long ago. Perhaps the most important is nutrient cycling, the breakdown of all dead organisms into materials that enrich soils so they can continue to support life. Some others are pollination, cleansing of air and water, control of both drought and flooding, and, of course, of climate.

One way of protecting these services is through honest pricing. As things are, producers price their goods according to the costs of production plus some profit. Honest pricing would add, as an additional cost, the damage to environmental services caused by that production. For example, the honest price of automobiles and their fuels would reflect the damage to nature they cause.

Researchers are focusing increasingly on the structure of a world that could recover from the damage we've dealt it. They talk about the establishment of, say, a National Environmental Authority in this country. It would be, like the Federal Reserve, mostly independent and thus able to take the actions that legislators do not have the political courage to tackle. They talk about new approaches to international environmental law that could improve the efficiency of negotiations over things like overpopulation, overconsumption and pollution.

They talk also about what they call "biophilia," referring to what is left of a deep human love for the world around us. I prefer to use a simpler term. I call it a native sense.

For more than 99 percent of our time on this planet, we lived as foragers—hunters and gatherers. Ours was subsistence living. Don't knock it. The word means "existence in reality." People were less aware then, according to the mythologist Mircea Eliade, "of belonging to the human species than of a kind of cosmic-biologic participation in the life of their landscape." We were "part of" then—we had to be to survive. We were not "apart from."

We remember that tie to nature, even those of us who never leave our cities. We remember whenever we hear thunder or the aspirations of the rain. We remember as one season becomes another, when we look up and see and hear migrating geese in their high formations.

We can build on that remembrance, that built-in link with the world of which we are, to get corporate about it, little more than a wholly owned subsidiary. We can make native sense an important part of a new educational effort that gives the environment its just due in human affairs.

Opposition to this and other environmental advances will be intense, particularly from those who refuse to believe that beings as grand as we are should be dependent on, for God's sake, trees. But some politicians are coming around to these ideas. Some of our largest corporations have seen the light and are trying to reduce their load on the planet. A growing number of wealthy Americans, most conspicuously Bill Gates of Microsoft, are using their money to improve the quality of human life. Some conservative religious leaders are declaring that doing harm to God's creation is a sin.

But the sad fact is that very few presidents or potentates anywhere in the world will want to talk about the problem or about the fact that they are not talking about the problem. Which one of them would be comfortable about stepping to a microphone and saying, "Good morning, my fellow citizens. I thought you'd like to know that we are well on the way to committing ecological suicide"?

It is possible that the zipped lip evidenced by our leaders might be helpful. It could give the followers more of an opportunity to lead. Aldo Leopold may have

been right when he said that getting an ecological education left him to live alone in a world of wounds. But he is wrong today. There are now thousands of us who keep him company. There cannot help but be many more who will come to agree with him that "a thing is right when it tends to preserve the integrity, beauty and stability of our biotic community."

Two noted cultural historians were also right: Joseph Campbell, when he lamented that "the world is full of those who have stopped listening to themselves," and Thomas Berry, when he warned, "We never knew enough, nor were we sufficiently intimate with all our cousins in the great family of the earth, each telling its own story. The time has now come, however, when we will listen or we will die."

I think we will listen, if only because we would rather not die. It may take a string of disasters to open our ears, but we will listen. There is evidence of new activism around the world. Grass-roots activity has been a prime mover of such great causes as civil and women's rights. If and as more of us speak out, the quintessential cause of *nature's* rights may be added to the list.

I'm working on a bit of drama in preparation for just that eventuality. I see a future Carl Rove, tough as ever, hanging up a huge poster in his campaign office. It reads, "It's the ecology, stupid!"

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

Only by our picking favorites and coddling them have annuals like corn and wheat come to feed us so much.

Why Perennial Grains are Possible

Jake Doll

The plants that cover the few untouched patches of the Great Plains have their roots deep in prehistory. They are the same species that have thrived for thousands of years on black soil and hot prairie wind, surviving flood, drought and bison hooves. They build strong roots, use every available resource, and put these resources back into the soil when they die.

A walk through native prairie is a relaxing experience. The ground is steady beneath your feet. Keep walking, though, and you're sure to encounter a very different scene. A fence line or irrigation ditch will mark your passage out of prehistory and into the troubling future of our land. The broad field that greets you, whether of gently waving wheat or yellow-tasseled corn, may look reassuringly healthy, but it has none of the prairie's solidity. This type of land use is not sustainable. It requires a huge input of energy to maintain, and even with this energy it cannot be maintained indefinitely.

The Land Institute wants to make crop land behave more like native prairie. We believe that the use of perennial crops will make agriculture more sustainable. Perennials, like the native grasses of the prairie, are plants that live for years. Annual crops like corn and wheat die and must be replanted. Perennials are better than annuals at controlling erosion, maintaining soil fertility, and surviving disease and pests.

Unfortunately, most perennial plants do not produce large quantities of seed like domestic annuals. They have been ignored as viable crop species for millennia. Today, with modern plant breeding techniques and an understanding of plant genetics, it may be possible to create a perennial grain with the productivity of an annual, a plant that can support our growing population. But there remain many unresolved issues in the search for a crop that has both high seed yield *and* the characteristics of native grasses.

Evolution favors specialization. Each species, over the course of millennia, has evolved a particular set of characteristics to survive in a particular manner in a particular environment. Other characteristics, those that are too costly or unsuitable, are abandoned. Scientists call this an evolutionary trade-off: the species evolves to do

one thing well, rather than two things poorly.

