

LAND REPORT

THE LAND INSTITUTE • SUMMER 2011



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.

OUR WORK

Thousands of new perennial grain plants live year-round at The Land Institute, prototypes we developed in pursuit of a new agriculture that mimics natural ecosystems. Grown in polycultures, perennial crops require less fertilizer, herbicide and pesticide. Their root systems are massive. They manage water better, exchange nutrients more efficiently and hold soil against the erosion of water and wind. This strengthens the plants' resilience to weather extremes, and restores the soil's capacity to hold carbon. Our aim is to make conservation a consequence, not a casualty, of agricultural production.

LAND REPORT

Land Report is published three times a year. ISSN 1093-1171. The editor is Scott Bontz. To use material from the magazine, reach him at bontz@landinstitute.org, or the address or phone number below.

ELECTRONIC MEDIA

To receive Scoop, e-mail news about The Land Institute, write to Joan Jackson at olsen@landinstitute.org, or call. Our Web site is landinstitute.org.

SUPPORT

To help The Land Institute, see the contribution form on the back cover, or contribute online at landinstitute.org. Funders receive the Land Report.

TO REACH US

The Land Institute
2440 E. Water Well Road, Salina, KS 67401
phone 785-823-5376
fax 785-823-8728
info@landinstitute.org

DIRECTORS

Anne Simpson Byrne
Vivian Donnelley
Terry Evans
Pete Ferrell
Jan Flora
Wes Jackson
Patrick McLarney
Conn Nugent
Victoria Ranney
Lloyd Schermer
John Simpson
Donald Worster
Angus Wright

STAFF

Scott Bontz
Carrie Carpenter
Marty Christians
Cindy Cox
Sheila Cox
Stan Cox
Lee DeHaan
Tiffany Durr
Jerry Glover
Adam Gorrell
Stephanie Hutchinson
Joan Jackson
Wes Jackson
Patricia Johnson
Ron Kinkelaar
Glenn Laubhan
John Mai
Grant Mallett
Bob Pinkall
Steve Renich
John Schmidt
Duane Schrag
Scott Seirer
Freddie Smith
David Van Tassel
Cindy Thompson
Shuwen Wang
Darlene Wolf

CONTENTS

LAND REPORT 100, SUMMER 2011

4	At the Land	15	The Future of Food Prince Charles
7	Hardening Off Wes Jackson	27	The Land Rudyard Kipling
8	A Rock Rolls Scott Bontz	29	Thanks to our contributors
11	Prairie Festival recordings	31	The writers and artists
12	Prairie Festival 2011	32	Donation form

Cover: "Front's Edge," by Lisa Grossman. Oil on canvas, 24 x 20 inches. Grossman will show paintings at The Land Institute's Prairie Festival, September 23-25. For another sample, and introduction of festival speakers, see page 12.

Contents photo: Also scheduled for the festival is a book of Land Institute President Wes Jackson's selected essays, "Nature as Measure." This is the book's cover photo, by Scott Bontz, and shows the institute's perennial grain crops in the making: intermediate wheatgrass, sunflower, Illinois bundleflower, hybrid wheat, and hybrid sorghum.





Last year researcher Lee DeHaan and about half a dozen workers spent two days hauling 4,800 intermediate wheatgrass seedlings from greenhouse to the field and transplanting them by hand. This year in about three days they moved five times as many seedlings. The difference was The Land Institute's new me-

chanical transplanter. Two people take seedling plugs from flats and drop them into chutes. The machine plants and waters the plugs. Other workers follow to assure proper deposit of the seedlings. From left: Kevin Urban, DeHaan, Kirsten Hansen, Elizabeth Peuchen, and Adam Gorrell. Scott Bontz photo.

At the Land

\$695,000 FOR WHEATGRASS

A team of researchers at the University of Minnesota and The Land Institute's Lee DeHaan won a \$695,000 grant to breed intermediate wheatgrass, a perennial grain in the making, and study how it can be put to use in food and improved for fuel. This is perhaps the biggest step to develop wheatgrass as a grain after DeHaan's work with it here over the past seven years. It involves more than breeding: the Minnesota team will include a soil researcher, an economist, and food scientists. The startup funding, from the university's Initiative for Renewable Energy and the Environment, will be spread over three years. Then the effort will need to seek more money.

DeHaan helped write the grant proposal. He'll provide improved starter seed – he's seen steady gains in seed size and yield of about 20 percent per generation. And he is spending six weeks at Minnesota to help the program. The university's project is to

- breed plants for yield and perform well in Minnesota.
- study how the grain can be used and improved as food.
- study how genetics, fertilizers, and legume intercropping affect seed yield, flour quality, carbon sequestration, profitability, and the amount and quality of stems and leaves for ethanol or direct burning.
- study tradeoffs between seed yield and biomass yield.

- study where growing wheatgrass makes the most economic sense.

The Land Institute focuses on breeding perennial crops for grain. But studies by us and researchers elsewhere show that hay can be removed from fields of perennials for decades with no apparent harm to soil – which doesn't hold for annuals. (See page 20 of the fall 2009 Land Report.) So, as the Minnesota team said, "producing food and fuel with the same crop would remove the either-or scenario of current biofuel crops, which require the sacrifice of potentially food-producing land to plant them."

DeHaan wants researchers beyond Minnesota to join the work. Expansion could help make Kernza – The Land Institute's trademark name for wheatgrass – a commercial grain crop in as little time as another decade. University researchers are unlikely to take on writing large grant proposals for Kernza, because they don't know the crop and don't want to do all the background work. But they are willing to collaborate if someone helps them through. "I now see a big part of my work is to be a 'jumper cable' to get this work going in other places," DeHaan said.

More broadly along the line of enlarging the team: researchers at Michigan State University, who are studying though not yet breeding wheatgrass and early perennial wheat hybrids supplied by The Land Institute and Washington State, hosted a

meeting in July of more than two dozen researchers interested in perennial grains, including from Canada, Australia, and the US Department of Agriculture, and three Michigan farmers. They traded notes and considered formation of an organization that might be called International Perennial Grains Society.

And on a note more refined: Free State Brewery in Lawrence, Kansas, made a lager beer with Kernza. DeHaan said, “The local, admittedly biased, reviews were good.”

NEW MANAGER

After 16 years, day-to-day management of The Land Institute changed hands. Our first managing director, Ken Warren, retired in June, after helping for a month to train his replacement, Scott Seirer.

Seirer, 60, had retired three years earlier as executive editor of our local newspaper, after 38 years in journalism. He kept busy with volunteer work, including as a Medicare counselor and a cooking teacher. The connection that comes with volunteering, however, is not the same as with a regular job, he said. Warren persuaded him to take the reins of a growing farm science nonprofit. Seirer said, “I’ve always been an admirer of The Land and think a lot of the mission.” And, “The opportunity to help with work that could be of global significance is a particularly persuasive argument.” He will be our budget overseer and bottom-line watcher, business and personnel manager, and public speaker and tour leader.

Seirer grew up in Mankato, in north-central Kansas, began newspaper work as a photographer for the Salina Journal, went on to write and edit at other papers, and finished that career as the Journal’s executive editor. For an appreciation of Warren, see page 8.

SOWING THE IDEA

The April issue of National Geographic presented a concise argument for perennial grains, including note of our work. Illustration was a photo of plants we grew: young annual wheat took a fraction of the first page, while established perennial intermediate wheatgrass spanned that and the facing page, then continued on a third. The comparison is fair, since for most of the year a wheat field has little to no living roots.

An article by researchers at The Land Institute and university affiliates ranked in February in the top 1 percent for citation by other scientists in papers about environment and ecology – meaning it was widely read and useful. The article was “Harvested perennial grasslands provide ecological benchmarks for agricultural sustainability.” The journal was *Agriculture, Ecosystems and Environment*. Evaluation came from the Thomson Reuters service.

The January 28 issue of Kiplinger *Agriculture Letter*, which offers “forecasts for agribusiness decisionmakers,” noted perennial grains could be profitable in 10 years, because of technology advances, researchers in China and mainstream universities joining The Land Institute’s work, and potentially huge savings to farmers.

Kansas City Public Television produced an eight-minute video about The Land Institute’s work. You can watch it at <http://www.youtube.com/watch?v=Ijv7y-WEgE4>.

Land Institute staff members made presentations in Germany, Washington, DC, Maine, Massachusetts, New York, Utah, and Indiana. Upcoming: October 4 in Powell, Wyoming; October 12 in San Francisco; October 20 in Beltsville, Maryland; November 30 in Urbana, Illinois; January 23 in Chestnut Ridge, New York; March 29 in Indianapolis. For more, call 785-823-5376 or see Calendar at landinstitute.org.

HARDENING OFF

WES JACKSON

This Land Report is number 100. Here is a thought from the first, in December 1976.

