SESSION 4
Looking Forward: Leopold For The 21st Century. What Would He Say To His Hundredth Anniversary Class Graduating This Year?

Friday, April 3rd, 2009

This panel tackled the most explicit, but perhaps most challenging, charge: as the title indicates, what would Aldo Leopold say to those in the graduating class of 2009, his centennial class? What is expected of professionals in the environmental field? What does it even mean, right now, to be in the environmental field? A spectrum of experts from various fields help make sense of this question.

Panelists
Gus Speth
Mary Evelyn Tucker
Sally Collins
Clive Hamilton
Bruce Jennings
Gene Likens
Melina Shannon-DePietro
Wes Jackson

MARY EVELYN TUCKER:

Before we open up to this terrific panel before us, I want us to reflect on this wonderful question that he leaves us with in his essay, "Goose Music." It's haunting; it's lyrical; it's penetrating; it's profound. He says in relation to his children, "What is it that I am leaving them? What are the skills? But what is the presence from the land?" And he says, "What if there are no more whistling of swift wings when the morning star pales in the east and when the dawn wind stirs through the ancient cottonwoods, and the gray light steals down from the hills over the old river, sliding softly past its wide brown sandbars? What if there be no more goose music?" That's the question, I think, for our students, for ourselves, for all next generations. "What if there be no goose music?"

We have an amazing group of people here. We are so privileged and honored that they've come today to the Forestry School from their many commitments and obligations. And we'll proceed in alphabetical order just for the sake of clarity on your program as well.

We're going to begin today with Sally Collins. Sally was named Director of the U.S. Department of Agriculture in the Office of Ecosystem Services and Markets in December of 2008. And most recently she was the Associate Chief of the U.S. Forest Service from August 2001 through December 2008. She has degrees from the University of Colorado and the University of Wyoming. We thank her for her public service and we're so pleased she's here to be with us. Thank you.

SALLY COLLINS:

Thanks. I started this new job, Director of Ecosystem Services and Markets, in January and ever since I've had all kinds of young people calling, pleading "I want to work for you. I want to work with you. This is the newest, coolest thing." In fact, somebody said to me, "This is the new sexy profession for young natural resource professionals." And while that is exciting and wonderful, because I do believe this is a significant part of the future of conservation, I know that many folks, including me for many years, worry about how markets for ecosystem services mesh with the land ethic. Today I will attempt to explain how I've come to consider this question.

I spent my first 25 years working on public land issues, and there were and are really important public land issues - from the spotted owl and cutting old growth forests, to mineral development to fires and budget shortfalls to meet critical resource needs.

But a few years ago I started paying more and more attention to what was happening on private lands. We were losing 4,000 acres a day of private forest

lands to development - to subdivisions, to ex-urban development, second homes, etc. And I started worrying: what's happening to our private landscape and what is it that's causing people to have to turn this land over, to sell off their lands; 80 percent of the industrial timberlands sold in the last ten years to real estate investment trusts and timber investment management organizations. The private landscape of America was changing and something different needed to happen if we were going to change these trends.

So, I started turning my attention to Ecosystem Services. Why can't you take existing market forces and mobilize them to do good conservation? I thought maybe more money in the hands of landowners for selling ecosystem services would give them diversified income streams, paying them to provide clean air and clean water or wildlife habitat, sequestering carbon, or taking nutrients out of the water. Why can't we figure out how to mobilize economic forces to protect these things before we lose them? So, now you can see why it might be something that this next generation would be really excited and interested in.

But how does this fit with the land ethic? What would Aldo say about this, because you can't "price the priceless," right? As Aldo asked: "What would an economist say a Lupine is worth?" I spent a lot of time researching Aldo Leopold quotes, trying to imagine what he would do faced with today's dilemmas: the loss of ecosystem services and the failure of existing systems to protect them. What would he say to these graduates about mobilizing economic forces to do good things for the environment?

Let me describe what I found. I think that when Aldo turned his attention to the private land, he said that you have to work across landscapes in a way that the public and the private work together. I've become enamored of the mission of the Natural Resource Conservation Service because through its programs it

mobilizes the huge entrepreneurial spirit of the farmer, the rancher, the private forest land owner. And these landowners are "all over these markets"; they want to use these tools. This fits beautifully with Aldo's belief that "conservation accomplishes its objectives only when it springs from an impelling conviction on the part of private land owners."