Let's take a look at annual and perennial plants' contrasting specializations. Annual plants grow from a seed, reproduce and die within one growing season. They invest a large portion of their resources in reproduction. Not equipped to face the difficulties of winter or the long-term assaults of insects and disease, the annual plant gives rise to the next generation of the species through the production of hardy and plentiful seed. A perennial plant, by contrast, gives more resources to food storage, to defense against competitors and pests, and to permanent structures like roots, stems and leaves.

There seems to be a clear trade-off. Plants can invest their resources—nutrients, carbon—either in seeds or in structures that allow perenniality.

So, is it possible to develop a perennial plant with a high seed yield? Won't each increase in seed number and size take away resources, gram for gram, from storage structures? Won't we lose those valuable perennial characteristics: deep roots, hardiness, pest resistance?

In nature, this appears to be true. Annuals spread quickly across an open environment. They spring up after a fire, drought or any other event that disturbs the land. Their strategy is to multiply rapidly, cover the available territory with their plentiful seed, and then die. The seed will guarantee future generations. Perennials, like Indiangrass or switchgrass, settle into their environments and build extensive roots. They put less into seed over one season, since they'll live and produce seed for many years. Annuals and perennials have different but equally effective ways of dealing with nature's challenges. Any attempt to change them, to make annuals more perennial or perennials more annual, will make a less able plant, upsetting, in essence, the balance that nature has set. This does not mean that a productive perennial crop is impossible, only that, in natural environments, it has not evolved on its own. By changing the environment, cross-breeding annuals and perennials, and actively selecting the desired characteristics, we can overcome the evolutionary constraints that have limited perennial seed yield, creating new and exciting plants with both annual and perennial characteristics.

Here's how advantages of perennials help make this possible. Perennial plants, with big, living roots, can begin photosynthesis earlier than annuals, and often continue long after annuals have died. On average, natural systems dominated by perennials create more organic carbon than agricultural systems, dominated by annuals—despite synthetic industrial inputs. With their longer growth time they can earn a greater carbon “salary.” In the first year after planting a perennial will spend more than an annual on building structures such as rhizomes, tubers, fleshy roots and crowns, like making a down payment on a house or car. But in each subsequent year perennials can have a lesser construction cost than annuals starting from scratch. Some of this unused salary could be applied to seed. The gram-for-gram trade-off theory is oversimplified. It doesn't account for the complexity of the environment and plant genetics.

We must also realize that a new environment will dramatically change the relationship between persistence and seed production. Wild perennials have low seed production because they are contending with other plants for limited resources. The prairie is a competitive place, where water, light and minerals are precious. Wild annuals that engage in this competition also have smaller seeds than their domestic cousins. It is only in the artificial environment of the farm that annuals, selected over the course of 10,000 years of agriculture, can afford to place so much of their carbon in the form of seeds. They are coddled with nitrogen-rich fertilizer, irrigation, and disease and insect control. Perennials have never been offered this favoritism. Less competition could free them to evolve the big, plentiful seeds that we require for food production. By changing the environment, we alter the trade-off equation.

Our greatest advantage is the plant breeder. In the native prairie, excessively high seed yield is wasteful. These plants tend to be crowded out by their better adapted neighbors, an example of *natural* selection. An artificial environment, like agriculture, will allow a plant breeder to apply *artificial* selection. In our farms and greenhouses, where soil nutrients are less locked up by competitors than in prairie, the breeder will select plants that have the traits we desire. This same principle has been practiced unwittingly by farmers since the dawn of agriculture. They reserved seeds from favored plants for subsequent planting, artificially selecting for characteristics that, over time, made the annual grains we now recognize as wheat, corn, rice, etc. Today, with an understanding of plant genetics and molecular biology, we can do the same work in a fraction of the time. We are ready to apply these skills to perennials.

Of course, the goal is not to create perennials that are just like wheat or corn, but rather to fashion plants that can produce grain while emulating the characteris-

tics of native prairie: efficiency, sustainability, high productivity. Don't judge the potential of perennial grains solely by bushels per acre. Industrial agriculture, with its huge input of fossil fuels and chemicals, is currently the most productive strategy. But in the coming years, as petroleum becomes scarce and expensive, annuals' yield advantage will disappear. We'll need plants that produce abundant grain without irrigation or pesticides.

The Land Institute's efforts at breeding perennial cereal grain species have achieved some encouraging results. Crossing annual wheat with a perennial called wheatgrass has made many new plants with genes of both. Some of these plants have plump seeds and show regrowth after harvest. Similarly, breeding of sorghum with johnsongrass has produced a population of plants that contain all the necessary genes for perennial grain development. Illinois bundleflower, a perennial Plains native, already can yield near the average for soybeans in central Kansas. We're working with another high-yielding perennial Plains native, maximilian sunflower.

While these efforts have yet to produce an economically viable crop, it is clear that breeding programs with perennials can succeed. Twenty-five to 50 years of research will be necessary to produce a true perennial grain, but this investment of time seems trivial when considering the advantages. Perennial grains have the potential to greatly ameliorate the dismal ecological prospect of global grain agriculture.

Imagine a stroll through a wheat field with all the strength of the prairie, a dense mixture of perennials clinging to the earth, nurturing it, but also producing a crop sufficient for our food needs. This is no longer an idle dream. We have the tools to make it a reality. The Land Institute is looking beyond outdated models of evolutionary trade-offs to explore the promise of perennial grains.