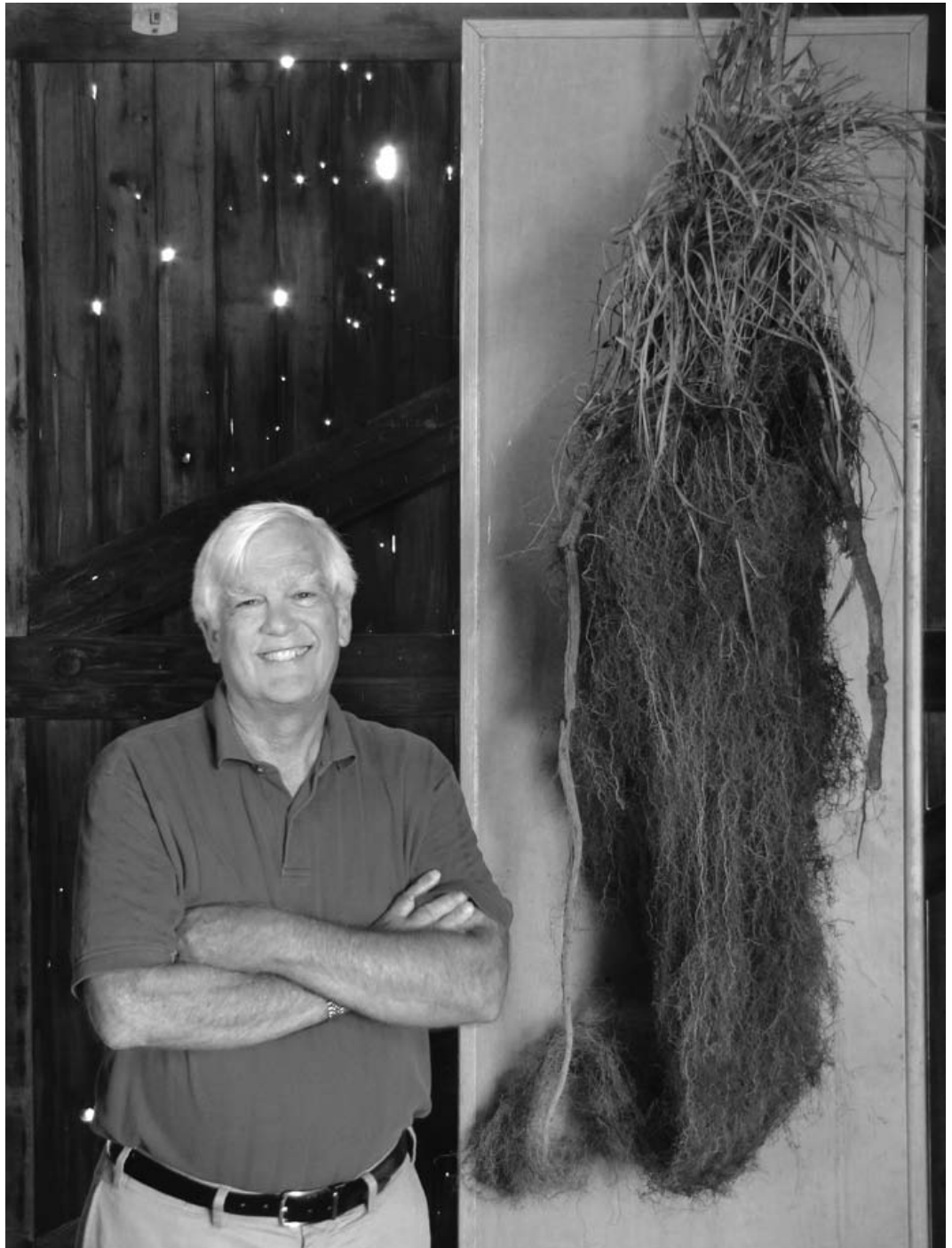
Once planted some seeds of a wild winter annual in small pots in a greenhouse. They were painstakingly watered and fertilized and produced a green, luxurious growth, surpassing in overall vegetative vigor their relatives in the field. From experience, it was known that if we moved these plants from the cozy greenhouse environment and left them outside, they would be vulnerable to the very environment which had shaped their ancestors. A high percentage would be unable to withstand the shock and might die, not because they lacked the genetic potential to resist the environmental extremes, but because the narrow greenhouse environment had not called forth the broad spectrum of genetic potential necessary to endure the adversity usually presented to wild populations.

The United States as a developed country might be regarded as a greenhouse culture. Lately we have been watching a gathering storm outside our comfortable environment and have become suddenly cognizant of how vulnerable our culture is. We lately anticipate that our cozy environment may fast disappear. In fact, only a few supporting sub-systems responsible for our affluence need falter, and we will find ourselves “out in the cold.”

There is a way to gradually prepare greenhouse plants for a full life outside. It is

called “hardening off.” By placing the plants outside a few hours a day at the beginning and gradually increasing the amount of time they are left outside, eventually they can be safely left there. The first time they are placed outside, on a quiet, warm afternoon, the outside environment may appear to differ very little from the greenhouse environment. But it is an important first step, and somehow it seems different. What we are doing, during this “hardening off” period, is giving the plant the outside conditions and the time to “kick in” the genetic machinery it has and needs to cope physically and psychologically with the outside environment.

One might say that our main purpose here at The Land is to provide alternatives to the present for a cultural “hardening off” process. Student work on projects described on these pages may be no more than moving plants from a warm, still greenhouse to the outside on a warm still day. But we hope most of our activity is a bit more than that. We know that if we jump too quickly into the world of the future, we might become so discouraged that we refuse to venture out again. We hope that one day we may regard being whipped by the wind as being touched by the earth, rather than threatened with wilt, but that can happen only if we have been properly “hardened off.”



Ken Warren and perennial roots. As they are to soil, he was to The Land Institute. Scott Bontz photo.

A ROCK ROLLS

SCOTT BONTZ

Ken Warren, geologist by training, loves fossils. But, at 66, he wants to avoid career “dinosaurism.” The man who 16 years ago became The Land Institute’s first managing director retired in June. He felt he’d done all he could for us. He wants more time with family: his wife and two children, who now have their own. And he seeks more field work in geology, after that first love’s subduction four decades ago, initially by a career in finance, then by a soil-saving nonprofit whose budget he saw quadruple.

Warren’s replacement is Scott Seirer, former executive editor of the Salina Journal. For more about Seirer, see page 6.

My office was next to Warren’s. Over my shoulder I could ask and learn from him about geology, agriculture, Land Institute history, music, almost any place in Kansas – especially if it had good food – and, it seemed to me, most of the people I’d heard of in Kansas. If he didn’t have an answer, he often knew where it was in his library, and brought it to me the next day.

I could listen to Warren talk with visitors. He was our leading tour guide. “I think the natural ham in me comes out,” he said. Through hundreds of presentations, he remained perennially animated pitching for perennial grain polyculture. He incorporated what he learned from one group to use with the next. He hoped for intelligent engagement with newcomers. He was happiest with challenging questions.

I heard and watched Warren with

staff. He was the boss but never bossy. He was master of balance at listening and talking. He seemed never to turn anyone away. Institute President Wes Jackson regularly landed in his office to make Warren a sounding board.

Sometimes those visits seemed as much to trade stories as to present ideas. About many of those many people he’s known, Warren has funny stories. He’s a shameless punster, an impromptu recitalist of Tom Lehrer satire, and was the audience-milking emcee of institute Prairie Festivals.

“I’m not sure I know anybody who’s funnier to be around than him,” said longtime institute supporter David Wristen. “And yet he was so serious and passionate about what we cared for, which was the work of The Land Institute.”

Growing up in Manhattan, Kansas, Warren regularly visited his grandparents’ farm two counties north of The Land Institute. The farm was diverse: poultry – which he came to dislike – cattle, milk, cream, wheat, brome seed. This “nongarden spot” also had wildlife, which Warren did like.

“I also liked the fact that high on the hills were interesting rocks with fossils in them,” he said. His family visited Colorado’s front range when he was about 12, and Warren recognized one sedimentary rock as a type he’d seen on the farm. He was amazed to realize that two places now so different were at an earlier time of common ground. A geologist was born.

He earned bachelor's and master's degrees in geology at Kansas State University. This included time at Yale to focus on paleobotany, the study of plant fossils and ancient vegetation, and summers working for oil companies on Alaska's North Slope. At that time about the only work available to a Midwestern geologist outside academia was in petroleum. Warren lined up a job with Mobil. They turned him down after a physical showed sarcoidosis in his lungs. The disease cleared up, but by then it was too late. He had a good contact at a bank at home, and went to work in finance. "I was never comfortable in that business," Warren said. "But I stayed in forever, for what reason I don't know." Forever was 25 years.

Through this he kept reading science, examining rocks, helping with Boy Scout merit badges. And he kept an interest in farming. As a young man he discovered and was taken by Rachel Carson's expose of agricultural and industrial chemicals, "Silent Spring," and Aldo Leopold's exploration of the land ethic in "A Sand County Almanac."

Returning to Kansas State for an alumni event, Warren went with a professor to The Land Institute. He became a supporter, a "Wes Jackson groupie." But after each Prairie Festival he dragged himself back to Merrill Lynch.

"What really tipped the balance," he said, "was reading 'Your Money or Your Life,'" by Vicki Robin and Joe Dominguez. At a function held for The Land Institute at Warren's home, Jackson in a lighthearted way suggested to him the managing director job. Warren's wife, Nina, encouraged Jackson to follow up on the offer, and he did. Warren said the book had made him "pretty vulnerable."

So he came, in the mid-1990's, a time of great change at The Land Institute. "He allowed us to be more effective, allowed our

expansion in ways that were less chaotic," Jackson said. Warren brought a science background, experience managing money and people, a history of being a friend of the institute, and, Jackson said, a low price. "We couldn't have asked for more."

The two men's philosophies matched: plant breeding per se is important, but more so is how we grow food and treat the world. A reader of the history of science, Warren knew of both its accomplishments and its abuses. He has liked seeing The Land Institute increase its scientific endeavor in plant research while remaining mindful and ethical about consequences.

The most important thing for him as manager was to make the institute an easy place to work. "I hope I've made it a place where people can look at having a career, and not just look at it as a temporary job until something better comes along," he said. Jackson said, "I think that everyone here likes being here, and he has to be given a lot of that credit."

Warren doesn't take much credit for the institute's new science building, but is proud that after years of his pushing for it, the researchers have it. He told the Salina Journal, "This organization has always been my mistress, and unlike many mistresses, it looks better with age."

Wristen, the institute supporter, who like Warren worked long in finance and finally quit, this time to be a bus driver, said, "The more I got to know Ken, the more I realized the important work he did ... and how valuable he'd become to Wes." Wristen has made Land Institute contributions to honor Warren. He said, "I hope like hell that he's going to every Prairie Festival from now until the end of time."

The geologist's hope: "I'll find some volunteering opportunities that will lead me down a rocky road."

PRAIRIE FESTIVAL RECORDINGS

September 24-26, 2010, The Land Institute

QUANTITY	TITLE	SPEAKER
_____	Donnelley lecture on restoration and conservation	Wendell Berry
_____	Restorative economics for a post-carbon planet	Joshua Farley
_____	The farm inside the body: agriculture and child development	Sandra Steingraber
_____	What is wealth?	Scott Russell Sanders
_____	What has been a series is now becoming a succession	Wes Jackson

Total individual CDs _____ × \$15 = _____

Sets (one of each) _____ × \$60 = _____

Total _____

We accept checks and money orders for US funds, and Mastercard, Visa and Discover.

Card purchases can be by mail, fax or phone. Place orders to The Land Institute, 2440 E. Water Well Road, Salina, KS 67401. Phone 785-823-5376. Fax 785-823-8728.

Name _____

Address _____

City _____

State _____ ZIP code _____

Phone _____

☐ Mastercard ☐ Visa ☐ Discover

Card number _____

Expiration date _____

Signature _____

What makes the color of wood? The soil it tastes.
– Kim Stafford, “Pine, Fir, Cedar, Yew.”

