

Kevin Bone, Director, Cooper Union Institute for Sustainable Design

Josh Svaty, Vice-President, The Land Institute

Mark Bittman, *New York Times* columnist

Wendell Berry, Poet-Farmer, The Berry Institute

Wes Jackson, President, The Land Institute

Kevin Bone: My name is Kevin Bone, I'm the director of the Cooper Union Institute for Sustainable Design and one of your hosts here this evening. I just want to say a few words before I hand it over.

A little bit of time perspective to start the evening, especially for the sake of some of my students who may be here; I hope that some of my students are here, I'm looking around. A reminder that those students are kind of 18 to 25 years old. Our distinguished guests here are 78 years old and 80 years old, respectively. This room is 155 years old. In fact, 155 years ago, almost to the day, this great hall had its inaugural public event. An eager group of New Yorkers came to listen to George B. Cheever, the Most Reverend George B. Cheever, speak on the logic of the word of God respecting slavery.

Spring, 1859, a mere 155 years ago, ground was broken on the Suez Canal, Charles Darwin published *The Origin of the Species*, and that same year a man named Edwin Drake drilled what is typically considered to be the first modern oil well near Titusville, Pennsylvania. In that year the good folks of Pennsylvania managed to pump up 2,000 barrels of oil. At the same time, a bit farther from home, a German chemist named Justus von Liebig was working on a process to isolate nitrogen. He was a blooming industrial-era agriculturalist and is considered the father of modern irrigation technology.

In those short 155 years since we opened this hall, began to drill for oil, and began to industrialize the farm, we have added 5.7 billion people to the human family. In the U.S., we now produce 6½ million barrels of oil per day. Globally, daily production is 75 million barrels. We have witnessed a remarkable expansion of the human enterprise. Our innovations are nearly beyond comprehension. Super computers, super conductors, super colliders, super tankers, jumbo jets, bullet trains, smart phones, smart homes, smart cities, half-mile tall buildings, two-mile deep offshore drilling rigs, and as of just recently, an active fleet of cars and trucks that number over 1 billion, that's with a *b*. We have created levels of wealth that would make even the greatest of Egyptian pharaohs blush.

These 155 years, and all the growth they've seen, are bringing along with them, to use the Robert Louis Stevenson expression, "a banquet of consequences." On the farm and food front, these consequences coming from the new ways of doing agricultural business are mounting like wartime losses. Since 1859, the amount of land under cultivation has expanded by some 500 percent. The era of large-scale, industrial-based, chemically intensive, fossil-fuel-powered farming is now

recognized as among the greatest threats to the environmental stability and ecological health of the planet. These two gentlemen who are here to speak this evening have done more to think about and address this banquet of consequences, and how these consequences are being felt on farm and land, than anyone else around. They are known to everybody in the environmental community on a first-name basis.

A lot of good people have come together to make this event happen. I'm going to let Josh Svaty of the Land Institute take care of a few of those acknowledgments, but before I hand it over to Josh, former Secretary of Agriculture of the good state of Kansas, vice-president of the Land Institute, I want to say one last thing here. When we first founded the Cooper Union Institute for Sustainable Design, and we developed a short list of who we wanted to give as the inaugural lecturer in our lecture series, the short list had one name on it, it was Wendell Berry.

I wrote to Wendell, and he sent me back this very beautiful handwritten note, and he was not interested in e-mail or anything else, and said he basically did everything possible to avoid leaving the farm and engaging in public discussions unless he had something he really wanted to say. We didn't invite somebody who was on the cutting edge of technology or some scientist that was behind some dazzling innovation, we thought of Wendell because he was a kind of poet-statesman of values. And to many of us in the sustainability discussion and in the environmental community, that question of values is really core to where we're going.

Both of our very distinguished guests have spent a long productive life thinking about these values in our world. Wendell said no at the time of that invitation, but we're glad that time has brought him around and his good friend Wes Jackson have come to join us in the Great Hall.

So, I'm going to hand this over to Josh, and then we'll welcome Wes and Wendell to our hall here. Thank you.

[Applause]

Josh Svaty: Thank you Kevin. The Land Institute is mostly plant breeders and ecologists, and we are located on the banks of the Smoky Hill River in Salina, Kansas. We love our home, we love doing our research there, and we don't often put events on or are part of large events like this in New York City. So I wanted to take a moment and thank all of the people that helped put this on because certainly those of us from the Land Institute love being a part of this and are honored that Cooper Union would have us here and allow us to be a part of such an exciting event.

There are especially some groups that have bent over backward to make this possible. They are listed on your program: The Buckminster Fuller Institute, The Wright-Ingraham Institute, Brown-Forman, our principal sponsor, and many others I want you to certainly thank them and appreciate them for helping do this, but I

also want to take time to specifically thank two individuals that have worked so hard on this evening, Lily Beaugard the finance director for Meadows Bee Farm and Sunnie Joh here at the Institute for Sustainable Design. Both of them deserve a round of applause. I don't want to contemplate the number of hours they've put on this in the last two months, but truly it was a Herculean effort, and we appreciate that. This is certainly, and Kevin did a great job of doing it. This is a hallowed space, the Great Hall. But I think the other thing that we need to remember this evening is that, as hallowed as this space is, Cooper Union is much more than the event where Abe Lincoln spoke here 150 years ago. It is still a living, breathing institution, that is training and allowing for the creativity of young people so that they can solve many of the challenges that we face today.