Our Symbiotic Relation with Graduate Students

For help in reforming agriculture, The Land Institute reaches into the seminal ground of higher education.

Our graduate fellowship program funds master's degree and doctoral students to do research advancing our development of agriculture patterned after natural ecosystems. This work might otherwise not happen, because it is perceived as too risky, too lengthy or unnecessary for today's agriculture. Students can take advantage of major universities' resources.

The program plants the seeds of our ideas for school research and for when these bright young people move on to their life's work.

Fellows receive up to \$9,000 annually. We have awarded 58 fellowships since the program began in 1998. For more see www.landinstitute.org.

Following are sketches of work by the new fellows who attended our weeklong June fellows workshop.

Greg W. Shepherd
Iowa State University

Comparing Soil Water Dynamics Among Annuals and Perennials

Getting perennials into agriculture depends on understanding soil water dynamics in both annual and perennial plant communities. My questions:

1) Will different types of vegetation cause changes in depth from which plants take up moisture? 2) Will differences in vegetation affect soil moisture?

Measurements come from six plots: corn field, soybean field, brome pasture, restored prairie, restored savanna and degraded woodland. I will study where plants get water and how deep their roots are, and monitor soil moisture and groundwater.



Lauren Young
Indiana University

How Neighbor Plants Affect Illinois Bundleflower

Illinois bundleflower is a prairie legume that The Land Institute is working to domesticate. I will study the effect of neighboring plants, such as grasses, on bundleflower establishment, persistence, and interaction with insect herbivores and nitrogen-fixing bacteria. There will be experiments in plots where bundleflower was planted in varied density with perennial wheatgrass, which the institute is breeding with wheat, and in tallgrass prairie with bundleflower. This will help inform use of bundleflower in natural systems agriculture.



Brent Hulke
University of Minnesota

Perennial sunflower development

In past years I have bred domestic oilseed sunflower with wild perennial sunflowers. The offspring were perennial. I continue to make crosses between descendants and the domestic sunflower to improve characteristics of the population. In the end I hope to produce sunflower varieties with white mold resistance, high yield, good oil quality and ability to overwinter in cold environments like Minnesota.



Steve Culman
Cornell University

Exploring Microbe Diversity

I will compare the diversity and community structure of soil bacteria and fungi in a prairie with an annual grain system. This knowledge will help us manage and sustain soil fertility in the perennial polycultures of natural systems agriculture.



Brett Mattingly
Indiana University

Assembling Perennial Polycultures to Enhance Productivity and Maintain Diversity

Plant diversity is essential to natural systems agriculture because it provides pest resistance, soil maintenance and increased productivity. In plant communities, however, competitively dominant species can threaten diversity. Plant species may become dominant as a result of the order in which they are established in a community. I will alter the sequence in which native prairie species are established, to study how community assembly can manage dominant species and maintain the diversity and productivity of perennial polycultures over time.



Whitney Broussard
Louisiana State University

Linking 100 Years of Land Use and Water Quality

This project will study the relationships between land use and water quality over the past century, focusing on the effects of croplands that occupy 22 percent of the contiguous United States and dominate water quality problems. The study will identify concentrations of these pollution sources and measure shifts over the years. Results will help clarify the ecological links between agriculture and water quality, and help develop natural systems agriculture.



Matthew Rouse
Kansas State University

Natural Patterns of Disease Management

In developing a perennial polyculture of grain plants, disease management must change from using new plant varieties and genetic engineering, to using genetically diverse populations. This is one way natural plant communities control disease. The resistance of the tallgrass prairie's dominant species, big bluestem, is relatively high. I will measure how one resistance gene in big bluestem varies among plants. This will set a benchmark of natural disease management for natural systems agriculture.



Julia Piaskowski
Washington State University

Breeding Perennial Wheat with a Wild Relative

This project examines the results of incorporating large portions of the tall wheatgrass genome into perennial wheat hybrids by crossing them with each other. Which chromosomes will be retained or lost? Does the sex of the parent influence chromosome fate? In addition to perenniality, wild grasses confer novel disease resistance, stress tolerance and other valuable genetic resources. The development of perennial wheat is a key part of natural systems agriculture.



Julie Dawson
Washington State University

Comparing Nitrogen Use Efficiency in Wheat

Nitrogen use efficiency is an important trait in breeding crops. Plants that use nitrogen more efficiently need less fertilizer. In addition to costing farmers less, this can improve soil and water quality. Perennial grains' deep, thick roots and longer photosynthesis might contribute to efficient nitrogen use, but the nitrogen dynamics of perennials are not well understood. I will compare the efficiency of perennial wheat with different annual wheats, and with mixtures of perennial and annual wheats. The results will be used to develop efficient perennial grains.



The clown dancer pulls a roar of laughter from the Native Americans. As always, laughs signal something serious and worth studying.

A Funny Thing Happened on the Way to the Powwow

Roger L. Welsch

I never miss the annual Omaha tribal powwow, always held the weekend before the August full moon. I use the occasion to stuff myself with fry bread and corn soup, talk with friends and relatives, catch up on tribal news, listen to good music, and watch stirring dances.

Although I am by training a folklorist and anthropologist, at powwow time I try to avoid anything that smacks of professional observation. This is time off, and anyway, it would be a breach of the confidence of my Omaha friends to “observe” them. But it’s hard to be in a Native American setting and stay stupid. Some things are too hard to ignore.