So, let's think about "impelling conviction." What about these markets for conservation, paying farmers to protect a threatened and endangered species or a wetland as mitigation for development someplace else. Is it really right to "price the priceless?" Are we indirectly supporting development? And what are the ethics of that? Are we "saving all the parts" when we do that? Are we protecting the "beauty and the integrity of the biotic system?" If the "land is a community to which we belong" are we treating it with "love and respect" when we commoditize it? Can markets coexist with beauty and love? Can markets be developed in this spirit of a love for the land, through an impelling conviction held by the landowner?

I think the threats of climate change and land development have forced us to rethink all of the rules by which we operate. We have to move more quickly with every means and tool available to mitigate and adapt to the challenges it brings. One of the things you find out reading about Aldo Leopold is that he was very frustrated by bureaucracy, as am I at times. I think all of us who get to this point in our careers, looking at issues like land conversion and its requisite loss of ecosystem services, and climate change in all of its dimensions, begin to realize that the tools that we have in a bureaucracy can be very limiting.

Aldo says, "At times we tilt the windmills on behalf of conservation in the convention halls and editorial offices, but on the back forty we disclaim even owning a lance." The old debates often resulted in just that, words without

action, lots of money spent fighting in courts, not investing in land restoration. Today, we clearly have to act quickly and mobilize all forces to address these challenges. Aldo suggests this in this final quote I will give you today: "The solution is to surreptitiously set up within the juggernaut certain new cogs and wheels whereby the residual love of nature, inherent even in Rotarians, may be made to recreate at least a fraction of those values which their love of progress is destroying." Market-forces mobilized on behalf of conservation and empowering landowners to innovate are some of those new cogs and wheels. I like to think that my new office is created "within the juggernaut" to facilitate this. This is why I want all of these new, enthusiastic and committed graduates coming to work for me!

Finally, for those rightly suspicious of markets these days, I will end with a quote from Gordon Brown, from a speech he gave at Saint Paul's Cathedral just before the big Economic Summit this week (April, 2009): "The truth is that the virtues that all of us here admire most and the virtues that make society flourish - hard work, taking responsibility, being honest, being enterprising, being fair - these are not the values that spring <u>from</u> the market. These are the values we bring <u>to</u> the market. They don't come from market forces. They come from our hearts."

I think Gordon Brown, like Aldo Leopold, knows that we can move society to the right place by tapping into something much deeper, like a land ethic; that markets, just like a bureaucracy, just like laws and regulations, are merely the architecture that we've created to carry out our goals as a society. My question to you is: are we smart and compassionate enough to create the markets in this spirit so that they work for us? And are we humble enough to modify them as we go along? In the end, this boils down to a basic belief in people - in their desire and willingness to do the right thing.

I believe we can do this and do it well.

[APPLAUSE]

MARY EVELYN TUCKER:

Thank you so much. Our next speaker is Clive Hamilton, who is here visiting the School of Forestry at the present, and we're delighted to have him. He is Professor of Public Ethics at the Centre for Applied Philosophy and Public Ethics. And he for 14 years was the Executive Director of the Australia Institute, which is the leading progressive think tank there. He's written *Growth Fetish* and coauthored *Affluenza*, among many, many books, and is here especially in the interest of climate change and ethics. Thank you, Clive.

CLIVE HAMILTON:

Thanks very much, Mary Evelyn. In thinking about the question of what Aldo Leopold would say to the FES class of '09, I believe he would perhaps urge the students to go and watch the 2008 animated film, "WALL-E". WALL-E is a story that can tell us all we need to know about the most imposing obstacle to their future, and that is the growth machine. I'd urge you to see the film if you have not seen it already.

In the film, consumerism has reached its zenith in a future community of grossly obese, physically incapable, and mentally vacant consumers locked on a never ending luxury cruise in space. A long time beforehand, these humans had taken to their super spaceship because they had made the earth uninhabitable. They left behind a devastated environment and a small garbage compacting robot, WALL-E, who's programmed endlessly to nibble at the edges of a vast pile of rubble, a civilization lying in ruins.

The surviving human community can float endlessly in space because of its technological mastery. Content in its Lotus-eating dystopia, it has no desire at all to return to Earth. Technology has wholly replaced nature, and the bloated consumers, who do no more in the film than loll around and eat, have become less than human because they've forgotten what it means to be part of a natural world.