I think it's also important that we note with Wes and Wendell that as extraordinary as their words and their work are, that the Land Institute and the Berry Center will need to continue working for years to come, and so it's important that as we celebrate an evening like this, we also remember, that whether it is Cooper Union, or Buckminster Fuller, or the Land Institute, or any of the other groups, that if we want to drive this sort of change that will inspire us this evening forward for decades to come, it takes the help of all of us, so I encourage you: Reach out, find ways that you can be a part, make a difference in these organizations. We appreciate it. And I'm sure any of us would invite you to come out and find out what we are and what we are about. We are eager to share.

But enough about that. Our first speaker and the person that I will introduce is a very well known, nationally known, *New York Times* columnist. He's a best-selling author. We were privileged enough to have him at our Prairie Fest this last fall, our main event at the Land Institute in Salina. And he is a food writer. But there are a lot of food writers in this country. There are even a lot of food writers that love to trace the story of their food back onto the farm. And that's a really wonderful story to tell. But I think one of the things that has given Mark Bittman such a voice, is that he has begun to explore and he began to realize that if he really wanted to fully understand the food situation, he needed to come out to the Midwest, and begin to see what was really going on on the most important and most productive acres in the United States. And he has done that and he has written about it exceptionally well and helped to raise the awareness across the country about industrial agriculture and what can and should be done about it. And he does it in a tremendous voice. So it is our privilege to have him here, but it's also fun because as he came out to the Midwest, his roads eventually led him to Wendell Berry and also to the Land Institute of Wes Jackson.

And it's such a treat for us this evening that their three roads would converge here in the Great Hall at Cooper Union. So Ladies and Gentlemen, I present you Mark Bittman, Wes Jackson and Wendell Berry.

[Applause]

Mark Bittman: I've spent time with both of these gentlemen in the last two years, and they are truly gentlemen. Either could be resting on his wondrous accomplishments over lifetimes of varied work, a fraction of which would be enough to satisfy most of us that we'd spent our time on Earth wisely. Instead, they're still crusading and wonderfully. But we didn't come here to hear me talk about Wes and Wendell, we came here for them to talk about one another, their work, and what sense we can all be making of agriculture and the environment. I'm going to read one little quote from each of them that are among my favorites. Wendell has said, and this is why people call Wendell a prophet:

"We have lived our lives by the assumption that what was good for us would be good for the world. We've been wrong. We must change our lives so that it will be possible to live by the contrary assumption, that what is good for the world will be good for us."

I think that's pretty fundamental and quite true.

Wes—not that this is a competition and not that Wes is ever succinct, as you'll see—but Wes has said, and he's said this to me directly:

"If your life's work can be accomplished in your lifetime, you're not thinking big enough."

You've each told me separately that you talk on the phone frequently. And, without getting too personal, I'm wondering if you can share with us what you talk about and whether the conversation has been moving forward.

Wendell Berry: If you're talking to somebody and the other person is your friend, and you enjoy talking, and you have a lot of new stories, new jokes, and so on to pass along, and there comes along a reason to become serious, then you have a serious conversation. But ours is a friendly conversation, which means that from the point of view of seriousness, we've wasted a hell of a lot of time. But we have, often, had conversations that were really productive and at the end of them we'd thanked each other. And that's the way it's gone. It hasn't been intentional, deliberate, controlled by purpose, but it's been, it's been under the dispensation of a kind of grace.

Wes Jackson: I do detect at times that Wendell has a list, which is a relief because I have a list and I can see both of us going through our lists sometimes. But there's a...we're working out something, and sometimes it's a struggle and sometimes we don't get it all taken care of in that conversation. But it comes up again. So it's been a useful conversation beyond being merely fun.

MB: All right, and it's one that continues, obviously.

This is a question I get all the time, and I think of you both and wish that I could punt it over to you. And the question is: Is there a sense that sustainability is becoming a

fundamental issue or is it just a bunch of us talking among ourselves? Are things getting better or are things getting worse? A little meatier question.

WB: Well, things are getting better and things are getting worse. I've had acquaintances who answered every question with: "Well, yes and no." Things are getting better in the sense that this event would not have been imaginable three decades ago. Well, actually, it wouldn't have been imaginable a decade ago. There are lots of places now in the country that are involved in the development of local food economies and the conversation about food and its obvious dependence on the land. And you can go to those places and speak the language that Wes and I have been using in speaking with each other for so many years, 35, and people know what you're talking about. You can go to some city governments and people know what you're talking about. I don't...I know you can't go to my state government and be understood. And I don't think you can go to the capital in Washington and be understood. But there is a growing conversation that's using the same language, concerned about the same issues, and that's better.

Things are getting worse in the sense that the corn and bean economy, for instance, a totally market determined, technologically limited way of land use, is now invading the extremely vulnerable landscapes where I live, and we're a long way from being able to stop that. And so I want when I talk to people to say that we now have a beginning. It's an authentic beginning and it's not going to be undone, it's going to go on, I'm fairly confident of that, but it is a beginning. Most of the land in use now is being badly used.