My favorite—and most uncomfortable—moments are when a clown dancer appears in the powwow arena. It doesn’t happen every year. You never know when this fellow is going to show up, which probably says something about him right off the bat. But when he does show up, a roar of continuous laughter goes up from all the Native Americans. As always, laughter signals something serious, worth paying attention to.

The clown dancer bursts on the scene, usually stumbling into the dance arena not through the traditional, prescribed opening to the east but from among the dancers and viewers seated around the arena. Chaos reigns as he stumbles over benches, audience members, lawn chairs, and dancers on his way into the arena.

His dance is, er, distinctive. His sense of rhythm is horrid, but even worse, he dances counterclockwise around the central drum, directly against the flow of all the other dancers. This is not only disruptive and clumsy, it is unheard of: besides being bad manners, it is considered very bad luck for everyone in attendance.

Among the Omaha it is very important that everything end with the last beat of a song. I sat at the Omaha drum for many years learning songs, but finally gave up not only because the repertoire was clearly beyond my abilities but also because I became a nervous wreck from the fear of striking the drum one beat after the final thump, a humiliation for which my German upbringing had not equipped me. In competition, an Omaha dancer, no matter how skillful, is eliminated

from the contest if he or she dances one step after the final note of the song. The clown dancer dances not just one step after the last beat of the song, but four, five, ten steps. He is lost in the music in his own head and preoccupied with checking the time on a large alarm clock in his hand.

Between dances he talks loudly with others, even while tribal elders are addressing the crowd, a violation of tribal courtesy. Even worse, he throws his arms around the shoulders of visitors and tribal members, even women, a dreadful breach of ethics in a community where a woman trying to get through a clogged aisle will leave and find a male relative to tap the shoulder of the man obstructing her passage rather than touch him herself.

There is no convention or courtesy the clown dancer does not ignore, no taboo he doesn’t breach. He finds ways of offending others and embarrassing himself that you’d have to go out of your way to think up. He does nothing right. Nothing.

There is no confusing the clown dancer with fancy dancers, jingle dancers or traditional dancers in the arena. He is dressed in an ancient, oversize, double-breasted suit, clearly purchased at a Goodwill or Salvation Army clothing store or rescued from the back of some closet. He is wearing a garish necktie, oxford shoes, and a homburg. A white linen flour sack pulled over his head hides his face, and on the sack are painted bright blue eyes and red lips, a startling contrast with the dark skins of the dancers around him. (I use the male pronoun, but in keeping with his hopeless perversity, this “man” is often, I have learned, a woman.)

In his hand, instead of a staff or dance ax or feather fan, the clown dancer carries the alarm clock, attached to his waist or vest with a stout rope or chain. As he “dances,” he refers again and again to his clock, meanwhile colliding with other dancers, bumping singers at the drum, and stepping on the feet of visitors and dancers seated around the arena.

The message is clear—except maybe to some European American visitors: The clown dancer is the

white man. This is me and my people as Native American “anthropologists” see us. They are good at it because they have so many opportunities to see the white man at work and play. I have to travel 175 miles to visit my Omaha friends and relatives. I am on the reservation a few times a year, a day or two at a time. I witness and learn Omaha ways, but the process is slow and incomplete.

Omahas live constantly in contact with the white man’s world. They can’t escape it for long, even when they want to. They see mainstream American culture every day, every hour. They know it well enough to offer up a good imitation of it.

At community festivals—regional, ethnic, historical, whatever—people project an image of themselves as they wish to be seen, as they for the moment see themselves. Occasionally, as in the Omaha clown dancer, they also capture others as they see them, providing perhaps the ultimate lesson gained in anthropology—a chance for the observer to be the observed. In a valley of the Omaha reservation near the Missouri River north of the city of Omaha, far away from my own home, I learn not nearly as much about the Omahas as I learn about myself.

Tasting the Dust

Jean Janzen

The way he brings it in,
leaves falling from his hair,
then kisses me, you would think

that gardening is pleasure,
which he says it is, digging deep
to kill bermuda roots, piercing

his hands on roses.
Sweat drips into my eyes
from his forehead, physician

curing himself with soil.
Sometimes I join him, raking
the pages of leaves, but the garden

is his, the place which gathers
struggles from his hands
and returns its own—

the story of dust, an origin
so deep and dense, it rose
like fire to make the mountain,

a narrative of tumble
and breakage from its sides,
the wet roar of ages

under the slow beat of the sun.
The mountain offering itself
in mud, sticks and stones

for his spade, his touch,
to make of it a shape and fragrance,
to taste the center of this earth.

Biting the Land That Feeds Us

Jim Scharplaz

I am a rancher. I live on the land I grew up on, in the house my father built for us. For over 25 years, I have tended descendants of the same cows my parents bought when they married 64 years ago.

I am also a licensed professional engineer. I hold an advanced degree in agricultural engineering. I have done university agricultural research, and I have designed and built specialized machinery to farm research plots.

I think I have a pretty wide view of agriculture.

What I see are wonderful people doing their best to care for creation and produce healthful food. And I see practices that pollute the soil, water and air, and destroy our long-term ability to feed ourselves.

It's easy to blame lazy, greedy farmers for destructive farming. But I believe that our federal farm program is largely responsible. The main objective of this program is cheap food and raw material for industry. It forces farmers to cut corners with our soil and water, to use practices that harm the land on which agriculture depends.

As our food source suffers, so eventually do we all.

For about 15 years, I have worked in efforts to change the things in agriculture that, if not stopped, will lead to hunger in the future. Others have worked far longer and harder than I have.