PRAIRIE FESTIVAL 2011

SEPTEMBER 23-25, SALINA, KANSAS

Celebrate and share your thoughts at a place working to make farms like natural ecosystems, September 23-25 in Salina, Kansas. Speakers:

Brian Donahue, Brandeis University, former Land Institute education director, author of “The Great Meadow: Farmers and the Land in Colonial Concord.”

Kamyar Enshayan, director of the University of Northern Iowa’s Center for Energy and Environmental Education.

Richard Heinberg, Post Carbon Institute, author of “The End of Growth: Adapting to Our New Economic Reality.”

Naomi Klein, author of “The Shock Doctrine: The Rise of Disaster Capitalism,” and contributor to The Nation and Harper’s.

David R. Montgomery, University of Washington, student of how land form changes affect ecology and societies, author of “Dirt: The Erosion of Civilizations.”

Wes Jackson, Land Institute president, author of “Consulting the Genius of the Place.”

Also: barn dance, children’s activities, catered supper, documentary film “John Muir in the New World,” music by Ann Zimmerman, paintings by Lisa Grossman.

Primitive camping available - no campers, trailers, or RVs. Directions, transportation, and lodging information are under the Visit tab at landinstitute.org. Or call 785-823-5376. Schedule and updates appear on the Web site Calendar.



“Distant Blue – Tallgrass Preserve,” by Lisa Grossman. Oil, 24 by 6 inches. Grossman will show at the festival.

Saturday

Friends of the Land _____ x \$12 = _____

Others _____ x \$16 = _____

Sunday

Friends of the Land _____ x \$6 = _____

Others _____ x \$8 = _____

Student rate for weekend, without supper

_____ x \$10 = _____

Attending ☐ Saturday ☐ Sunday

Children under 12, free _____ x \$0 = _____

Supper Saturday, paid by September 17

_____ x \$13 = _____

Vegetarian, not vegan, meal? ☐ Yes ☐ No

Enroll as Friend of the Land, one year,
tax-deductible, \$50 minimum. You are
already a friend if you have given
since September 23, 2010 \$ _____

Total \$ _____

☐ Visa ☐ Mastercard ☐ Discover

Expires _____ / _____

Number _____

Signature _____

Phone registration: 785-823-5376 weekdays

Names of those attending:

Address _____

City _____

State _____ Zip _____

Phone _____

E-mail _____

We will not confirm your reservation.

Pro-grams and meal tickets will be at the
registration desk. No refunds. ☐ Send map.





"January: Lambing," wood engraving, from "The Farmer's Year," by Clare Leighton. This and two other Leighton wood engravings are presented not as a romantic call to the past, but as an artist's work to

record rural working people in the 1920's and 1930's, including in the American South, while the world became increasingly industrial, urban, and technical. Used by permission of the Estate of Clare Leighton.



THE FUTURE OF FOOD

PRINCE CHARLES

From a conference May 4 at Georgetown University.

President de Gioia, ladies and gentlemen. It is a very special pleasure for me to be here again at Georgetown and to speak at this conference. It certainly makes a change from making embarrassing speeches about my eldest son during wedding receptions.

My one regret today is that I have missed the first panel discussion, chaired by Eric Schlosser, who has done so much, if I may say so, to raise awareness of the key issues in his important film [“Food, Inc.”] and in his writing. I know that Eric has outlined why this conference is so vital. The world is gradually waking up to the fact that creating sustainable food systems will become paramount in the future because of the enormous challenges now facing food production.

The Oxford English Dictionary defines “sustainability” as “keeping something going continuously.” And the need to “keep things going” for future generations – in other words, for all of you students, whether here at Georgetown or, through the wonders of modern technology, elsewhere across this vast country – is quite frankly the reason I have made the long journey to Washington.

One or two of you may have noticed that over the past 30 years I have been venturing into extremely dangerous territory by speaking about the future of food. I have all the scars to prove it! Questioning the conventional world view is a risky business. And the only reason I have done so is for the sake of your generation and for the integrity of nature herself. It is your future that concerns me, and that of your grandchildren, and theirs too. That is how far we should be looking ahead. I have no intention of my grandchildren confronting me and demanding to know why on earth we didn’t

do something about the many problems that existed, when we knew what was going wrong. The threat of that question, the responsibility of it, is precisely why I have gone on challenging the assumptions of our day. And I would urge you to do the same, because we need to face up to asking whether how we produce our food is actually fit for purpose in the very challenging circumstances of the 21st century. We cannot ignore that question any longer.

Very nearly 30 years ago I began by talking about the issue, but I realized in the end I had to go further. I had to put my concern into action, to demonstrate how else we might do things so that we secure food production for the future, but also, crucially, to take care of the earth that sustains us. Because if we don't do that, if we do not work within nature's system, then nature will fail to be the durable, continuously sustaining force she has always been. Only by safeguarding nature's resilience can we hope to have a resilient form of food production and ensure food security in the long term.

This is the challenge facing us. We have to maintain a supply of healthy food at affordable prices when there is mounting pressure on nearly every element affecting the process. In some cases we are pushing nature's life-support systems so far, they are struggling to cope with what we ask of them. Soils are being depleted, demand for water is growing ever more voracious, and the entire system is at the mercy of an increasingly fluctuating price of oil.

Remember that when we talk about agriculture and food production, we are talking about a complex and interrelated system, and it is simply not possible to single out just one objective, like maximizing production, without also ensuring that the system which delivers those increased yields meets society's other needs. As Eric

has highlighted, these should include the maintenance of public health, the safeguarding of rural employment, the protection of the environment, and contributing to overall quality of life.

So I trust that this conference will not shy away from the big questions. Chiefly, how can we create a more sustainable approach to agriculture while recognizing those wider and important social and economic parameters – one that is capable of feeding the world with a global population rapidly heading for 9 billion? And can we do so amid so many competing demands on land, in an increasingly volatile climate, and when levels of the planet's biodiversity are under such threat or in serious decline?

As I see it, these pressures mean we haven't much choice in the matter. We are going to have to take some very brave steps. We will have to develop much more sustainable, or durable, forms of food production, because the ways we have done things up to now are no longer as viable as they once appeared to be. The more I talk with people about this issue, the more I realize how vague the general picture remains of the perilous state we are in. So, just to be absolutely clear, I feel I should offer you a quick pen sketch of just some of the evidence that this is so.

DEMAND SHIFTS GEAR

Certainly, internationally, food insecurity is a growing problem. There are also many now who consider that global food systems are well on the way to being in crisis. Yield increases for staple food crops are declining. They have dropped from 3 percent in the 1960's to 1 percent today – and that is really worrying because, for the first time, that rate is less than the rate of population growth. And all of this, of course, has to be set against the ravages caused by cli-

mate change. Already yields are suffering in Africa and India, where crops are failing to cope with ever-increasing temperatures and fluctuating rainfall. We all remember the failure of last year's wheat harvest in Russia and droughts in China. They have caused the cost of food to rocket and, with it, inflation around the world, stoking social discontent in many countries, notably in the Middle East. It is a situation I fear will only become more volatile as we suffer yet more natural disasters.

Set against these threats to yields is the ever-growing demand for food. The United Nations Food and Agriculture Organization estimates that the demand will rise by 70 percent between now and 2050. The curve is quite astonishing. The world somehow has to find the means of feeding a staggering 219,000 new mouths every day. That's about 450 since I started talking. What is more, with incomes rising in places like China and India, there will also be more people wealthy enough to consume more, so the demand for meat and dairy products may well increase yet further. And all that extra livestock increasingly will compete for feed with an energy sector that has massively expanded its demand for biofuels. Here in the United States, I am told, four out of every 10 bushels of corn are now grown to fuel motor vehicles.

This is the context we find ourselves in, and it is set against the backdrop of a system heavily dependent upon fossil fuels and other forms of diminishing natural capital – mineral fertilizers and so on. Most forms of industrialized agriculture now have an umbilical dependency on oil, natural gas, and other nonrenewable resources. One study I have read estimates that a person today on a typical Western diet is, in effect, consuming nearly a US gallon of diesel every day. And when you consider that in the past

decade the cost of artificial nitrogen fertilizers has gone up fourfold and the cost of potash three times, you start to see how uncomfortable the future could become if we do not wean ourselves off our dependency. And that's not even counting the impact of higher fuel prices on the other costs of production – transport and processing – all of which are passed on to the consumer. It is indeed a vicious circle.

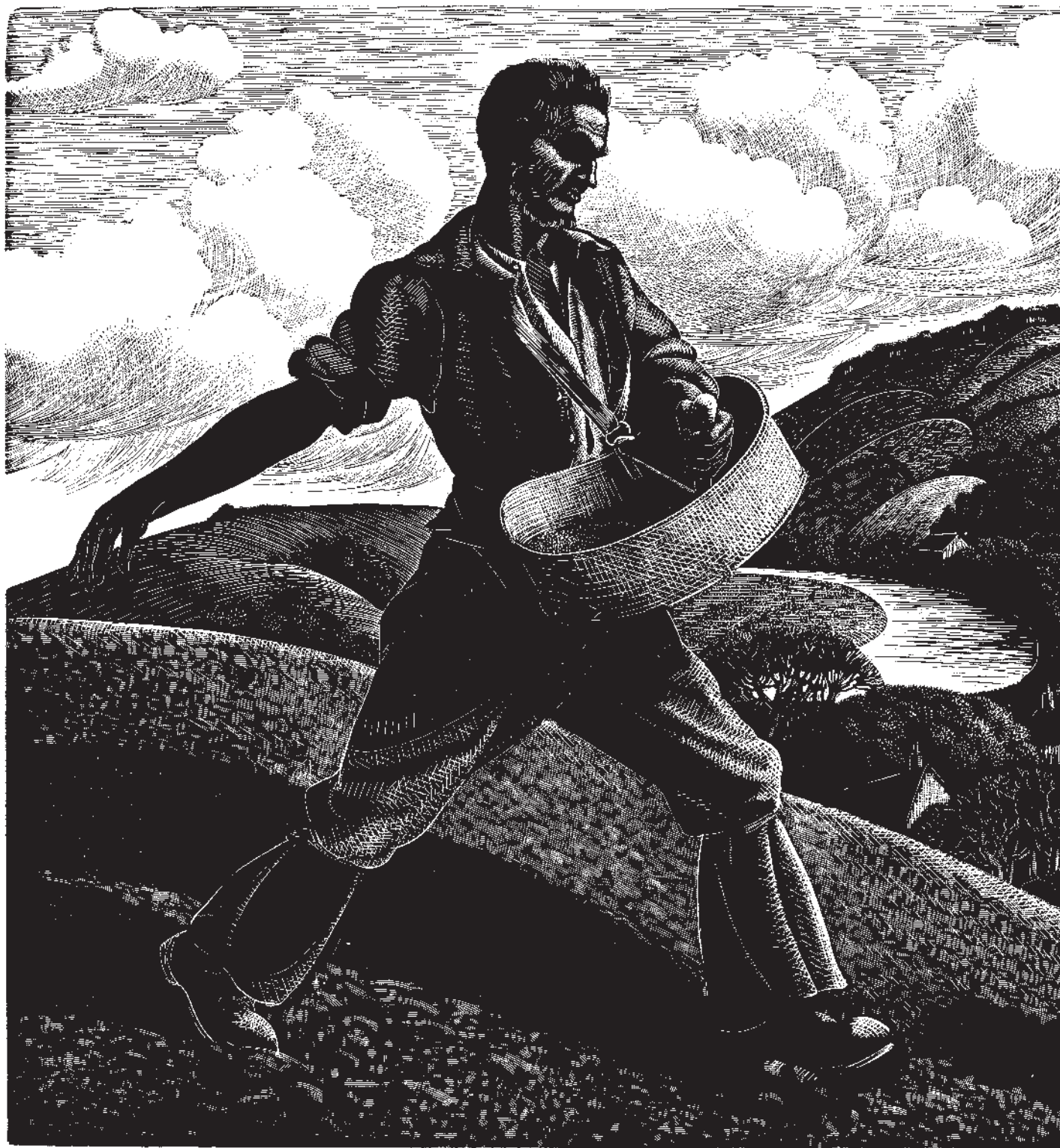
Then add the supply of land into the equation – where do we grow all of the extra plants or graze all that extra stock when urban expansion is such a pressure? Here in the United States I am told that one acre is lost to development every minute of every day – which means that since 1982 an area the size of Indiana has been built over – though that is small fry compared with what is happening in places like India where, somehow, they have to find a way of housing another 300 million people in the next 30 years. But on top of this is the very real problem of soil erosion.