If divorcing technology-sophisticated human beings entirely from the natural world seems a bizarre scenario, there are many, such as David Keith, a Professor of Energy and Environment at the University of Calgary, who believe otherwise. He was quoted a few weeks ago in Yale Environment 360 saying that, "While global warming might result in the loss of the natural world we care about, civilization is not at stake."

For him, and I'm sure many others, technology allows civilization and nature to occupy separate realms. He went on to say that "humans are amazingly adaptable, and have amazing powers of isolating themselves from the environment by their technology," so that it's likely, he believes, that we will end up in the business of "planetary management", where what remains of the natural world will be simply managed much like we'd manage a garden.

Well, in such a situation it would be a matter of indifference if civilized humanity inhabited a highly regulated Earth or lived in a drifting spaceship. Indeed, life in a self-contained wholly controlled environment is regarded as not just possible, but preferable by the surprisingly large membership of the National Space Society whose vision is, according to their website, "people living and working in thriving communities beyond the earth".

The Society's positive future for humanity is actually now being trialed here on Earth, with a trend towards integrated retail malls in which humans can live as well as shop and be entertained. Cropping up all over the United States they are, according to the Urban Land Institute, the wave of the future.

For example Boston's Natick Mall has 12 stories of condominiums attached to the enclosed mall. For those residents who might worry about being overwhelmed by artificiality, the developers have thoughtfully included what they call "a 1.2 acre park with wandering leafy paths" on the mall's roof. It is the sort of integrated lifestyle captured perfectly by the animators who created WALL-E.

To resume the story of the film, laboring away faithfully back on Earth WALL-E comes across something peculiar: a green seedling, the last remnant of nature on planet Earth. By convoluted means in the story, the seedling arrives on the spaceship. Its presence on the spaceship sparks something hidden deeply within the humans who occupy it – some vestigial memory of the meaning of nature – which stimulates a desire to rediscover some sort of authentic life. At least that desire flickers in the ship's corpulent captain who decides to set a course for Earth.

He discovers to his dismay that the spaceship's computers have long ago assumed control, and he's merely been going through the motions of being in charge. The vessel's computer system has developed its own objective and has no interest at all in returning to Earth. Perhaps it senses that nature and human free will are threats to its supremacy.

So in the film a struggle to the death ensues, in which the remnant humanness of the fat consumers and their captain ultimately triumphs. They return to earth and begin to rebuild a living, authentic community from this last green shoot.

I tell this story because it's a very powerful allegory of the way in which the growth machine, which we thought we had built to enhance our own welfare, has taken on a life of its own and resists fiercely the slow awaking to its perils of the humans it's supposed to serve. We think we have power, but the growth system awards power only to those who will advance its objectives. We internalize the discourse, as Foucault would say. So we begin to articulate the interests of the system and govern ourselves according to its rules. That's what consumerism is all about.

As I think we may regrettably discover in the next few months as we watch events unfold in Washington, the closer some get to the levers of the machine, the more they must be committed to its goals. No-one who believes that economic growth is part of a problem will be allowed near those levers.

Our political leaders are generally those who have internalized the goals of a system most faithfully and are therefore most immune to the arguments and evidence that might challenge it. The state itself, which once represented the interests of the people — even if those interests were often thwarted by the power of business — has been reshaped at least since the 1970s to serve the interests of the economy.

So to finish, I think Aldo Leopold would be urging the class of '09 to become Luddites and to set about breaking up the machine, the growth machine. I should say that many of those arrested in 18th and 19th century England for machine-wrecking were transported to Australia as convicts.

[LAUGHTER]

But I'd reassure the class of '09 that there are worse places to be sent.

[APPLAUSE]

MARY EVELYN TUCKER:

Thank you so much Clive. You can see why it's a pleasure to have him here. And Wes Jackson, whom I met probably ten years ago at the wonderful conference Steve Kellert put together on the good in nature and humanity, as many of you know is a tremendous leader in this field and of course needs no introduction.

But, just for the sake of background, Wes was born on a farm near Topeka, Kansas and earned degrees in Biology, Botany, and Genetics. Most significantly in 1976 he founded the Land Institute. His writings reflect this wonderful sensibility that he has including *Virtues of Ignorance*, *Limits of Knowledge*, *Becoming Native to This Place*. He's received a MacArthur Fellowship, the Right Livelihood award, a Pew Conservation Scholars award. Without further ado, this extraordinary, this prairie man, Wes Jackson.