Have things changed? Certainly. They have gotten worse.

According to the Oakland-based group Redefining Progress, Americans are running down the earth's biological capital at a rate five times what can be sustained. More fertilizer has polluted the rivers, more topsoil has washed away to the ocean, and more pesticides have polluted the groundwater. Noxious odors and dust have fouled the air. Bioengineered "Frankenfoods" have infiltrated the supermarket and corrupted the gene pool. Multinational corporations have commandeered the marketplace. And many more of those wonderful people have had to leave their farms forever.

That's not to say that efforts have been wasted in promoting an agriculture that can furnish abundant food and also protect our soil and water. The situation would be far worse without this work. But I no longer believe that farmers alone can change agriculture for the better.



Many nonfarmers are as concerned as anyone else about this situation. And now that 98 percent of Americans don't farm, the decisions these nonfarmers make about what to buy, what kind of work to do, what to value, and what kind of public policy choices are made, are more important than the decisions farmers can make about how to farm.

I realize the farm program can be very confusing to nonfarmers. In fact, it is often very confusing to farmers. But non-

farmers must become far more involved in shaping farm policy, if for no other reason than that their taxes pay for it. For their money, they should get a program that encourages production of the kind of food they want to eat, grown in a way that assures that generations to come can eat as well.

Specifically, they should demand more money for the underfunded Conservation Security Program, which rewards farmers for good conservation practices, not the volume of crops they grow.

Furthermore, nonfarmers should demand rewards and regulations that encourage farmers to switch to organic methods, which shun synthetic fertilizers and pesticides. Lobbyists for agricultural chemical companies have major influence over farm legislation, while the organic industry is much weaker. Nonfarmers must weigh in on the side of organic farming. They can start by insisting that the Agriculture Department defend its new organic rules against those who would loosen them.

Farmers and ranchers are a small minority of our population. We no longer have the political muscle to shape a farm program that will keep us on the land, topsoil out of the river, and food on your plate. Whether our grandchildren will eat is up to nonfarmers.

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

Rural War

The war in Iraq is killing rural Americans at a markedly higher rate than those from big cities and metropolitan areas.

Robert Cushing, a retired University of Texas sociologist, and Bill Bishop, a reporter for *The Austin American-Statesman*, hypothesized that fewer job and education chances in small places distant from metro areas lead more rural residents to enlist in the military. They noted that military studies consistently find that a poor economy boosts recruiting success.

The researchers used data from the 2000 census, and from the Defense Department for deaths through August 8. They found that nearly equal numbers of Americans ages 18-54 live in counties of more than 1 million and counties of less than 100,000. But the small

counties had lost 576 people in the war, the big counties 350. Counties with fewer than 50,000 residents and disconnected from metro areas had a death rate nearly double that of counties the same size but part of larger metropolitan areas.

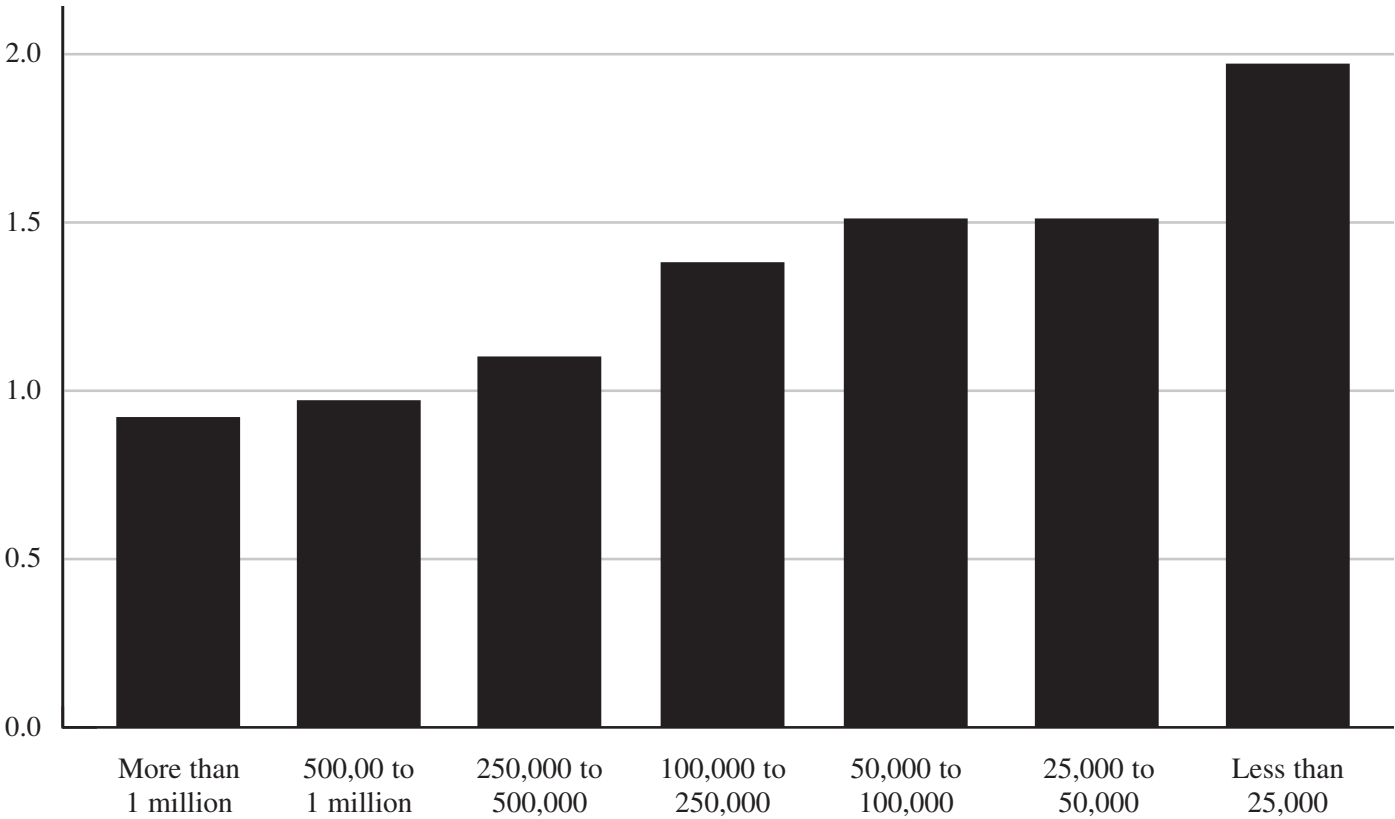
Bishop and Cushing wrote in an op-ed for *The New York Times* that monuments to soldiers sacrificed in this war will be found less often in thriving urban centers than in lagging rural communities.