WJ: I think that the so-called movement follows a recipe that I think sociologists have talked about, there's the "No talk, no do" phase, then there's the "Talk, no do" phase, and then there's the "Talk, do," and eventually just "Do." What I think is happening that is allowing the numbers to increase in lots of places around the country, is that the kind of gambles that have been taken with industrialized agriculture have led to some pretty serious problems in terms of nitrogen in the water, dead zones, fossil fuel dependency, chemical contamination, larger and larger scale, and so on. And it seems to me that in this gamble, we're approaching the time, the industrialized system is approaching the time in which they're rolling dice that don't have any dots. There's not much there available, and therefore the stock goes up for the point of view that Wendell and I have been talking about—and lots of others—for some time.

WB: I've been thinking of industrial agriculture as a great dragon. And it's technically dead. Its little brain is destroyed. Its wrong on every count, and the list of its failures is both undeniable and immense; the dead zone in the Gulf of Mexico would be enough to sink it if it had a brain. So its brain is gone, but its death throes are tearing the country apart. It's thrashing about in its death throes and doing a lot of damage, and the dragon, you know, is a serpent, they don't die very quickly.

MB: Wes, I wonder if you could give us a little of the David and Goliath conversation. I think that might be appropriate at this point.

WJ: Well, we all know that David, this gets back to the talk I gave at Prairie Festival last year. And there's a book by Marshall Ganz, about why David, or how David sometimes wins. And he, Ganz had started at Harvard and quit, and then went out and worked in civil rights and worked with Cesar Chavez in the Central Valley of California, and then he went back to Harvard and finished, and he eventually did a PhD in which he could...in which he dug into how the Davids sometimes win. And in his analysis, both bringing his 27 years of field experience and at the same time the scholarship, he concluded that David won partly because he knew to do what he did best. If some of you remember the story, he...the Israelites are fighting Philistines and Goliath comes out and no one will take him on, and David decides to take him on, and King Saul tries to put his armor on David, and David does, he girds up the sword, and then he takes it all off. And he goes over and gets five stones and he slays the giant.

So what he did was, first of all he was angry that no one would take him on, second of all, he did *what he knew how to do*. And what I think we're seeing within the sustainable agriculture movement is more people taking on what they know how to do. And they're not really out to slay Goliath but rather to reduce Goliath down to a manageable size. And so the bad thing about that story is the idea that the one shot well placed will take care of everything, that's where the part breaks down, but I think we're seeing more and more people that are developing competence, which is what David had. And then he made a commitment before he had a strategy, and I think that has been key to the so-called movement. There's not been a strategy, but there's been a commitment and then they, we figured it out. So.

MB: Can we draw comparisons between movements of, say, the '70s, which I know you were active in, and the food movement now? Is there a commitment, was there a commitment before there was strategy then?

WJ: I think so. It sort of got worked out along the way. And Ganz says in the book that Chavez's membership went down and he had an interesting way of putting it: "He began to substitute *resourcefulness* for *resources*. Forsaking the resourcefulness. And I think what we're seeing in the movement is a lot of resourcefulness. And that if we can keep that going and at the same time have the resources to go along with it but not to overshadow it.

MB: Agriculture, obviously, is no longer an integral part of most Americans lives. Land is something we visit not something we work, for the majority of us it's not even something we live on. So what have we lost by that, what are we losing, and is there a way to regain it?

WB: Well, that's enormously complex because we don't even visit it. We, people don't visit the land that's in use. Wes talks about how people cross Kansas, leaning

forward this way with their eyes on the horizon. They're looking for snow-capped peaks. And people visit the land that's scenic, not necessarily the land that's in use. It's extraordinarily difficult to get people to be interested in land that's being used let alone to be interested in the best ways of using it or the conversation about how best to use it. So, one of the things we know is true is that the land that's in use is now understaffed. There're not enough people to use it except in the way it's being used, which is to say that most of it's being abused. So, well, one way to get at this: Somebody asked me the other day what the most dangerous thing is in agriculture? I said, "Well, the chemicals, obviously. They're everywhere. If they stayed in place there wouldn't be all that big a problem, but they run off and they mix, and nobody really knows what's happening."

I've read some refereed, peer-reviewed articles by some scientists who say that the level of glyphosate in some of the Mississippi River tributaries in the Midwest is much too high. I called those people up, I said, "I read what you said, and I know you know it's too high, what's the effect?" And the answer always is, "Ha. A lot of people would like to know." Because of the difficulty of connecting a cause to effect in a large volume of flowing water, it's very likely we're not going to know very much about that in spite of all the experts.

But it's more complex than that. Chemicals are dangerous because they run off. Along with the runoff of chemicals goes the runoff of soil. That's one complication. Another one is that those chemicals exist to replace people. So if you reduce the chemical use, you've got to increase the use by people. And one of the daunting questions overhanging this discussion is: Where are the people going to come from? They'll have to be people with knowledge of how to use the land. They'll have to be people who know where they are. They'll have to be people who can afford to use the land. I heard a man say—a dairyman, a very bright dairyman and a big dairyman in Kentucky—he made two points in a meeting I attended on water quality. One is: The nutrients that run off are valuable. If you do the economic right thing, you're going to the ecological right thing; that is you're going to keep those nutrients where they belong. And then he said later, quite a bit later, "It's hard to get a farmer to think about keeping the nutrients in place if what he really has on his mind is the question 'Who's going to be the next person that lives in his house.'"