Again, in the United States, soil is being washed away 10 times faster than the earth can replenish it, and it is happening 40 times faster in China and India. Twenty-two thousand square miles of arable land is turning into desert every year and, all told, it appears a quarter of the world's farmland, 2 billion acres, is degraded.

Given these pressures, it seems likely we will have to grow plants in more difficult terrain. But the only sustainable way to do that will be by increasing the long-term fertility of the soil, because, as I say, achieving increased production using imported, non-renewable inputs is simply not sustainable.

MINING MAGIC

There are many other pressures on the way we produce our food, but I just need to highlight one more, if I may, before I move



“April: Sowing,” wood engraving by Clare Leighton. Used by permission of the Estate of Clare Leighton.



on to the possible solutions, because it is so important. It is that magical substance we have taken for granted for so long – water.

In a country like the United States, a fifth of all your grain production is dependent upon irrigation. For every pound of beef produced in the industrial system, it takes 2,000 gallons of water. That is a lot of water, and there is plenty of evidence that the earth cannot keep up with the demand. The Ogallala Aquifer, an ancient source under the Great Plains, yields about 30 percent of US irrigation water, but in most places in that semiarid region is dropping far faster than it can recharge. And consider that of all the water in the world, 97 percent is in the oceans, and more than two thirds of the rest is in glaciers. If you set these figures against future predictions, then the picture gets even worse. It is estimated that by 2030 the world's farmers will need 45 percent more water than today. And yet already, because of irrigation, many of the world's largest rivers no longer reach the sea for part of the year – including, I am afraid, the Colorado and Rio Grande.

Forgive me for laboring these points, but the impact of all of this has already been immense. Over a billion people – one seventh of the world's population – are hungry, and another billion suffer from what is called “hidden hunger,” which is the lack of essential vitamins and nutrients in their diets. And on the reverse side of the coin, let us not forget the other tragic fact – that over a billion people in the world are now considered overweight or obese. It is an increasingly insane picture. In one way or another, half the world finds itself on the wrong side of the food equation.

You can see, I hope, that in a global ecosystem that is, to say the least, under stress, our apparently unbridled demands for energy, land, and water puts overwhelming pressure on our food systems. I am not alone in thinking that the current model is simply not durable in the long term. It is not “keeping everything going continuously,” and it is, therefore, not sustainable.

So what is a “sustainable food production” system? We should be very clear about it, or else we will end up with the same system that we have now, but dipped in “green wash.”

For me, it has to be a form of agriculture that does not exceed the carrying capacity of its local ecosystem and which recognizes that the soil is the planet's most vital renewable resource. Topsoil is the cornerstone of the pros-

perity of nations. It acts as a buffer against drought and as a carbon sink, and it is the primary source of the health of all animals, plants, and people. If we degrade it, as we are doing, then nature's capital will lose its innate resilience and it won't be very long, believe you me, before our human economic capital and economic systems also begin to lose their resilience.

Let's, then, try and look for a moment at what very probably is *not* a genuinely sustainable form of agriculture – for the long term. In my own view it is surely not dependent upon the use of chemical pesticides, fungicides, and insecticides; nor, for that matter, upon artificial fertilizers and growth-promoters. You would have perhaps thought it unlikely to create vast monocultures and to treat animals like machines by using industrial rearing systems. Nor would you expect it to drink the earth dry, deplete the soil, clog streams with nutrient-rich runoff, and create enormous dead zones in the oceans. You would also think, wouldn't you, that it might not lead to the destruction of whole cultures or the removal of many of the remaining small farmers around the world? Nor, presumably, would it destroy biodiversity at the same time as cultural and social diversity.

On the contrary, genuinely sustainable farming maintains the resilience of the entire ecosystem by encouraging a rich level of biodiversity in the soil, in its water supply, and in the wildlife – the birds, insects, and bees that maintain the health of the whole system. Sustainable farming also recognizes the importance to the soil of planting trees, of protecting and enhancing water-catchment systems, and of mitigating, rather than adding to, climate change. To do this it must be a mixed approach. One where animal waste is recycled and organic waste is composted to build the soil's fertility, where antibiotics

are only used on animals to treat illnesses, not deployed in prophylactic doses to prevent them, and where those animals are fed on grass-based regimes as nature intended.

You may think this an idealized definition – that it isn't possible in “the real world” – but if you consider this the gold standard, then for food production to become more “sustainable” it has to reduce the use of those substances that are dangerous and harmful not only to human health, but also to the health of those natural systems, such as the oceans, forests, and wetlands, that provide us with the services essential to life on this planet – but which we rashly take for granted. At the same time, it has to minimize the use of nonrenewable external inputs. Fertilizers that do not come from renewable sources do not enable a sustainable approach which, ultimately, comes down to giving back to nature as much as it takes out, and recognizing that there are necessary limits to what the earth can do. Equally, it includes the need for producers to receive a reasonable price for their labors above the price of production. And that, ladies and gentlemen, leads me to the nub of what I would like you to consider.

NATURE'S INGENUITY

Having myself tried to farm as sustainably as possible for some 26 years in England, I certainly know of plenty of current evidence that adopting an approach which mirrors the miraculous ingenuity of nature can produce surprisingly high yields of a wide range of vegetables, arable crops, beef, lamb, and milk. And yet we are told ceaselessly that sustainable or organic agriculture cannot feed the world. I find this claim very hard to understand. Especially when you consider the findings of the impeccably well-researched International Assessment of Agricultural Knowledge, Science and

Technology for Development, conducted in 2008 by the United Nations. I am very pleased, by the way, to see that the co-chair of that report, Professor Hans Herren, will be taking part in the panel discussion towards the end of the conference. The report drew on evidence from more than 400 scientists worldwide and concluded that small-scale, family-based farming systems, adopting so-called agro-ecological approaches, were among the most productive systems in developing countries. This was a major study and a very explicit statement. And yet, for some strange reason, the conclusions of this exhaustive report seem to have vanished without trace.

This is the heart of the problem, it seems to me – why it is that an industrialized system, deeply dependent on fossil fuels and chemical treatments, is promoted as viable, while a much less damaging one is rubbished and condemned as unfit for purpose. The reasons lie in the anomalies that exist behind the scenes.

I would certainly urge you, first, to look at the slack in the system. Under the current, inherently unsustainable system, in the developed world we actually throw away approximately 40 percent of the food we buy. Food is now much cheaper than it was, and one of the unexpected consequences of this is, perhaps, that we do not value it as once we did. I cannot help feeling some of this problem could be avoided with better food education. You only have to consider the progress Mrs. Obama has achieved lately by launching her Let's Move campaign – a wonderful initiative, if I may say so. With manufacturers making their “healthy weight commitment” and pledging to cut 1.5 trillion calories a year from their products; with Wal-Mart promising to sell products with less sugar, salt, and trans-fats, and to reduce their prices on healthy items like fresh fruits