For more on the study, write to Bishop at bbish@austin.rr.com or 1415 Alameda Drive, Austin, TX 78704.

Defense Department data are at <http://web1.whs.osd.mil/mmids/casualty/castop.htm>.

Death Rate by County Population Size

The left column is a gauge for deaths per 100,000. Bottom numbers are county size. The ages considered were 18-54, the range of almost all U.S. fatalities in the Iraq war.



At the Land

Graduate Fellows

The graduate students whose research we help fund met in June for their annual weeklong workshop in Salina and our schoolhouse in Matfield Green, a small town in the Kansas Flint Hills. There they heard speakers from around the country on topics related to our work.

Angus Wright urged the students to careers of rigorous professionalism, following truth in the face of political pressure. Wright, a Land Institute board member and just retired from teaching environmental studies at California State University in Sacramento, wrote *The Death of Ramon Gonzalez: The Modern Agricultural Dilemma* to expose damage done to the people and land of Mexico by pesticides on vegetable crops. He also has covered the movement by poor Brazilians for land reform under threat of assassination. Wright told the students that many would go on to teach not at prestigious schools, but at state and community colleges—and that they should recognize how this can be a blessing, with less pressure to publish at the cost of research, along with administrators more grateful for what is published, and with more freedom. Students gave Wright a standing ovation.

Dennis Dimick, associate editor of National Geographic, told how the magazine takes on the difficulty of telling complex, controversial stories to a wide audience. He said the editors are cautious to be objective, going to the source rather than relying on others' reportage, and not hamstringing the story with supposed fairness when there is a scientific consensus on something like humans fueling global climate change—evidence trumps controversy. Dimick said the importance of environmental challenges has led editors to make them central to many recent articles.

Eric Sacks told of breeding perennial rice in the Philippines. Sacks and his co-workers at the International Rice Research Institute crossed upland annual rice varieties, grown by subsistence farmers on poorer soil, with wild relatives, and got hybrids that could produce the underground stems of a perennial plant and the grain yields of a crop plant. The results now are being worked on by Chinese scientists. We are communicating with them.

William Schlesinger talked about how agriculture cycles carbon, and how it might take more carbon dioxide, the primary greenhouse gas, from the atmosphere and store it in soil. Schlesinger, a Duke University biochemist and a member of the National Academy of Sciences, said one key to carbon sequestration is to avoid soil disturbance, which releases it to the air. Another is plants that are better at pumping carbon below ground. And the amount of carbon to remove

from the air could be lessened with less burning of fossil fuel to make farm chemicals. A path to reach all of these goals is replacing annual crop plants with perennials, The Land Institute's aim. But even under the best circumstance, fields storing carbon will play a minimal part in avoiding climate change wrought by industrial living.

Gene Turner told how 200 years of tillage has sent nutrients from North America's landscapes to contaminate the seas around river mouths and drive away most life. He and his wife, Nancy Rabalais, are researchers at Louisiana State University and have been key in understanding how farming in the upper Midwest can make a dead zone where the Mississippi dumps into the Gulf of Mexico. This area and others have swollen in the past few decades with the dramatic increase in use of synthetic fertilizer. The problem is not just from runoff carrying the fertilizers, but because the fertilizers have allowed growing of annual crops on land previously considered unworthy. This releases to leaching vast amounts of nitrogen once held in check for cycling by perennial vegetation.

Professor John Reganold and graduate student fellow Matthew Arterburn described agroecology studies and breeding of perennial grain crops at Washington State University. They presented this as case study of a university and The Land Institute as complements. The institute has inspired the school in work on perennial grains. The school has added breadth to our effort with its resources and by being in a different region of the country. Washington State is increasingly known for its sustainable agriculture program. It is the first school to offer a degree in organic agriculture.

Sasha Kramer told about the Millennium Ecosystem Assessment, a United Nations-sponsored report that found two-thirds of what ecosystems give us—water and food, control of pests and pathogens, renewal of fertile soil, control of floods, and more—are being degraded. Kramer is a former fellow at Stanford University studying greenhouse gas emissions and nutrient retention in agriculture.