So you see how these problems branch out and become complicated. And, so, one of the most intellectually respectable things that we can do is appreciate the complexity of the problem that we're dealing with.

Is that the question you asked? [Laughter]

MB: It's the answer we wanted.

WJ: Well, we had a problem of agriculture that simply became exacerbated in industrial time. And that problem is a 10,000-year-old problem. And that as long as we had a sufficiency of people on the land, the rate of soil erosion wasn't really

serious and the rate of...the need to put chemicals out there that are tissues they've not evolved with. So our efforts are to solve the 10,000-year-old problem and not have to be so dependent upon the commercial fertilizer, the pesticides, and putting, whether it's through the chemicals for pest control or whether it's the chemicals we're putting on for fertility. And to that end, we're saying, we can now build an agriculture based on the way natural ecosystems work, and that's why our group at the Land Institute and now increasingly around the country and the world are *perennializing* the major crops so that those roots can be there and hold the soil, and put them in mixtures that would mimic a vegetative structure that would give us the processes of the wild that would come to the farm.

So this is our time to build an agriculture in which we can use the principles of ecology and evolutionary biology to have grains—corn, wheat, sorghum, sunflowers, soybeans, and so on—that would be grown the way a natural ecosystem works. And this would represent a fundamental shift in the way we do the business on the landscape, in that 10,000 years ago nature had to be destroyed in order for the seed to germinate, but we can now imagine, with the perennials there, that we can bring all that knowledge that's been put on the shelf in ecology, bring that to the farm, and begin to have an agriculture as sustainable as the nature we've historically destroyed.

So the cultural aspect of this that has been accumulating and has gone somewhat in decline until recent times, that's going to be necessary, but at the same time, there's going to be the plant breeders developing perennial grains, the ecologists, the soil scientists, the entomologist and the plant pathologists that can begin to build an agriculture that works like the kind of nature that we've historically had to destroy in order to get our grains, which are some 70 percent of our calories, growing on 77 percent of our agricultural acreage. So we can solve this problem, and we can solve it in our time, and it's a problem that could not have been solved until this particular time given the computational power and what we know about molecular biology.

So to bring together the cultural and the scientific, and this is the conversation that Wendell and I have had all these 30 and some years. And how to make that happen is very much on our minds.

WB: May I add to that? What we're talking about is changing the view of nature radically, from the idea of nature as an enemy to be conquered to the idea of nature as an ally. One of my informants used to say, "It's good to have nature working for you. She works for minimum wage." So we're talking about a mind differently informed; but one of the richest ideas Wes has ever had is that there is for land in use an eyes-to-acres ratio that is appropriate to that place. I think this is a law, but it's an odd law because it would differ from one place to another, right? But if humans are going to use the land they have to be there watching, and by this, Wes always implies they're watching competently.

WJ: My late friend Strachan [Strom] Donnelley, a philosopher, lived in New York, is the founder of Humans in Nature. And the ideas that he brought to the conversation, the ideas that come out of Whitehead and Hans Jonas and some of those philosophers, I see as sort of some of the core thinkers for this idea of nature as a standard or as a measure against which we judge our agricultural practices. And there's something that happened 10,000 years ago, there at the Eastern end of the Mediterranean, when, with the plow, that the...it wasn't just the destruction of nature in order to have food, it's that idea ricocheted throughout civilization and it is with us today, and it's the dualism that we can all trace back to the Greeks and the Hebrews that's now our modern problem. We have the wildness that we call the sacred. And then we have the other and the profane. And we can now in our time begin to pull those together and, in my view, if we're successful at it, it will be more important than the Copernican revolution in the sense that it gets right to our food and at the time the Copernican revolution happened we didn't need it, but we need this and we need it now.

Because in the interest of feeding all these people—well, right now, we're losing 30 million acres a year worldwide due to land degradation, that's United Nations. From 1700 to 2000, we've lost in acreage worldwide about three times the total ag acreage of the U.S.

So this is ongoing. And you add to that the fact that land use is number two as a source of greenhouse gases. Right behind power plants and ahead of all transportation. Now some of that land use is due to deforestation in the Tropics, but some of that deforestation is *for* agriculture and when you take that, my colleague our director of research Tim Cruise has worked it out, that you take that and it's about...agriculture's about equal to all transportation.

So what do we do? We get Priuses, we get squiggly light bulbs, we get all of these sort of things, but where's the attention to the land? We need a movement that pushes the importance of solving this problem. Not only do nature's ecosystems have greater net primary production than the human-managed systems that follow, but those ecosystems are not net producers of atmospheric carbon or greenhouse gases generally.

So there's more on our plate now than simply alternative crops. I think this has important philosophical implications.

MB: Well put. Let's continue in this vein for one second. You know we've spent say 200 years increasing yield, and when you talk to people who want to have the conversation about how to feed the world, which comes up, how do we feed the 9 billion, you often run into the discussion that the only way we could possibly feed everybody is to further...become more productive and further increase yield. Yet, I could make the argument, although not as well as either of you, that yield is in...high yields are in a way part of the problem. So can we talk about that for a minute?