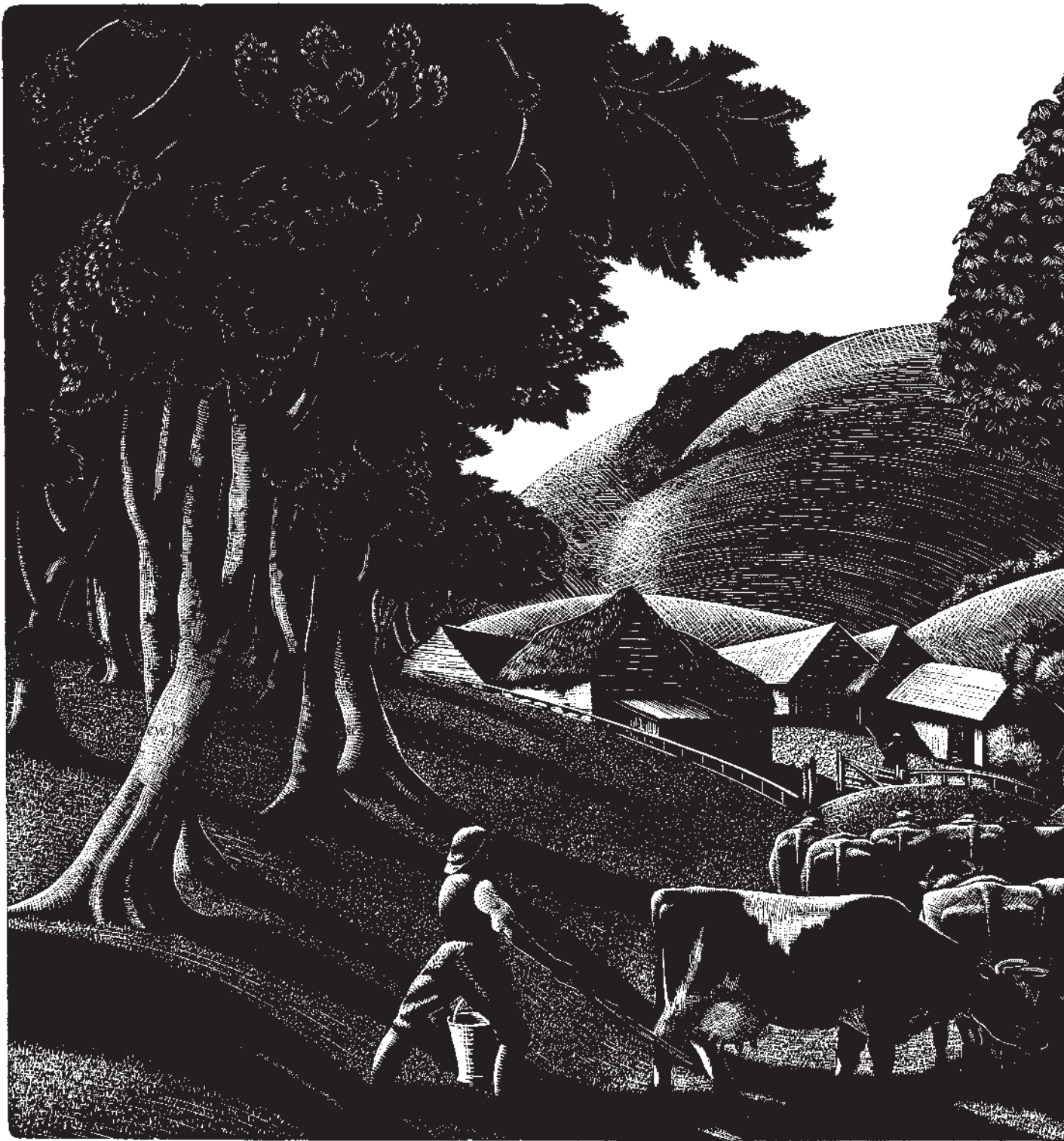
and vegetables; and with the first lady's big drive to improve healthy eating in schools and the excellent thought of urging doctors to write out prescriptions for exercise – these are marvelous ideas that I am sure will make a major difference.

Alas, in developing countries approximately 40 percent of food is lost between farm and market. Could that be remedied too, this time by better on-farm storage? And we should also remember that many, if not most, of the farmers in the developing world are achieving a fraction of the yields they might do if the soil was nurtured more with an eye to organic matter content and improved water management.

However, the really big issue we need to consider is how conventional, agri-industrial techniques are able to achieve the success they do, and how we measure that success. And here I come to the aspect of food production that troubles me most.

The well-known commentator in this country on food matters, Michael Pollan, pointed out recently that, so far, the combined market for local and organic food, both in the United States and Europe, has only reached around 2 or 3 percent of total sales. And the reason, he says, is quite simple. It is the difficulty in making sustainable farming more profitable for producers and sustainable food more affordable for consumers. With so much growing concern about this, my International Sustainability Unit carried out a study into why sustainable food production systems struggle to make a profit, and how it is that intensively produced food costs less. The answer to that last question may seem obvious, but my ISU study reveals a less apparent reason.

It looked at five case studies and discovered two things. Firstly, that the system of farm subsidies is geared so that it favors overwhelmingly those kinds of agricultural



"July: Cottage Gardens," wood engraving by Clare Leighton. Used by permission of the Estate of Clare Leighton.



techniques that are responsible for the many problems I have just outlined. And secondly, that the cost of that damage is not factored into the price of food production. Consider, for example, what happens when pesticides get into the water supply. At the moment, the water has to be cleaned up at enormous cost to consumer water bills; the primary polluter is not charged. Or take the emissions from the manufacture and application of nitrogen fertilizer, which are potent greenhouse gases. They, too, are not priced at source into the equation.

This has led to a situation where farmers are better off using intensive methods and where consumers who would prefer to buy sustainably produced food are unable to do so because of the price. There are many producers and consumers who want to do the right thing but, as things stand, “doing the right thing” is penalized. And so this raises an admittedly difficult question – has the time arrived when a long, hard look is needed at the way public subsidies are generally geared? And should the recalibration of that gearing be considered so that it helps healthier approaches and “techniques?” Could there be benefits if public finance were redirected so that subsidies are linked specifically to farming practices that are more sustainable, less polluting, and of wide benefit to the public interest, rather than what many environmental experts have called the curiously “perverse” economic incentive system that too frequently directs food production?

The point, surely, is to achieve a situation where the production of healthier food is rewarded and becomes more affordable, and that the earth’s capital is not so eroded. Nobody wants food prices to go up, but if it is the case that the present low price of intensively produced food in developed countries is actually an illusion, only made possible by transferring the costs of cleaning up pollution or dealing with human health problems onto other agencies, then could correcting these anomalies result in a more beneficial arena where nobody is actually worse off in net terms? It would simply be a more honest form of accounting that may make

it more desirable for producers to operate more sustainably – particularly if subsidies were redirected to benefit sustainable systems of production. It is a question worth considering, and I only ask it because my concern is simply that we seek to produce the healthiest food possible from the healthiest environment possible – for the long term – and to ensure that it is affordable for ordinary consumers.

There are, after all, already precedents for these kinds of measures, particularly, for instance, in the way that governments around the world have stimulated the growth of the renewable energy market by the provision of market mechanisms and feed-in tariffs. Could what has been done for energy production be applied to food? Is this worth considering? After all, it could have a very powerful, transformative effect on the market for sustainably produced food, with benefits all round.

Certainly, the United Nations Environment Program inspires hope when it estimates that the “greening” of agriculture and fisheries would increase economic value per year by 11 percent by 2050. The hugely overstretched stocks of the north-east Atlantic bluefin tuna is a case in point, where it is estimated that a transition to sustainable fisheries management could generate a profit of more than \$500 million every year, as compared with the current figure of \$70 million – and that is after having received \$120 million in subsidies. It is also worth bearing in mind that these sorts of policies which encourage more diversity, in terms of landscape, community, and products, often generate all sorts of other positive results too – in tourism, forestry, and industry.

This all depends upon us deepening our understanding of the relationship between food, energy, water, and economic

security, and then creating policies that reward producers who base their farming systems on these principles. Simply because, if we do not consider the whole picture and take steps with the health of the whole system in mind, not only will we suffer from rising food prices, we will also see the overall resilience of our economies and, in some instances, our ecological and social systems too, becoming dangerously unstable.

If we do take such important steps, it seems to me that we would also have to question whether it is responsible in the long term to have most of our food coming from highly centralized processing and distribution systems. Raw materials are often sourced many thousands of miles away from where we live; meat is processed in vast factories and then transported great distances before being sold. In light of the kinds of events we have been witnessing more frequently of late, such as the horrific floods in Pakistan last year and in Australia a few months ago, it is very easy to imagine that with systems concentrated in such intense, large-scale ways, these events could quickly escalate into a global food crisis. We have to consider how we achieve food security in a world where commodity food prices will inevitably rise. So, could one way be to put more emphasis on re-localizing the production and distribution of key staple foods? Wouldn't that create the sort of buffer we will need if we are to face increasingly volatile and unpredictable world market prices?

And remember the point I made earlier, that food production is part of a wider socioeconomic landscape. We have to recognize that social and economic stability is built upon valuing and supporting local communities and their traditions. Smallholder agriculture therefore has a pivotal role. Imagine if there was a global food shortage; if it became much harder to import

food in today's quantities, where would countries turn to for their staple foods? Is there not more resilience in a system where the necessary staple foods are produced locally, so that if there are shocks to the system, there won't be panic? And what is more, not only can it be much more productive than it currently is, strengthening small farm production could be a major force in preserving the traditional knowledge and biodiversity that we lose at our peril.

So might it be wise, given the rather difficult situation we appear to be in, that if we *do* look at re-gearing the way subsidies work, we include policies that focus funding on strengthening economic and environmental diversity? This diversity is at the root of building resilient economies that have the adaptive capacity to deal with the increasingly severe and frequent shocks that affect us all.

Ladies and gentlemen, I am a historian, not an economist, but what I am hinting at here is that it is surely time to grasp one of the biggest nettles of all and reassess what has become a fundamental aspect of our entire economic model. As far as I can see, responding to the problems we have with a "business as usual" approach toward the way in which we measure GDP offers us only short-term relief. It does not promise a long-term cure. Why? Because we cannot possibly maintain the approach in the long term if we continue to consume our planet as rapaciously as we are doing. Capitalism depends upon capital, but our capital ultimately depends upon the health of nature's capital. Whether we like it or not, the two are in fact inseparable.

There are alternative ways to growing our food that, if used with new technology – things like precision irrigation, for instance – would go a very long way to resolving some of the problems we face. If they

are underpinned by smarter financial ways of supporting them, they could strengthen the resilience of our agriculture, marine, and energy systems. We could ensure a means of supply that is capable of withstanding the sorts of sudden fluctuations on international markets which are bound to come our way, as the price of oil goes up and the effect of our accelerating disruption of entire natural systems becomes greater.

In essence what I am suggesting here is something very simple. We need to include in the bottom line the true costs of food production – the true financial costs and the true costs to the earth. It is what I suppose you could call "accounting for sustainability," a name I gave to a project I set up six years ago, initially to encourage businesses to expand their accounting process so that it incorporates the interconnected effect of financial, environmental, and social elements on their long-term performance. What if accounting for sustainability was applied to the agricultural sector? This was certainly the implicit suggestion in a recent and very important study by the United Nations. The Economics of Ecosystems and Biodiversity assessed the multitrillion dollar importance to the world's economy of the natural world, and concluded that the present system of national accounts needs to be upgraded rapidly so they include the health of natural capital, and thereby accurately reflect how the services offered by natural ecosystems are performing – let alone are paid for. Incidentally, to create a genuine market for such services – in the same way as a carbon market has been created – could conceivably make a substantial contribution to reducing poverty in the developing world.

This is very important. If we hope to redress the market failure that will otherwise blight the lives of future generations, we have to see that there is a direct relation-

ship between the resilience of the planet's ecosystems and the resilience of our national economies.