WES JACKSON:

Thanks to all who organized this event. It is an honor to be here. I doubt that a Land Institute would exist without the thinking of Aldo Leopold. His essays, especially "Odyssey," "Illinois Bus Ride," along with the Land Ethic, probably have done more to concentrate my mind on the necessity and possibility of building an agriculture based on the way natural ecosystems work then any other source. When I considered nature's ecosystems around the world, they feature material recycling and run on contemporary sunlight. Essentially all of them are perennial mixtures.

But now I begin my five minutes. Here is what Aldo Leopold might say in 2009: Congratulations, graduates and fellow Alums. You face what is likely the greatest challenge in human history: the convergence of the 3.45 billion year carbon consumption imperative, the sharp downturn in quantity from the five pools of energy-rich carbon. And with that reality, the serious problem of our ecosphere, which is warming up.

As you know, earth's organisms are carbon-based and have been since the beginning of life those 3.45 billion years ago. We humans, like other members of the earth's biota, go after energy-rich carbon with little exercise of restraint. Our numbers were kept in check by our shaping ecosystems until 10 to 12 thousand years ago. Then we invented agriculture, and the human-nature split began.

At that moment we began exploiting the energy-rich carbon pool of the soil, the young, pulverized coal. Worse, we began to seriously waste the soil's potential for carbon renewal because our annual grain crops required yearly soil disturbance, which ushered in soil erosion beyond natural replacement levels.

The second pool of energy-rich carbon stored in forests took a serious hit beginning about 5,000 years ago. This pool made possible the smelting of ore, to give civilization the Bronze and Iron Ages. Two hundred and fifty years ago coal, the third pool, began fueling the industrial revolution.

The fourth pool was opened in 1859, the same year Darwin's *Origin of the Species* appeared in London bookstores. It was Colonel Drake's oilwell drilled in Western Pennsylvania. Natural gas, which had been discovered early, but not intensely used, is the fifth pool.

This accelerating exploitation of ancient energy-rich carbon brings me to my next subject, speed. The speed of growth: in the growth of population, the population of people's gadgets, and the growth of infrastructure for both people and gadgets. When we plot the curves of growth, for either people or gadgets, we are reminded of the growth rates of bacteria on a Petri dish, fruit flies in a flask, rabbits without predators, and more.

To illustrate the speed of change in our time, the 10-year-old has lived through a quarter of all the oil ever burned. The 22-year-old, through 54 percent. And we're slated to have 7 billion people by 2012. This is a big new time we're in. The person in his or her mid-seventies has lived through a tripling of the human population. Our numbers have doubled since President Kennedy. Joel Cohen says that anyone who had died by 1930 never lived through a doubling of the human population. Anyone born in 2050 or later likely won't either.

And now as we find ourselves rushing toward inevitable limits in the use of each of those five pools, creating a soft landing and ending growth becomes a challenge of your generation and beyond. And so to you, distinguished graduates of the Yale School of Forestry and Environmental Studies, with the edge of the Petri dish in site, fine-tuning the land ethic and acting on it is a practical necessity beyond saving wild biodiversity for its own sake. We need these wild ecosystems, these renewable economies of nature, for they hold answers to questions for a future agriculture we have not yet learned to ask.

Sustained action is needed now that the number one threat to biodiversity on a global scale is agriculture. There's nothing phony about nature's economies since they run on solar energy and feature material recycling.

So, the place to begin is to mimic, to some degree, a forest or prairie in our agriculture. If we mimic the structure, we can expect to be granted its functions of soil retention, water and nutrient management, nitrogen fixation and more. And at that interface, between nature's design of the wild and the domestic design for agriculture, we have the comparison between two economies and, I daresay, the place to begin as we seek to build a renewable human economy. I am asking each of you graduates not to shy away from asking questions which now go beyond the available answers. For what is on the line is the necessity to end growth and the extractive economy.

It's been well said that if we don't get sustainability in agriculture first, it's not going to happen. This was when the first break began. Even so, the disciplines of ecology and evolutionary biology are available to stand behind a new agriculture. The industrial sector has no such discipline to call on. Resilience instead of growth can become our clarion call. Capitalism is the abstraction that humans have invented to accelerate our rush to the edge of the Petri dish. It is Petri dish economics.

And since the publication of *A Sand County Almanac* 60 years ago, the acceleration of the movement to save our ecological cogs and wheels is a source of hope that we can build an agriculture, to keep us fed while we struggle to build an economy whose feature will be resilience, not growth.