WB: We've spent 200 years increasing production, and 200 years decreasing the natural endowment. Kentucky's been settled by Europeans, old-world people, since 1775...25 plus 14 is 39...239 years we've been there, and we've got less of everything except people. Less of everything except people, and when you've got a situation like that going on, and you're thinking about increasing production, it seems to me you've got to think again. I don't think we've gotten around to that yet because we haven't understood our dependence on nature. Kentucky loses 300 acres a day just to development let alone bad farming and forestry and the rest of it. And we're a backward state. I mean, if we were more advanced, we'd be losing a lot more acreage than that.

So we've got to look around. This is not...we're not in a situation that is without precedent. It's really important to remember that livestock farmers, people who do so-called animal agriculture, if they're grazing and raising cattle or sheep or whatever, they are directly dependent on nature and they know it. If you've got a cow that can't naturally have her calf and mother it when it's born and feed it herself without your help, you're in very serious trouble.

So there's an example of what we have to do. That's an example we have to follow. If you can't leave that little cow and her calf to nature, turn your back on her and walk away, then you're in trouble.

MB: Let's go here. We know this is a very long, there is a question at the end of this statement, we know that the age of the American farmer is high. We know there are fewer small farms than ever. And we know that there are fewer farmers than ever. We know, we think at least, that there are some number of young people that would like to farm if only they could afford it and figure out how to get into it. And we also know that industrial farming is profitable enough so now that most of the best farmland and, as you've said before, even *not* the best farmland in the United States is either off the market or priced so high that few people can afford it. Corn is obviously everywhere. So the question is: What can be done to encourage young people to farm? And what can be done to make it easier for those young people who are willing and eager to farm to get started?

WJ: Next question. I'll let Wendell go first and then I'll second it.

WB: I'll go first and then he can correct me.

Well, I remember my grandmother saying to me, "Honey, don't ever farm." And she was speaking from 40 years of hard times in the 50 or so years that she had been married to my grandfather. And that advice is still going on. And it's because in the agricultural system that we've got and have always had, the farmer is the last considered and the lowest paid in the whole structure.

This is going to make it very hard to keep the farm-raised young people on the farm. And whether they've been raised in a family that's farming well or not, they're still

used to being dependent on the weather, for instance. They're still used to getting up in the morning. I just was reading that some of the learned people in education have decided that it's unnatural to expect young people to get up early in the morning, and so they're going to start school later. It's unnatural for any human to get up in the morning and go to work. But there's a different set of assumptions for humans. And that is that they'll get up in the morning and take care of their responsibilities. So I'm for starting school earlier.

There are in spite of all the difficulties, some people who...*young* people who are attracted to farming. They used to say they have a vocation. And something does need to be done to help them to get land, and there are efforts of that kind going on. But the chances are that it won't be going on fast enough. But, nevertheless, young people without farming experience are committing themselves to farming, are getting a hold of land, it's marginal often, but doing well at farming. Their situation is still pretty dire because they're not making enough money from it. This raises another issue, the cheap food policy that has been a mistake, food's underpriced, people aren't getting paid well enough for producing it, and so on, which brings up another problem, which is that even cheap food is too expensive for a lot of poor people. So, so we take care of that.

WJ: Well, for reasons you don't need to know about, I drove from Kansas to Chicago before catching the plane to La Guardia. And my wife and I coming along looking out on an April landscape where the corn has not yet been planted or the soybeans have not been planted, and this is the time for rain. And we saw rill after rill, gulleys being cut in, and I wondered, we wondered to ourselves, "How can it be that in Iowa and Illinois, where they're paying as much as \$20,000 an acre, how can it be that there is a willingness to allow this erosion to go on?" These \$20,000 is a lot of money for an acre of farm ground, and if you are renting the land, then you're paying as much as not too many years ago was the price of that acre itself, just the rent.

So here we have now as the consequence of the subsidies for biofuels, which is nuts, 97 million acres of corn, that's up from around 70 million acres of corn. And the soybeans. And no fences, no livestock out there that you can see. My daughter's looked into this, she's an ecologist, she says that if we had as many dairies in Iowa as we had 30 years ago, we would not have a dead zone, because there'd be pastures. That's all been turned into corn and soybeans. The dead zone wouldn't be as large, is the way she put it. So there's...something happened, with this industrial mind that is taken over the landscape to the point that there's a willingness to neglect the soil that's headed down the Mississippi and into the Gulf and the nitrogen with it, and the towns, Des Moines, I understand, had to spend something like 25 million just to clean the nitrogen out of the water to make it drinkable.

So here's this nuttiness that comes partly from the subsidies that is actually exacerbating the problem. Now just another thought here. I think Wendell's the one that pointed out to me that the statement "we must feed the world" is a kind of industrial heroism. Rather than to say "the world must be fed," we say "we must

feed the world.” And that’s an important distinction. The 9 billion, then what? You know, we’re at 7 billion going to 8 billion, and we’re not asking “then what?” And in the interest of doing that for the short term, we’re actually leading to more famines later on of a more extensive nature. So the here and now is a part of the problem, we’ve got to start thinking in terms of 50 and 100 years.