Ladies and gentlemen, I hope you have begun to see my point. Essentially, we have to do more today to avert the catastrophes of tomorrow, and we can only do that by re-framing the way we approach the economic problems that confront us. We have to put nature back at the heart of the equation. If we are to make our agricultural and marine systems – and therefore our economies – resilient in the long term, then we have to design policies in every sector that bring the true costs of environmental destruction and the depletion of natural capital to the fore, and support an ecosystem-based approach. And we have to nurture and support the communities of smallholders and family farmers.

I trust that these thoughts will help to fire your debates and focus your thoughts for the rest of the conference. Who knows, perhaps at the end of it, we might be able to herald a new “Washington consensus.” Like the previous version that has so dominated economic thinking around the world, it could be a consensus that acknowledges the need for markets and the role of the private sector, but which also embraces the urgent need for a rounded approach – one that recognizes the real opportunities and tradeoffs needed to build a food system that enhances and ensures the maintenance of social, economic and environmental capital.

The new food movement could be at the heart of this consensus, acting as an agent for truly transformational change, not just by addressing the challenges of making our food systems more sustainable and secure, but also because, as far as I am concerned, agriculture – not agri-industry –

holds the key to the improvement of public health, the expansion of rural employment, the enrichment of education, and enhancement of quality of life.

Critically, such a new Washington consensus might embrace the willingness of all aspects of society – the public and private, large corporations and small organizations – to work together to build an economic model built upon resilience and diversity, which are two great characteristics of your nation. Such a partnership is vital; indeed, it has never been needed more, and I am tremendously inspired by recent initiatives in the United States. You cannot help but feel hopeful when such huge corporations like Wal-Mart back local sourcing of food and decide to stock their shelves with sustainable or organic produce. Industry is clearly listening. Everyone has to work together, and we all have to recognize the principle Mahatma Gandhi observed so incisively when he said that “we may utilize the gifts of nature just as we choose, but in her books the debts are always equal to the credits.”

It is, I feel, our apparent reluctance to recognize the interrelated nature of the problems, and therefore the solutions, that lies at the heart of our predicament, and certainly of our ability to determine the future of food. How we deal with this systemic failure in our thinking will define us as a civilization and determine our survival. Ladies and gentlemen, let me end by reminding you of the words of one of your own founding fathers and visionaries. It was George Washington who entreated your forebears: “Raise a standard to which the wise and honest can repair; the rest is in the hands of God” – and, indeed, as so often in the past, in the hands of your great country, the United States of America.

THE LAND

RUDYARD KIPLING

When Julius Fabricius, Sub-Prefect of the Weald,
In the days of Diocletian owned our Lower River-field,
He called to him Hobdenius – a Briton of the Clay,
Saying, “What about that River-piece for layin’ in to hay?”

And the aged Hobden answered: “I remember as a lad
My father told your father that she wanted dreenin’ bad.
An’ the more that you neeglect her the less you’ll get her clean.
Have it jest as you’ve a mind to, but, if I was you, I’d dreene.”

So they drained it long and crossways in the lavish Roman style.
Still we find among the river-drift their flakes of ancient tile,
And in drouthy middle August, when the bones of meadows show,
We can trace the lines they followed sixteen hundred years ago.

Then Julius Fabricius died as even Prefects do,
And after certain centuries, Imperial Rome died too.
Then did robbers enter Britain from across the Northern main
And our Lower River-field was won by Ogier the Dane.

Well could Ogier work his war-boat – well could Ogier wield his brand –
Much he knew of foaming waters – not so much of farming land.
So he called to him a Hobden of the old unaltered blood,
Saying: “What about that River-bit, she doesn’t look so good.”

And that aged Hobden answered: “‘Tain’t for *me* to interfere,
But I’ve known that bit o’ meadow now for five and fifty year.
Have it *jest* as you’ve a mind to, but I’ve proved it time on time,
If you want to change her nature you have *got* to give her lime!”

Ogier sent his wains to Lewes, twenty hours’ solemn walk,
And drew back great abundance of the cool, gray, healing chalk.
And old Hobden spread it broadcast, never heeding what was in’t;
Which is why in cleaning ditches, now and then we find a flint.

Ogier died. His sons grew English. Anglo-Saxon was their name,
Till out of blossomed Normandy another pirate came;
For Duke William conquered England and divided with his men,
And our Lower River-field he gave to William of Warenne.

But the Brook (you know her habit) rose one rainy Autumn night
And tore down sodden flitches of the bank to left and right.
So, said William to his Bailiff as they rode their dripping rounds:
“Hob, what about that River-bit – the Brook’s got up no bounds?”

And that aged Hobden answered: “’Tain’t my business to advise,
But ye might ha’ known ’twould happen from the way the valley lies.
When ye can’t hold back the water you must try and save the sile.
Hev it jest as you’ve a *mind* to, but if I was you I’d spile! ”

They spiled along the water-course with trunks of willow-trees
And planks of elms behind ’em and immortal oaken knees.
And when the spates of Autumn whirl the gravel-beds away
You can see their faithful fragments iron-hard in iron clay.

.

Georgii Quinti, Anno Sexto, I, who own the River-field,
Am fortified with title-deeds, attested, signed and sealed,
Guaranteeing me, my assigns, my executors and heirs
All sorts of powers and profits which – are neither mine nor theirs.

I have rights of chase and warren, as my dignity requires.
I can fish – but Hobden tickles. I can shoot – but Hobden wires.
I repair, but he reopens, certain gaps which, men allege,
Have been used by every Hobden since a Hobden swapped a hedge.

Shall I dog his morning progress o’er the track-betraying dew?
Demand his dinner-basket into which my pheasant flew?
Confiscate his evening faggot into which the conies ran,
And summons him to judgment? I would sooner summons Pan.

His dead are in the churchyard – thirty generations laid.
Their names went down in Domesday Book when Domesday Book was made.
And the passion and the piety and prowess of his line
Have seeded, rooted, fruited in some land the Law calls mine.

Not for any beast that burrows, nor for any bird that flies,
Would I lose his large sound council, miss his keen amending eyes.
He is bailiff, woodman, wheelwright, field-surveyor, engineer,
And if flagrantly a poacher – ’tain’t for me to interfere.

“Hob, what about that River-bit?” I turn to him again
With Fabricius and Ogier and William of Warrene.
“Hev it jest as you’ve a mind to, *but*” – and so he takes command.
For whoever pays the taxes, old Mus’ Hobden owns the land.

THANKS TO OUR CONTRIBUTORS

PERENNIALS ON THE HORIZON CAPITAL CAMPAIGN

All who have given to The Land Institute's new research center.

LEAD GIFT: Descendants of Joyce C. and Elizabeth Hall

MEMORIALS: Marty Bender, from David Wristen · Ruth Hull, from Nancy A. Jackson · Mary Anne K. Powell, from William B. Powell · Ann Blair

Simonson, from Peter Simonson · Howard Vogel, from Patricia Lertora · Judy Peckham Weyant, from Richard Peckham & Maureen Nowlan · Robert B. Greiner, DVM, and Roy H. Lattimer

IN HONOR: Maren & Sophia Hofman and Larry Pray, from Joyce Hofman · Gary Tegtmeier and Ken Warren, from David Wristen · David Wristen, from Elizabeth & Craig Wakeman and Deborah Borek & David Jenkins

INDIVIDUALS AND FAMILIES: Anonymous · James R. Allen · William R. and Jane B. Alsop · Milton L. Andersen · Frank J. and Jeanette Anderson · Christina Arnold · Mary Athens · DeWayne & Sherry Backhus · Dorothy & Brian Barnett · Steve & Judy Bemis · Don & Helen Berheim · Mark A. & Jane Berkley Charles & Dianne Boardman · Scott Bontz · Sheri Breen · Jay K. & Sara Bremyer · Martin E. & Wanda Brotherton · Thomas W. & Ruth L. Brown · Lee & Carolyn Carlson · Carrie & Curt Carpenter · Lucia L. Cate · Gay Chanler · Jon & Jeannie Chenette · John B. Cobb, Jr. · Bruce Colman · Stan & Priti G. Cox · Dick & Ellie Dawson · The Alice Jo & Stanley DeFries family · Al & Mary DeSena · Doug & Krista Dittman · Eileen Duggan · Selma N. Duvick Warren Ediger · Professors David & Joan G. Ehrenfeld · Robert & Sue Eichhorn · Kamyar Enshayan & Laura Jackson · Terry & Sam Evans · Drs. John J. & Katherine C. Ewel · Rob & Kelli Exline · Charles S. Faulkner II · Andy & Betsy Finfrock · Jan & Cornelia Flora · Don M. & Mary Anne Flournoy David V. Francis · John K. Franson · Jim & Annabel Fredrickson · Gladys Gifford · Eric G. & Emma Gimon · Barbara T. Greenewalt · Shirley Griffin & Michael Heinle · Wendell & Nancy Gugler · Fred Haigh · Leon & Judy Hannebaum · Bert & Dawn Haverkate-Ens · Marilla P. Hazlett & Brian O. Trigg Shirley & Barnett Helzberg Jr. Donor Advisory Fund · Shirley & Doug Hitt · Joe & Pam Hodges · Joyce M. Hofman · John & Chick Hood · Buddy & Marcy Huffaker · Randall & Stephanie Hutchinson · Quincey Tompkins Imhoff Fund · Wes & Joan Jackson · Nancy & Scott Jackson · Nancy A. Jackson Bill James & Debra Starin · William & Alicia Jennings · Dr. Lucy A. Jordan · Sally Kendall · Jack & Jane Kenyon · Craig & Brenda King · Marianne Kluever · Jeff & Paula Knox · James H. Koplin · George J. & Mary Helen Korbelik · Wendell & Judy Kurr · Glenn & Sue Laubhan · Edward J. Lawrence LeFort-Martin Fund CCF · Thom & Elizabeth Leonard · Marie Lies · Donald N. & Nancy M. Link · Charles R. Maier · Grant Mallett & Nancy Tilson-Mallett · Bill Martin · Helen Tilley Martin · Karin A. McAdams · Carl & Mary McDaniel · Rod & Karen Meier · Mark L. & Julie Sager Miller Fund Matt & Jennifer Miller · Suzanne Mittenthal · Jo Ann Myers · Arthur K. & Connie S. Neuburger · William C. Neumann · Rae Ann Nixon · Kurt Nordback · Frank & Jeanne Norton · Lawrence R. Olsen · Michael Perry & Carolyn Butcher · Robert L. & Karen N. Pinkall · George & Alice Potts Donna & Darwin Poulos · Jerry L. Quance & Marcia A. Hall · Steven & Pamela Read · Raymond & Gladys Regier · Dick & Toni Renfro · Dr. & Mrs. Paul W. Renich · Martha Rhea · David C. & Jane S. Richardson · Peter Riggs · Dick & Willie Righter · Gordon & Barbara Risk · Niklaus Salafsky & Julia Segre · Mark Sanderson · Janice E. Savidge · Lloyd G. & Betty A. Schermer · John & Betty Schmidt · Tschudy G. Schmidt · Duane Schrag & Robin Black · Kay & Bill Schrenk · Clair Schultis · Peter & Helen Schulze · Elizabeth Sidamon-Eristoff Fund · Dick L. Siemer & Clare D. O'Leary-Siemer Jay & Carolyn Simpson · John Simpson & Sondra L. Goodman · Don & Ellie Skokan · Curtis Sloan & Helen Duritsa · Beth K. Smith · Boyd & Heather Smith · David K. Smoot Revocable Trust · Morrie & Sydney Soderberg · Marshall & Janice Stanton · Marjorie E. Streckfus · Glenn H. Stroer · Liatris P. Studer · Brad R. Stuewe, M.D. & Paula A. Fried, Ph.D. · Connie Swan & Bob Klunder · James A. Tarnowski & Judy K. Berkshire · Connie Taylor Margo Thompson · Don Tolbert · Cork & Ella Umphrey · Ellie Unruh · Robert Himmerich y Valencia, Ph.D. & Eva Valencia de Himmerich · James Van Eman & Susan Bailey · Kristin & David Van Tassel · Carol & Hulse Wagner · Laurie Ward · Ken Warren & Nina Ainslie · Wallace N. Weber · Bob & Judy Weeden · Linda E. Wiens · Mark S. & Pamela J. Woodard · Donald & Beverley Worster · Angus Wright · David & Rita Wristen · Donna L. Wygle Kristy & Norman Yenkey · Dr. & Mrs. William M. Zales · Dr. Dewey K. Ziegler