[APPLAUSE]

MARY EVELYN TUCKER:

Thank you so much. And now we have Bruce Jennings, who's the Director of the Center for Humans and Nature, which was founded by Strachan Donnelly, a great friend of Yale, a great friend of the Forestry School. His daughter and his

wife are here today, and we thank them profoundly for this wonderful center that's being carried on by Bruce and others. And in fact Bruce told me yesterday that with the Bioethics Center there will be a new joint series of lectures and programs here along with the new school. So we're very pleased with that cooperative venture, joint venture.

He teaches here as well at the School of Public Health, and has degrees not only from Yale but also from Princeton. We're very happy to have you here today Bruce. Thank you.

BRUCE JENNINGS:

Thank you very much, and let me join others in expressing my appreciation to Dean Speth and others for inviting me and for holding this incredibly rich and interesting symposium. It's a real privilege and pleasure to speak at this hour of the afternoon, when our brain metabolism is at its peak.

[LAUGHTER]

And it is always fun to speak following so many remarkably learned and articulate previous speakers.

I'm going to take a slightly different approach to the question posed to our panel. I really don't know what Aldo Leopold *would* say to the class of 2009. In good philosophical fashion I will dodge the scholarly question and instead address myself to what I think he *should* say, and probably would if he were looking at the human prospect through 2009 eyes.

One thing in particular caught my eye in looking through some of Leopold's writings for a clue to guide me. It was his emphasis on the importance and

indeed the power of changing minds — not just manipulating "incentives" or motivations, but whole minds, feelings, desires, intellectual understanding, imagination, values and commitments; whole ways of thinking and acting in the world. He sometimes called this endeavor, "the development of an ecological conscience." And he believed it went hand in hand with an education about the reality of nature as a system, as a pyramid, as an interdependent nexus or network of life and of energy – an ecological consciousness.

"Ecological science," he wrote, "has wrought a change in the mental eye." That's the sentence that I want to use as my jumping-off point for my remarks. This remark occurs in a passage where Leopold is saying that Daniel Boone understood nature and an ecosystem and the land in a certain intuitive way, but that we now today have a deeper understanding than he did. Boone lived on a surface; ecology allows us to see more deeply beneath the surface. And it actually dovetails nicely with the passage that was read at the beginning of this session by Mary Evelyn about how the ecologist is a lonely figure, because he or she can see things that most of the rest of us miss.

This sort of formulation leads me to ask the question, "Is ecology a profession?" What are schools of environment studies supposed to do? Are they creating a group of people with a special kind of education that we ought to refer to as a profession, and if so, what does that mean? And what should professionals be doing in our society today given the problems we've been talking about all day long?

I think Leopold would have said to us that he's concerned in 2009 about the potential loss in our culture and our society of two essential things. In a recent book Jane Jacobs actually has voiced this concern. The first is a loss of an ideal or culture of professionalism, in particular ethical, civic professionalism. And the

second, consequent to the loss of professionalism, is an atrophy of our society's moral and natural imagination. Finally, with both a loss of civic professionalism and the atrophy of a moral imagination concerning the biotic community - the "land" - comes a crippling of our social capacity to realize anything like the land ethic in our policies and practices. This is nothing less than a crisis of ecologically responsible democratic citizenship.

Faced with this prospect, Leopold, and all intellectuals and educators in the conservation movement, would and should charge the graduates of Yale FES to recover, recapture, and recreate that sense of ethical professionalism and that sense of moral imagination, and to help nurture and restore the vital connection between our land and our democracy.

Now, what do I mean by ethical professionalism, in what sense might ecology be a profession, and how should professionals be educated? I suggest to you that we think in terms of the following distinctions – which I believe are Leopoldian in spirit, if not in terminology or actual argumentation.

First, proposition number one. Education is not the same as training, or mastering a given body of information. Two, being a professional is not the same thing as having technical or theoretical expertise. Three, having a calling or a profession is not the same thing as having a career.

To develop a new kind of mental eye, as Leopold put it and explored it in *A Sand County Almanac*, is to develop a capacity for ethical judgment and discernment. It is also to develop a sense of commitment and responsibility. To have a profession is to have something to profess, and to have the qualities of mind and heart adequate to professing it with wisdom and finesse.