Wendell and I and Fred Kirschman took the 50 Year Farm Bill to Washington. We sort of knew that it wouldn’t go anywhere, but we thought it ought to be put out there in front of the folk. Well, some of my friends in the sustainable ag movement, working with various foundations that have been working on the 5 Year Farm Bills have finally started throwing up their hands and say we haven’t done any good, or not very much good, and not enough good. What is it something like 2/3 of 1 percent of the acreage is now organic? Something like that. It’s not much. Not that that has to be the standard in an absolute sense, I mean, I take aspirin but I’m not a drug abuser. So it’s not a matter of absolutely no chemicals, it’s a matter of some, you know, to be like the Greeks, a golden mean or something.

But we’re not really addressing these questions. And I think we’re not going to address them adequately as long as we have, in computer language—forgive me, Wendell—the hardware of the annual. That we have the hardware and we design software to accommodate that hardware. With the perennial hardware, we now have the opportunity for ecology to inform our research agenda.

So, I’ve been running the risk of irritating some of my friends in agronomy by saying agronomy is what we do to mitigate the consequences of disturbance. And we need to be working toward an ecological agriculture, and I’ll use this little sound byte, I got it from my late friend Chuck Washburn: “If we don’t get sustainability in agriculture first, it’s not going to happen. Because agriculture ultimately has a discipline standing behind it of ecology, and the material sector, the industrial sector has no discipline to inform it. And I think we ought to look at that really hard. Really hard.

And I’ll say one other thing. We have pickup trucks, we have a greenhouse, we have combines, we have computers, we have a whole bunch of things in our research arsenal. A big question is: As we go through and contribute to this very problem that is all around us, will these new varieties we’re developing, these new species we’re developing, our colleagues in Canada, our colleagues in Australia, Shuin’s perennial wheat in 20 different spots in 8 different countries, as they are all involved in this transition, are we creating varieties and species that are going to be requiring what brought them into existence? And our answer is no.

The creatureliness or some other better word would be available to even a Neolithic farmer. The industrial world can’t say that, whether it’s about wind machines or solar collectors or whatever because the industrial world coming up with these various renewables has the scalpel of civilization that is heavily dependent on fossil fuel and putting it in place.

So we've got to get this thought through about to what extent the ecological mind can substitute for the industrial mind.

WB: Yeah, just a little bit. The reason that people are not thinking about the nature of the places where they're doing their work, their agriculture, or whatever they're doing, and trying to make a harmony between the nature of the place and the human economy of that place, is that we're an industrial culture. And if you want to know what an industrial culture is, it's a culture in which a farmer will pay 5 or 10 or 20 thousand dollars an acre for land and sit and watch it wash away while he takes perfect care of his machinery and his pickup truck.

MB: I'm going to ask a political question but it may be that you want to answer it with a cultural answer. But, to go back to the David and Goliath thing, if we want to starve a beast, how do we start? If we assume that a slingshot...a single stone from a slingshot is not going to kill it, what are the institutional changes that we'd like to see happen first? What are the most important ones? Or is this, as I said, or is this a cultural question, or both?

WB: Well this is the kind of question that I always duck.

MB: You have Wes here... [laughter]

WB: I'm going to tell you why. Because it assumes that I or somebody has a plan for starting somewhere and bringing a change about, and I don't have a plan. And I would be a little frightened of anybody who did. The 50 Year Farm Bill is not a plan, it's just a statement about what good agriculture would be. It's a statement about how you have bad agriculture now and it is how you would get there, but it isn't really a plan. I think the change is going to be much clumsier than that. If, well, I think the way you do is you simply do the right thing now.

I'm suspicious of plans to begin with. I'm suspicious of people who claim to know about the future. I think that the right thing to do now is usually obvious and choices are standing in front of everybody that can be made, but in the whole collection of people and choices, it's going to be a clumsy business. I don't think it's going to go cleanly from one step to another. If my observation of changes that have been made is correct, you don't start with an agenda of problems and solve them one at a time until you get to the end of the agenda. I think as you solve one problem you become aware of *more* problems and the process locally.

We started once at home with the question: How do you get the mayor of Louisville to think about the possibility that Louisville might depend on the agricultural surroundings? That's a simple question. It took a long time to answer it. It took a long time to get the mayor interested. Once the mayor was interested we had a bunch more problems. Like, what do you do next? What does the mayor do? Who does the mayor need to help him? What do you need to say to the mayor now? And

so on. So, it's not going to be a clean...that's the way communists think, and they always mess up. [Laughter] It's the way democratic people think, too. There's always something being proposed that's a big...the final solution to something or other, and it's always messed up. And that's because we're human.

And so I think that what we need to become is better critics. We have to have a better standard, the standard is nature; nature's going to give us a standard. And then we begin to judge our solutions, we begin to judge the steps we've made, we begin to work our way, slowly, humbly, and alertly...and pleasingly toward a better way. [Applause]

WJ: Well, I'll quote Wendell. This is from a phone conversation many years ago, and he said, "We need to feature questions that go beyond the available answers in order to drive knowledge out of its categories." If you are featuring questions that don't have yet answers, and you take the questions seriously, there's going to be a yeastiness of thought that is fundamentally different than a question that has a quick answer. You're going to be worrying with it. You're going to be broadening the considerations.