FOUNDATIONS & ORGANIZATIONS: Alexander Family Foundation · Arrow Printing Co · Bank of Tescott · Bennington State Bank · Mike Berkley Family Foundation · Clubine & Rettele Chartered · Double J Farms Inc. · The Fanwood Foundation/West · Farmlab, a project of Metabolic Studio · First Bank Kansas · William H. Graves Family Foundation · Greater Salina Community Foundation · Hawai'i-La'ieikawai Association Inc. · William Randolph Hearst Foundation · Hunnewell Elevator Inc. · The Inge Foundation · R.C. Kemper Charitable Trust · Leighty Foundation · The Logan Foundation Ludlow Griffith Foundation · Research Products Co. · Ryan Mortuary · Salina Concrete Products · Solomon State Bank · Sunflower Bank · Turkey Creek Investment Partnership · UMB Bank · Yavanna Foundation

PLEDGES

Those who give through periodic deductions from bank accounts or credit cards, increasing our financial stability, are acknowledged in the fall issue.

GIFTS

These friends made single donations during January through May.

MEMORIALS: Mike Bemis, from Steve & Judy Bemis · Marty Bender, from Dave & Rita Wristen · Wanda Courtney, from J. David & Jacqueline Swift · Jeff Empfield, from Karen Finley, Catherine Worster, & Donald & Beverly Worster · Lois George, from Wilma & Richard Righter · Robert Heidbrink, from Samantha Buchan · Walter Hoffman, from Edward Casey · Linda C. Hryniewicz, from Andrew Hryniewicz · Walter W. Isle, from Pam Walker · Curtis L. Larson, from Mark Larson & Mary Kennedy · Warren & Sally Lawson, from Amanda Evans · Daniel Navilio, from Samantha Buchan · Elizabeth “Betty” Norton, from Mary Elliman · Mike O’Connell, from Randy Schenkat · John P. Ruppenthal, from Dennis Lewis · Robert Schultz, from Nancy A. Jackson · Marjorie Smith, from David & Connie Hansen · Robert Sudlow, from Geoffrey & Leslie Oelsner · Chuck & Joyce Swift, from Joel Hanes · Carl Wellsandt, from Anna Levin

IN HONOR: Robert & Shirley Bodmer, from Andy & Betsy Finrock · California, from Dana Simmons · Margaret Campion, from Mary Elliman · Ruth Cathcart-Rake, from John Cathcart-Rake · Tim Clark & Julia Plume, from Mom & Dad, Robert & Beverly Clark · Fields Cobb, from Cynthia Cobb · Terry & Sam Evans, from Mark Johnson · Ella & LaVern Friesen, from Paul, Mary Ray & Luke · Ruby A. Hall, from Shirley Shimada · Stephanie Hutchinson, from Dave & Rita Wristen · Dave Murphy & Ethan, Lydia, Gabriel & Sam Stokke, from Lisa Stokke · Susan Pokorny, from Sarah Fleming, Joanne Neel-Richard, Judith Lhamon, Gwenith Heuss Severance, & Jill Strawn · John Simpson, from Grover B. Simpson · Dennis Smart, from Jay Smart & Denise Pedrotti · Andrew Starin, from Debra Starin & G. James · Matthew Van Dyke, from Nancy Van Dyke · Ken Warren, from Steve Renich · David Wristen, from Debbie Borek

INDIVIDUALS AND FAMILIES: Robert Adams · James Alwill · Kristin & William Amend · The Amity Fund · Jonathan Andelson · Christopher Anderson & Suzan Fitzsimmons · Eric Anderson · J.R. Anderson · Anonymous · Kenneth & Katie Armitage · John Armstrong · Denise Attwood & James Conner · Carl & Priscilla Awsumb · DeWayne & Sherry Backhus · William & Sue Ellen Ballard · Jack Barbash · Ann & Khalil Barhoum · Jonathan & Nancy Barker · Marty Bates & Janie Stein · Jonathan & Sarah Baum · John & Letitia Bayer · Eugene Bazan · Diane & William Beachly · Kathryn Beattie · David Belluche · Stephen & Judith Bemis · Charles Benscheidt · Mayrene Bentley · Bill Berg · Daniel Berg · Alan Black · Lowell Bliss · John Blythe · Egon & Diana Bodtker · Justin Border · Deborah Borek & David Jenkins · Steven Borgelt · Andrew & Leonor Bowman · Edward Braun & Jean Krusi · Lois Braun · Cleo Braver & Alfred Tyler · J. & Diane Brent · Martha Bridgers · Bradford & Lorna Brookins · Cheryl Brown · Jerome Brown · Thomas & Ruth Brown · Kenneth Bruene · Harlan & Evelyn Brumsted · Sarah Brunmeier · Gregory & Susan Bryant · Paul & Joni Bube · Samantha Buchan · David & Sandra Buckner · Erik & Jessyca Burke · Peter & Toshiko Busch · John & Eleanor Butler · Joel Buxton · Jimmy Byun & Margaret Sawyer · Laura & Michael Calwell · Mary Carhartt & Dave Broberg · David & Bonnie Carlson · Jack & Martha Carter · Edward Casey · Robin Cash · Mary Ray Cate & Paul Friesen · John Cathcart-Rake · William & Ruth Cathcart-Rake · Jonathan & Jeanmarie Chenette · Robert & Beverly Clark · Roland Clement · Michael Clow · Cynthia Cobb · Gregory & Dorothy Conniff · Karen Cook · Maren Cooke & Neil Donahue · Barbara Coughlin & John Fallon · John & Sage Cowles · Martin & Laurie Cox · Ira and Debbie Cox Charitable Fund · David & Kim Criswell · Elisabeth Crosby & Paul Becker · Walter & Mary Czech · Vernon Dahlheimer · Duane Dailey · Robert & Anna-Margaret Dale · Malcolm Dalglish & Judith Klein · Joan & Richard Darrow · William & Kristine Davis · Anthony & Lawrie Dean · Rodney & Jeannette Debs · Eva Dehlinger · Dennis & Ruth Demmel · Al & Mary DeSena · Jacob Diaz · Jan & Deborah Dizard · Jeffrey Doan · Brian Donahue & Faith Rand · Esther Donahue · Gaylord Donnelley Charitable Trust · Nancy Dotlo · Roger & Anna Driskill · Marjorie Duck · Eileen Duggan · Katherine Dunlevy & George Seeds · J. Dunn · Selma Duvick · Mary Elliman · Mary Emeny · Richard & Kimberly Engstrom · James Erdman · Amanda Evans · Claude & Sandra Falls · John Feffer & Karin Lee · Tom Feldman · Pete Ferrell · Andy & Betsy Finrock · Karen Finley · Margaret & William Fischang · Emily Fisher & Evan Griswold · Sarah Fleming · Emma Flemmig · Jan & Cornelia Flora · Merle & Mavis Fossum · The Fox Fund · Nicolas & Gisela Franceschelli · David & Janis Francis · Marcia Francisco & Joe Bickford · John & Mary Frantz · Chris & Leanna Frasier · James & Lisa French · Jeffrey Funk · Gaubatz Family Fund · John Gerber · Elisabeth Gibans · John & Beverly Gilbert · Eliza Gilkyson · Helen Gitelson · Wesley & Heather Goertzen · James & Rebecca Goodman · Mark Graf · Nancy Gray · Heather Greene · Ashok Gupta & Jan Schoonover · Charles & Ann Haffner · Robert Hagen & Deborah Smith · Margaret Haley · Larry & Patricia Hall · Joel Hanes · Joyce Hanes · David & Connie Hansen · John & Sharon Hanson · Don & Mary Jo Heath · Daniel & Peggy Hebert · Jerry & Rosemary Heidrick · Alison & Conrad Heins · Frederick & Cheryl Heppner · Donald & Louise Heyneman · Eleanor & Kenneth Hiebert · Abigail Higgins · John Highkin & Cindy Zimmerman · Serenity Hill · Margaret Hilton · Tim & Suzanne Hobson · Anton Hodgers & Carol Statland · Stanton & Carol Hoegerman · Chris Hoffman · David & Tina Honey · William & Leslie Hooks · Alan Hoover · Steven Hopp & Barbara Kingsolver · Geralyn Hosticka & Kurt Esfeld · June Howard · Charles Howe · Richard Hoye · Wellington & Marcy Huffaker · Mark Hulbert & Merideth Tomlinson · Dean & Nicki Hulse · Sarah Hunt & Todd Crane · Logan Hurst & Nancy Reynolds · Brenda Hyde · Charles Isenhardt · Nancy Jackson · Wes & Joan Jackson · John Janovec & Amanda Neill · Kristi & Bernd Janzen · Richard Jenkins · Robert Jensen · Bruce Johnson · David Johnson · Guy Johnson · Mark Johnson · Wendy Johnson & Peter Rudnick · Alice Jones · Daniel Jones · Lucy Jordan · William & Kathleen Justice · Larry & Sonja Kaiser · Susan Kaiser & Frank LeBeau · Carl & Gladys Keener · Brian Keeney · Andy & Nan Kegley · Roger & Cara Keller · John & Martha Kenyon · James Key · Kelly Kindscher · LeAnn Kirkpatrick · John Kleinwachter · Mark Klett · Don Kluever · Beth Knepper · Rob Knowles & Meryl Stern · Amie Knox & James Kelley · Margaret & Tad Kramar · Douglas & Patricia Kramer · Alison Krohn · Nancy Kupper-Smith · Michelle Lambson · Harriet Landon · Janet Landon & Lynn Simmons · J. & Eva Lankhorst · Mark Larson · Konney Larwood & Patricia Mettler · Cynthia Latta · John & Martha Laubach · Louis & Ann Laux · Timothy & Jacquilyn Lawler · George Lawrence · Winfred Leaf · Jennifer Lee & Wendell Haag · LeFort-Martin Fund CCF · Richard & Virginia Lepman · Benjamin & Wendi Letourneau · Anna Levin · Dennis Lewis · Steve Lickteig & Barrie Hardyman · Matthew Liebman & Laura Merrick · Curt Liesenfelt · Donald & Nancy