That's why there is a deep affinity, certainly in the Judeo-Christian tradition at any rate, between the notion of calling and the notion of profession. Leopold's writings are replete with narratives of calling, called by the voice of cranes and by the eye of a dying wolf. To be called is to be open to hearing or seeing a source of value larger and more fundamental than ourselves and our immediate interests. And such openness in turn leads one to embrace that higher value when it is confronted. That embrace is deeply transformative.

Precisely because calling and profession are so powerful, judgment and critical discernment are all the more crucial. There are true calls and false ones. In the practical application of knowledge to real-world decisions and actions, values are complex and subject to interpretation in light of context and circumstance. Values are often multiple and in conflict with one another.

So profession is not simply making a commitment per se; it is making a commitment critically, reflectively, with discernment. It entails a degree of mastering, of critical reasoning capacities and reasoned ethical judgment. Education that does not make provision for and guidance toward such mastery is not education at all; it is technical training that prepares for a career, but does not enable a calling.

So are we training, in our schools of environment studies, a cadre of individuals who have the specialized knowledge that gives them a new mental eye, but also that sense of professionalism or calling that shapes moral discernment and moral judgment? If we aren't, if we are not giving them a Leopoldian mental eye of values as well as facts, where will we as society get such vision? If we are not training the next generation of ecological experts to be professionals, can we do without such ecological professionals? I think that in the years ahead we cannot do well without them; we need their vision and leadership and we can ill afford to

be guided by technical experts lacking in ethical professionalism. Sensualists without spirit, specialists without heart, as Max Weber put it grimly.

Now, if we can educate and produce a new generation of ecological professionals, what are they supposed to do? The essence of being a professional, I would argue, is really not the application of specialized knowledge to particular problems, so much as it is the practice of a kind of civic and moral education for the society as a whole.

And what is it that professionals educate society about? It is to develop in all of us citizens, lay people, an expanded sense of moral and civic imagination - and in the case of ecology, natural imagination.

Physicians don't simply apply technical skill to cure a physiological problem. They shape our understanding of our own body and our own health. Similarly I contend that all professionals have this role of nurturing an expanded moral imagination and civic capacity. That's why it's a false opposition – alas, often posed - to pit expertise against democracy; professional leadership against grassroots, participation and empowerment. Of course, technocratic elites often impede and undermine democratic governance, but Leopoldian professionals would not.

[APPLAUSE]

MARY EVELYN TUCKER:

Thank you very much.

Now we have two final speakers. We're delighted to have Gene Likens with us here, who's the founding director and President Emeritus of the Institute of

Ecosystem Studies. His research focuses on the ecology and biogeochemistry of forest and aquatic ecosystems, primarily through long-term studies at the Hubbard Brook Experimental Forest in the White Mountains of New Hampshire.

He and his colleagues were the first scientists to discover acid rain and to document the link between the combustion of fossil fuels and an increase in the acidity of precipitation in North America. That's a lifetime achievement I think, and that, among much of his science work, has been recognized by the American Philosophical Society, the National Academy of Sciences, the American Academy of Arts and Sciences, and in 2002, he was awarded the 2001 National Medal of Science, the nation's highest science honor, for his contributions to the field of ecology.

We're deeply honored to have you here today. Thank you.

[APPLAUSE]

GENE LIKENS:

Thank you. I also am very pleased to be here. It's been a really interesting day. And like you said, to be at the end of the program - you have that honor of being the last speaker – not only is the energy level at an interesting point, but almost everything you could imagine that should be said that's intelligent has already been said. So I will proceed from there. And I'm also pleased that you concluded in your remarks that it was okay to be a professional ecologist, because that's what I am and I was kind of wondering where you were going. I was glad you ended up where you did.

Well I'm not quite brash enough to suggest what Aldo Leopold might have said to this class. I'm a professor type, and I'm an ecologist, and in fact I've talked to the School of Forestry and Environmental Sciences students on occasion.

However, I could imagine that he might have wondered to a group of students in a classroom setting, "So, y'know, I've written a lot of things 60 years ago," and following Estella, "so, what do you think?" I think the whole question of not only the Land Ethic, but the Leopold way of thinking about complicated natural systems is an issue that's been in almost every single talk today, from my point of view, in one form or another.

The Aldo Leopold Foundation was concerned about this issue as well, and Luna Leopold in particular wanted us to explore that issue in some depth and a serious manner. So he generated some funding for a conference, which we held in the spring of 2007, on exactly that issue – is the Leopold Land Ethic still relevant in the 21st century?