And something else Wendell said several years ago. He was talking about how ultimately we're up against ignorance. And what we have is a knowledge-is-adequate worldview. Well, as a consequence of that conversation, which went and went and went, we put on a conference several years ago called *The Virtues of Ignorance...or Toward an Ignorance-Based Worldview*, and then a volume came out called *The Virtues of Ignorance*. And what we decided is since we're fundamentally ignorant, you know, let's go with our long suit. [Laughter] Rather than knowledge is adequate, why, then, what does that mean? Well it forces us to remember things, hope for second chances, keep the scales small, and so on—study the exits.

Those two things, those two conversations, to me, have been most useful. Because it helps us realize that the world of the answer has been the world that we've created and the ecosphere that we have been compromising and destroying.

Give you a little example: back up a bit, to 1600 not to the Big Bang, but to 1600, when Francis Bacon and René Descartes said "Break a problem down," mostly Bacon saying this, "to the point where there's no ambiguity." Well, of course, that's when it becomes irrelevant, without any ambiguity. So that became the way of science. Bacon's novel *New Atlantis* lays this out and the island of Bensalem. And by the way that's what the Royal Society picked up as the standard for science.

So this penetration downward in the hierarchy all the way to molecules and atoms, and look what we have now as a primary problem in just grain agriculture—Monsanto and others have given us the gene for Roundup resistance, and they also have the chemical Roundup—a two-molecule approach to solving a problem. They're saying it will help with soil erosion. Meanwhile, we now have this problem across, well, roughly, 300 million acres that are affected by this one way or another.

The Millennium Ecosystem Assessment Report says that agriculture is the number one threat to biodiversity. And so, if we can imagine working upward in the hierarchy of the sciences from atoms to molecules to cells to tissues to organs to organisms to the ecosystem, then as...Wendell has an essay called "Solving for Pattern," the ecological worldview will find us solving for pattern, and that will be a reversal of the dominant way that science has worked since 1600.

So this is part of the great intellectual and I think cultural transformation, that if there's a hope for saving the soils and protecting our water, it is from that worldview that just inverts the way we've been thinking about the world. There's nothing wrong with being reductive, so long as we don't believe the world is like the method. That's the problem. And so...and so there. [Laughter, applause]

WB: The idea that if people know they're ignorant, they'll be more careful is a good idea. And, again, we're working as a civilization now contrary to that idea. We're assuring people that because they have more information available than they've ever had before, they're going to do better than they ever have before, which is turning out to be a disappointment. [Laughter] You can have *all* this information, all the information you can get, and you may be assured that it'll never be adequate to anybody that's trying to do a good thing in a good place.

Wes assembled this gathering, Wes is always thinking, which he deserves a lot of credit for. We had this ignorance conference, as we called it, out in a tiny little town, an un-flourishing, tiny little town in the middle of Kansas called Matfield Green, and Wes had banners across the street when we started the conference that said: "Welcome Ignoramuses." [Laughter]

WJ: It was a real hit. [Laughter] I gotta tell you, I gotta tell you how that got started, because it gets a little bit into the anatomy of the discussion. Hans Jenny was a great soil scientist at Berkeley and a friend of mine. And I introduced him to Wendell. He was probably the greatest soil scientist of his time. And then Wendell went and bought Hans Jenny's book *The Soil Resource*. And as Wendell is apt to do when he reads a book, he pays attention. And so he wrote me a...Wendell wrote me a letter, and he quoted a paragraph from that book, which went something like this:

"The rain message enters the forest canopy and through crown drip, leaf drip, stem flow, the rain message is transmitted downward to the forest floor where it leaves as it entered at random."

Then Wendell said, "Is Professor Jenny's use of the word 'random' a verifiable observation or a limit of perception?" He says, "I suspect that the honest answer is that it's a limit of perception. But to appropriate the unknown with the language of science is to do what the Greeks warned us against: It's hubris. That the rain message really comes from mystery through pattern back to mystery."

Now that was an important lesson for me, because how many times do we make an assumption and assign a language to it in order to get on with an evaluation? You see what I mean? This is, and, by the way, I talked to Hans Jenny about that, he says, "Oh, of course, Wendell is absolutely right." But the kind of sloppiness that we're inclined to have in science, where we pride ourselves in not being sloppy, is there.

And so, what I want to make a pitch for here, is here is a literary man that had to correct the scientist, and that's going to be important. I think this is what brings the humanities and the sciences and the social sciences together, and it forces that knowledge out of the...well...use the knowledge that's been forced out of the categories. If Wendell and I thought of one another as literary or scientist, we couldn't have the kind of conversations we have. Those conversations are the consequence of a common love of farming and land, and *that* is, it seems to me, as Wendell has in that one essay, "It all turns on affection, don't you know."

WB: I want to add just a little bit to that. That was a valuable conversation. And I'm satisfied with it to that extent...that it helped us to think. I still regret that I took my example, my negative example, from a friend and ally, and I wish I hadn't.

WJ: Well, he's told me that before, but the thing is it's too rich, and Hans Jenny understood because he's a scientist, and he took it as a collegial engagement. That's the way he took it.

WB: I understand, and that shows him to have been an exemplary man.