Peter Simonson, who teaches rhetoric at the University of Pittsburgh, critiqued the workshop for us last year and returned for refining this year. He also told the students about how scientists can communicate well with both scientists and lay people by addressing the five classic canons of rhetoric—invention, arrangement, style, memory and delivery; with thinking about audience, occasion and purpose; and by recognizing that rhetoric is an art guided by principles that can be defined and learned—that being bad at public speaking is not insurmountable.

Pete Ferrell led a tour of his 10,000-acre cattle ranch south of Matfield Green, and told how he has worked for both production and sustainability by moving herds to control when and how much they eat of a place. Ferrell is a Land Institute board member. His ranch is in the Flint Hills, the largest preservation of tallgrass prairie in the United States, and at once one of Kansas' most vulnerable landscapes and least degraded, because the thin topsoil could not take the plow and annual cropping that the institute seeks to replace.

We now have 20 active fellows and 40 former fellows in this 7-year-old program. Their growing number challenges good communication among us all. So we invited former fellows to meet current fellows at the workshop. A quarter of former fellows attended, at their own expense. From this gathering we hope to make a well-connected, self-reinforcing network that will influence university research agendas and perhaps policy for decades to come.

For short descriptions of our fellows program and the new fellows' work with us, see page 18.

Presentations Made

Forty people attended the Memorial Day weekend Short Course, the largest group to take this introduction to our work. The students are of varied ages and backgrounds. Many think about becoming researchers in fields that might fit our graduate student fellowships.

Institute staff members spoke at a lecture at the University of Manitoba, for a wheat conference in Bowling Green, Kentucky, at an Earth Day seminar in Colorado Springs, Colorado, at meetings of the Center for Humans and Nature in Baraboo, Wisconsin, and Libertyville, Illinois, for the conservationist group Green Lands, Blue Waters in Minneapolis, Minnesota, and at the Iowa Prairie Conference in Cedar Rapids, among other places.

We also had many visits from high school and college students, and other groups large and small.

Tours

We would enjoy meeting you, telling our story and hearing yours. Please call or write ahead. We give guided tours only with advance arrangement, from 8 a.m. to 5 p.m. weekdays. Walking around without a guide may be pleasant, but it will leave you with more questions than answers. We are about 8 miles from Interstate 70 and 3 miles from Interstate 135, so it is easy for people passing through Kansas to stop in. See more on our Web site at "Visit," or call us at 785-823-5376.

Presentations Scheduled

September 8, Springfield, Missouri
September 20-27, Adelaide Australia
September 23-25, Prairie Festival, Salina, Kansas
September 29, Crested Butte/Gunnison, Colorado
October 19, Wichita, Kansas
November 8, Topeka, Kansas
November 6-10, Salt Lake City

For details, call us or see Calendar at www.landinstitute.org.

Prairie Writers Circle

We send op-ed essays to newspapers around the country. Recent topics: depletion of the Ogallala Aquifer, human shortsightedness, drug companies polluting India, political reform in Kansas, bulldozing landscapes, populism, trees and power lines, the unsustainability of oil production, learning from the new West, and the danger of synthetic herbicides.

Contributor Jim Scharplaz's essay "Weeding Out the Skilled Farmer" is in the college textbook *Subjects/Strategies: A Writer's Reader*. For Scharplaz's latest, on how saving farmland takes nonfarmers, see page 22.

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

Prairie Festival, September 23-25



Bill McKibben, author *The End of Nature*, the first book on climate change for a general audience, and *Enough: Staying Human in an Engineered Age*.



Sue Halpern, author of books including *Migrations to Solitude*, about people living solitary lives, and *Four Wings and a Prayer: Caught in the Mystery of the Monarch Butterfly*.



Craig Holdrege, biologist and author of *Genetics and the Manipulation of Life: The Forgotten Factor of Context*. He directs the The Nature Institute in upstate New York.



Carl McDaniel, author of *Wisdom for a Livable Planet*, which profiles activists for sustainability, and *Paradise for Sale*, on change to a Pacific island from mining fertilizer.



Strachan Donnelley, president of the Center for Humans and Nature, writer of articles on conservationist Aldo Leopold, biologist Ernst Mayr and philosopher Albert North Whitehead.



Wes Jackson, Land Institute president and author of books including *New Roots for Agriculture* and *Becoming Native to This Place*, for connection and devotion to locale.

David Kline, Ohio farmer, editor of *Farming Magazine*, and author of *Great Possessions: An Amish Farmer's Journal and Scratching the Woodchuck: Nature on an Amish Farm*.

Plus

- Barn dance.
- Singer-songwriter Anne Zimmerman.
- Food by chef Donna Prizgintas.
- Free camping.

For more, including a schedule, see www.landinstitute.org.

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as we work together toward greater ecological sustainability. Thank you to you, our perennial friends.

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Winesap from barn. From *John Szarkowski: Photographs*.

The Writers and Photographer

Bill Vitek is associate professor of philosophy at Clarkson University in Potsdam, New York, and co-editor, with Wes Jackson, of *Rooted in the Land: Essays on Community and Place*. He can be reached at Vitek@clarkson.edu.

Wes Jackson is president of The Land Institute. His books include *New Roots for Agriculture* and *Becoming Native to This Place*.

John Szarkowski was director of photography at the Museum of Modern Art in New York for almost 30 years. Books of his photographs include *The Idea of Louis Sullivan* and *The Face of Minnesota*.

William H. MacLeish wrote *The Day Before America: Changing the Nature of the Continent* and *The Gulf Stream: Encounters with the Blue God*.