Link · Robert & Rachel Loersch · Jakob & Tamar Loewenberg · Amory & Judith Lovins · Alice Loyd · Karen & Gordon Luetjen · Jane MacNeil
 Thomas Mahoney & Madeline Maxeiner · Craig Maier · Richard Malsbary · Philip Margolis · David & Laurie Marks · Elliot Marshall · Marsha & Ric
 Marshall · A. Charlene Martin · Royceann Mather · William & Robin Matthews · John & Susan Maus · Elizabeth Maynard · Joe Mazour · Shelly
 McAllister · Norma McCallan & Robert McKee · Will & Valerie McClatchey · Laura McClenny · Fred McColly · Thomas & Linda McCoy
 J. McDowell · Dorothy McNeil · James & Diana McWilliams · Curt Meine · Rachel Melis · Margaret Mellon · Anne & Norman Meyer · Gerald
 Mikkelsen · T.H. & Kathleen Milby · Michael Moon · James Moore · James Morgan & Teresa Maurer · Merry Muraskin · Virginia & Laurence Mutti
 Koji & Susan Nakao · Joanne Neel-Richard · Harland & Corinne Nelson · Herbert & Pamela Neumann · Ada Niedenthal · Melinda Nielsen · Rae Ann
 Nixon · Jorge & Patricia Nobo · William & Shirley Nolting · Kurt Nordback · Janet & John Nybakke · Geoffrey & Leslie Oelsner · Michael & Kathleen
 Oldfather · Arthur & Debra Ozias · John & Sharon Palmquist · Haigler Pate · Helen Pauls · Ellen Pearson · Kenneth & Ana Pecota · Cynthia & Ronald
 Pederson · Caroline Perkins · Joy & James Perry · William & Cynthia Pfannenstiel · Clare Pierson · Kathleen & William Pierson · Susan Pokorny
 Frank Pommersheim & Anne Dunham · Jon Pope · Donna & Darwin Poulos · John & Dorothy Piske · David Proch · Trucia Quistarc · Victoria &
 George Ranney · Steven & Pamela Read · Terri Reicher · Susan Reimer · Raymond & Barbara Reinert · Stephen Renich & Cheryl Umphrey · Deborah
 Rich · Stephen Richards · Roger Richter · Muriel & James Ricketts · Gregory & Beth Rieke · Peter Riggs · Wilma & Richard Righter · Roger & Carrie
 Ringer · Griffith & Mary Roberts · Diane & Jack Robertson · David Rodgers · John Rogner · Stephen & Lynne Ryan · Niklaus Salafsky & Julia Segre
 Sarna Salzman · T. Sampson · John & Dori Samson · Sanders-McClure Family Fund · Janice Savidge · Randolph Schenkat · Richard & Dorothy Scherer
 Carol Schmitt & W. Propst · Richard & Sharon Schoech · Jonathan & Gail Schorsch · Jon & Jane Schulz · Chris Schweitzer · Diana Scott · Raymond &
 Mary Sell · Gerald & Jean Selzer · Bambi Semroc & Douglas Clarke · Kenneth & Gloria Sennert · Gwenith Severance & Judith Lhamon · Ellie Shacter
 Matt Sheaffer · Florence Shepard · Shirley Shimada · Charlotte Shoemaker · Dana Simmons · Grover & Mary Simpson · John Simpson & Sondra
 Goodman · Robynn Sims · Malley Sisson · Martha Skillman · Tim Skwiot · Jay Smart & Denise Pedrotti · Barrie Smith & Marcy Smalley · Lola & John
 Smith · David K. Smoot Sustainability of Life on Earth Fund · Robert & Marianne Smythe · Robert & Nancy Sorensen · Paula Speer · Jennifer Stanley
 Lucia Stanton · Marshall & Janice Stanton · Debra Starin & G. James · Dean Stevens & Jennifer Johnston · Adrienne Stolwyk · Pablo Stone · Tony &
 Patricia Stoneburner · Kimberly Stoner · James Stowers · Palma Strand · Jill Strawn · Charlotte & John Strecker-Baseler · Connie & Karl Stutterheim
 Marian Sussman · David & Shelli Swanson · J. & Jacqueline Swift · James Tarnowski & Judy Berkshire · Mary Tasheff · Constance Taylor · George
 Taylor & S. Hoke · Kevin Thomas · Margaret Thomas · John Thompson · William Throop & Meriel Brooks · Andre & Ruth Toth · Bruce Tsiknas &
 Mary Werowski · Marjorie & Lynn Van Buren · Nancy Van Dyke · James Van Eman & Susan Bailey · John and Sally van Schaick Fund · Verlon &
 Elaine Vrana · Pamela Walker · Raymond & Floriene Walker · Robert Wallis · Robert Walter · Richard & Barbara Ward · Thomas Warner · Julianne &
 James Warren · Brian Wass · Charles & Mary Watkins · Phillip Weaver & Kathleen Leenders · Gary & Mary Anne Weiner · Ed Welliver · Elisabeth
 Welsh · Brent & Ruth White · Mary Whitehead · Nancy Wicks · Jim & Ann Wilkinson · Catherine Worster & David Beran · Donald & Beverley
 Worster · Angus Wright · Mari Wright · David & Rita Wristen · Nancy Wygant · George & Margaret Yarnevich · Carroll Young & Frank Neiswender
 J. & Ruth Young · William & Dorothy Zales · Ruth & Mark Zalonis · Dane Zeller · Robert Zimdahl

FOUNDATIONS AND ORGANIZATIONS: Affleck Acres Inc. · Agri-Dynamics Inc. · Appleman Foundation Inc. · Atlantic Bullion & Coin Inc. · Bank of America
 Matching Gifts Program · Basalt Foundation · Beavertides Foundation · Bert & Wetta Sales Inc. · Buckskin Valley Farms · Chez Panisse Foundation
 CMH Foundation · The Fanwood Foundation/West · Ferndale Farms LLC · The Field Foundation of Illinois Inc. · Flora Family Foundation
 Foundation for Deep Ecology · Garney Family Foundation Fund · Bill & Melinda Gates Foundation · Good Works Foundation · Hanging Dog Valley
 Nursery · Hospira · Hunnewell Elevator Inc. · IBM International Foundation · Keep the Land Foundation · The Lasater Ranch · Liberty Prairie
 Restorations · Ludlow-Griffith Foundation · John & Catherine MacArthur Foundation · maxEmor Corp. · Merck Partnership for Giving · Neiman
 Environments Inc. · North Slope Enterprises · Dennis A. O'Toole Family Foundation · Penn State University, Paterno Library · Pfizer Foundation
 Matching Gifts Program · Portland General Electric · Rembe Enterprises · The Scheerer Family Foundation · SOR Inc. · Southwest Georgia Technical
 College · Virginia Zynda Family Foundation

DONORS OF TIME AND GOODS

North McArthur · West McArthur · Gene and Donna Sandbert · Cork Umphrey

THE WRITERS AND ARTISTS

Lisa Grossman is a painter and printmaker based in Lawrence, Kansas. She focuses on the open spaces and prairies of eastern Kansas and the Kansas River Valley. Clare Leighton (1898-1989), was a Briton who in midlife emigrated and became a US citizen.

She wrote and illustrated many books. A recent collection of her engravings and words is “Clare Leighton: The Growth and Shaping of an Artist-Writer.” Leighton prints are at the British embassy in Washington.

I WANT TO BE A PERENNIAL FRIEND OF THE LAND

Here is my tax-deductible gift to support Land Institute programs

Please print

Name _____

Address _____

City _____ State _____ ZIP code _____

I authorize The Land Institute each month to

☐ Transfer from my checking account (enclose a check for the first monthly payment)

☐ Charge my credit or debit card

☐ \$125 ☐ \$75 ☐ \$55 ☐ \$15 ☐ \$5 ☐ Other: \$ _____ Deduct on ☐ 5th of month ☐ 20th of month

Monthly giving: We will transfer your gift on the date you select, until you decide otherwise. You can change or cancel your donation at any time by calling or writing. We will confirm your instructions in writing.

I authorize a one-time gift of

☐ \$5,000 ☐ \$500 ☐ \$250 ☐ \$125 ☐ \$50 ☐ Other: \$ _____

Payment method: ☐ My check, made payable to The Land Institute, is enclosed.

☐ Charge my ☐ Visa ☐ Mastercard ☐ Discover

Account number _____ Expires _____ / _____

Signature _____

Clip or copy this coupon and return it with payment to
The Land Institute, 2440 E. Water Well Road, Salina, KS 67401

LR100



2440 E. Water Well Road
Salina, KS 67401

Nonprofit organization
US postage paid
Permit No. 81
Salina, KS 67401

If the date on your label is before 11-1-10, this
is your last issue. Please renew your support.