WJ: So just shut up about this, and don't bring that up anymore. [Laughter]

MB: We're finally getting to the phone calls. [Laughter] I asked you this before and I think it's a question that a lot of people here would like to hear your thoughts on, and that is, I hear you saying that we need to think carefully, I hear you saying we need to move slowly, I hear you saying that we need to address the problems that present themselves to us. As city people, what can we what should we be doing to help move things forward?

WB: Well this question is eased by the fact that a lot of city people are doing commendable things. There is a kind of urban agrarianism that's taking place. I used to answer that question by saying that urban people like the rest of us ought to try to describe their personal economies, and I would say that with perfect confidence that nobody can, in the economy we have, give an adequate definition or description of his or her personal economy. We don't know where it's all coming from, we don't know the human cost, we don't know the cost to nature, but still, though we can't completely answer the question, we can begin to answer it. And I'm all for willingness to begin because the effort is instructive.

We're all wrong. And this begins to veer over into a kind of context of religion, we're all wrong to the extent that we take our lives and our life supports for granted. And

city people have been wrong to just assume that the food would be forthcoming simply because they were hungry. It's much more complicated than that, and people have ecological responsibilities wherever they are.

Ignorance is a fact. And it's good to own your ignorance and know about it. But there's a limit to how forgivable ignorance is. And if it becomes obvious to you that you have debts that you don't know about and can't pay, then I think that needs to be accepted as a responsibility and something ought to be done about it. Well, farmers markets exist in cities because people are doing that. And it's wonderful to see. It's the hope that we don't have a farm population capable of doing anything politically for itself.

Industrial agriculture is an urban invention after all. Country people didn't invent it, it was sold to them. Bad deal, but they bought it. And if we're going to have a better agriculture, it's going to come about to a very large extent because urban people become informed enough, become concerned enough to help us invent a better agriculture and to insist that the necessary things be done.

So, in saying that, I think, I've taken a step beyond the old competitive model. We've assumed, too easily, that the country simply was in competition with the cities, humans were in competition with nature, we've assumed that the consumer and the producer were in competition. And there's just a better way. And I think that a good name for the better way is the neighborly way. Who are your neighbors? The neighbors are the people who need your help. And so...so there. [Laughter, applause]

And your neighbor may not be a human. Your neighbor may be the land and the creatures of the land.

WJ: Count this as a footnote, I hope not by the furlong. I think we've got to come to terms with the power of the imperative of highly dense carbon: coal, oil, natural gas. And all creatures, given that we are—we're carbon based, whether you're a redwood or a Holstein or a whale or a bacterium. We go after energy-rich carbon. And it has some interesting ghostlike qualities that have the ability to penetrate and create technology, which then in turn has the ability to use more carbon.

I think we're going to have to confront the necessity to put a cap on carbon and start reducing that cap, not just in the interest of climate change but given the kind of destruction that we've done with having that highly dense carbon.

So we have this moral imperative, but we also have the legal. And, just a little on that. The Declaration of Independence said that we were all created equal, and yet the Constitution allowed for chattel slavery. So we had the high moral and we had the legal. And in our time we have the high moral of the need to protect the ecosphere, and yet it's legal to rip the tops off mountains. It's legal to drill in the Gulf and in the Arctic. It's legal. And as long as the legality does not match the high moral,

then we have the problem such as we had that led up to the Civil War. And let's hope that we can get that reconciled without 650,000 dead, or whatever it was, it was a huge number.

It seems to me that we need to confront how that penetrates so much of our lives. We keep saying "restraint, restraint, restraint," and then we cave in. So, it seems to me, that we've got to rethink at a basic level what stands behind all these decisions that we make that we say are due to public policy. I'm almost to the point of thinking that public policy is a derivative of the ghostlike qualities of highly dense carbon.
[Laughter]

MB: Maybe that's a different conversation. [Laughter]

WJ: You see nobody clapped for that. They clapped for Wendell. [Laughter, applause]

MB: They would have clapped if you'd stopped one sentence sooner, I think. [Laughter] Last question, I think. And it's barely a question, but, is there reason for optimism? Or maybe we want to talk about the difference between optimism and hope?

WJ: I think that we have both said that we're not optimistic but we're hopeful. That as long as you have the good examples, then there's reason to be hopeful. And so...

WB: I got from you the problem with optimism and pessimism.

WJ: Yeah, they're just opposite forms of the same surrender to simplicity. [Applause] How about that?

WB: But they're programs, too. I mean, pessimism says everything's going to turn out for the worst and there's nothing you can do about it. And optimists have just relaxed because they can see that everything's going to turn out for the best, and there's no way you can help it.

Hope is a very different thing, and it's much more lively and interesting. And we need to have hope, and the...we're really all under the obligation to lay out for ourselves in order to keep living, and for our successors, our children, the ones who are coming later, a ground for legitimate hope. This is not a project for the future, this is something we must simply do. And we can do it by looking around at examples and so on, but the interesting thing about hope is that it leads directly to questions of criticism and also questions of how to do good work. And no harm's going to come from trying that. Hope, I think, will keep you confined to the human realm, it's not going to suggest that you do something heroic like build a bomb.

WJ: He did all right on that one.

MB: I think we can thank you both and let you go.

[Applause]