Jake Doll worked as a research assistant at The Land Institute this winter. He taught biology for the Peace Corps in Mozambique for two years, and has begun medical school at Columbia University.

Folklorist Roger L. Welsch lives on a tree farm in Dannebrog, Nebraska. His books include *A Life With Dogs* and *Everything I Know About Women I Learned From my Tractor*.

Jean Janzen, of Fresno, California, travels to give poetry readings and workshops. Collections of her poetry include *Piano in the Vineyard* and *Tasting the Dust*. A book of essays is *Elements of Faithful Writing*.

Jim Scharplaz raises cattle in Ottawa County, Kansas, and serves on the board of the Kansas Rural Center.

A Gentle Nudge

Most of us can use a nudge now and then to act on something we intend to do—such as writing or updating a will. If this describes you, consider this a nudge.

Most of us have seen the difficulties that arise when a person dies without a will. People who intend to include The Land Institute and others as beneficiaries know they will not get their wish unless each bequest has been clearly stated in a valid will.

The resulting peace of mind is a good result for you. It is ideal to complete so important a matter under no pressure, to be able to consider the options carefully and make sound decisions.

For simple information to provide your attorney to include The Land Institute in your will, please call Joan Jackson at 785-823-5376.

One more nudge—please do it soon. We would be pleased, too, to know if you have already named The Land Institute in your will. With permission, we would like to note such generosity in our Land Report acknowledgments.

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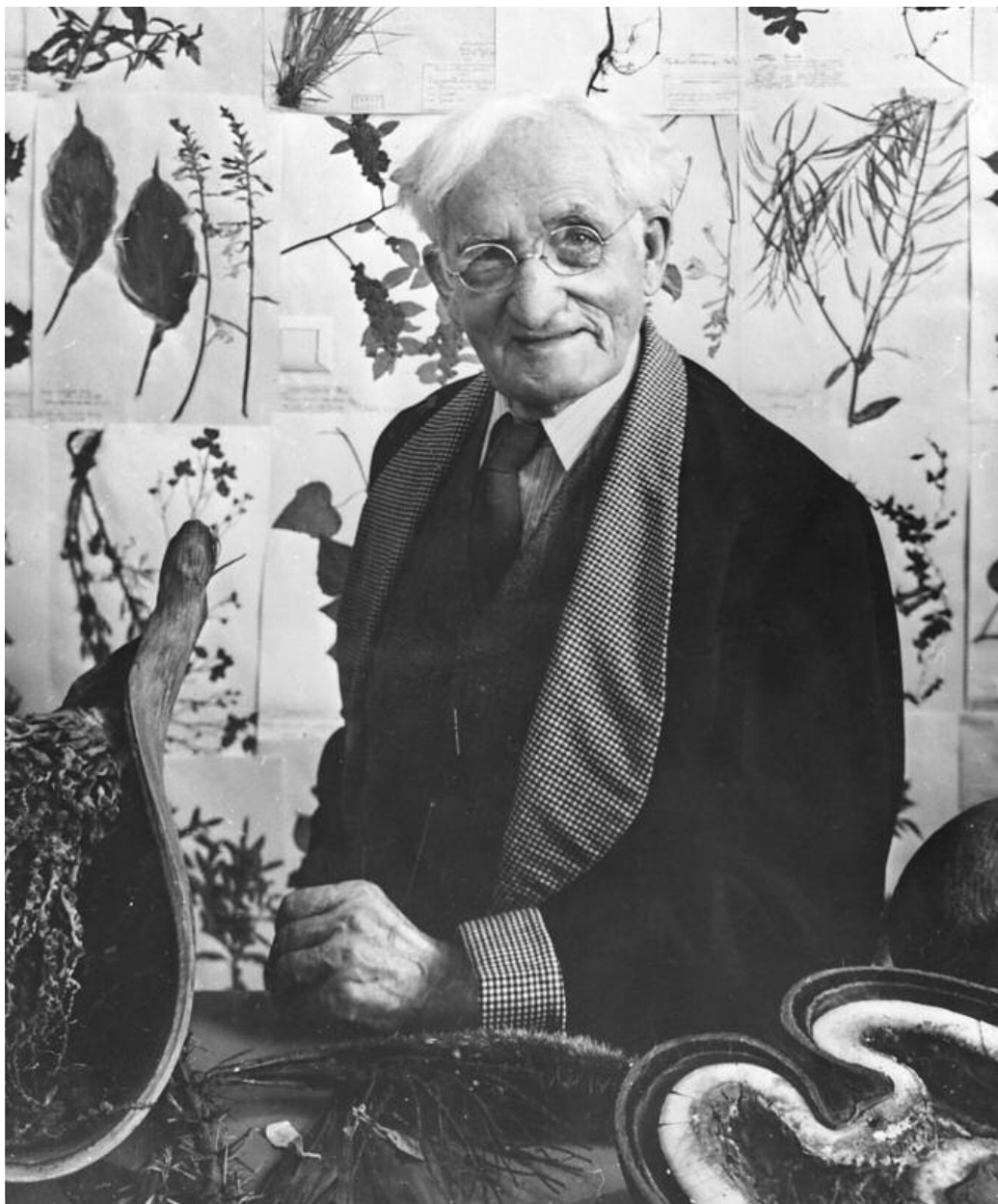
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LR82



Cornell University Library.
The botanist Liberty Hyde Bailey with specimens from his hortorium, 1949. "Call it an hortorium," he wrote. "A repository of things of the garden—a place for the scientific study of garden plants, their documentation, their classification and their naming."



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