We had an amazing, spirited discussion, a few of us on the telephone, about that topic and organizing the conference the night before he died. He was absolutely with it in terms of his contributions, and it was a very exciting event and it's a wonderful memory that I have about him and about that process.

We held the conference, and we addressed many of these issues that have been discussed today and more, about the change from an agricultural community to an urban community which we have worldwide. We're more than 50 percent urban today. The time reference, is it still appropriate today? The earth reference versus the land – what does land mean? Does that include water and air? Well yes, of course it does, but we specified some of those things and had wonderful academic discussions about them.

We concluded at the end, and there's a report that you're welcome to see and it's probably on the website for the Aldo Leopold Foundation, we concluded that yes, indeed, the Land Ethic is still appropriate and valid and may be, in many ways as I said, a way of thinking, even more so than at the time he wrote it, because it has had that maturation with time.

Secondly, and this has been mentioned several times today, I have for decades read the *Odyssey of Atom X* to students. And I want to read just one paragraph for those of you who might not have this committed to memory. "An atom at large in the biota is too free to know freedom. An atom back in the sea has forgotten it. For every atom lost to the sea, the prairie pulls another out of the decaying rocks. The only certain truth is that its creatures must suck hard, live fast, and die often, lest its losses exceed its gains."

As an ecologist, I wish I could write like that. But this to me is a wonderful way of describing an extremely complex situation, a complex ecological interaction in the most poetic, beautiful language that I'm aware of. I have spent the vast majority of my career putting numbers on that phraseology that's there. That's what I do; as a scientist I collect that kind of information.

I want to give you one example of that, and it's the connectivity – that hasn't been said much today. We've talked about synthesis and integration on occasion. But I would like to stress the connections, the interconnections that Leopold either sensed or wrote about or understood.

The example I want to give you briefly is, for the coal that is mined in southern Illinois, or eastern Kentucky, and gets burned in the production of power, 70 percent of our electricity is generated in the burning of coal and oil – mostly coal,

that goes into the atmosphere as sulfur and nitrogen oxides, gets converted to the strong acids, sulfuric and nitric, two of our strongest acids, comes back down on the landscape right here in New Haven and back down on the forest that I work on in the White Mountains of New Hampshire.

And we've just discovered that those forests have stopped growing. They look green, they look robust; they're not. They have stopped growing. And one of the scientists on the faculty here, Tom Sicama, has contributed enormously to that finding. And not only have those forests stopped growing, the most recent data just collected show that now the forest is decaying to the point that more carbon is being emitted to the atmosphere than is being sequestered.

So we had carbon sequestered in those coal fields a long time ago, and through that connectivity it is now being returned to the atmosphere and is contributing to climate change. That is the kind of thinking, ecosystem thinking, that I think Leopold brought to us and clarified for us very early on.

And I think we have to get back – I think Estella said it earlier. We have to get back from going smaller and smaller and smaller. We have to do that too, but we have to get to the point where we take our information out of the silos, put it together, integrate it, connect it, and make something out of it so that we can indeed manage our systems much better than we have in the past or we're not going to be well off in the future.

Finally, one of my favorite bits of writing from Leopold is – and I'm going to paraphrase this: We have to learn to live on a piece of land or water without spoiling it. What I like so much about that is that it doesn't say we have to buy it, put a fence around it, and don't ever let anybody in there again. But we have to learn how to live on our land and on our water. We have to use it, and with the

population increase that was described before, we have to learn that very quickly without spoiling it. Thank you.

[APPLAUSE]

MARY EVELYN TUCKER:

Thank you so much Gene. And now the next generation, to which we give an important handshake. And we're delighted that Melina-Shannon DiPietro can be with us. She's the Director of the Yale Sustainable Food Project started by Alice Waters and her daughter several years ago, and she's been the director since 2003. And she's been working also with the creation of the Yale farm, and the development of educational and academic programming related to food, agriculture, and the environment. She has a BA from Harvard, and we're so pleased that you're here and we look forward to your comments. Thank you.

MELINA SHANNON-DIPIETRO:

Thank you Mary Evelyn. Thank you all, thank you Dean Speth and Lisa for bringing us here. I want to say first it's an honor to sit here and talk with you all.

There are three comments I've prepared, and then there were three ideas that leapt into my head as we were sitting here, and I'm either young enough or foolhardy enough to imagine what Leopold would say to us.

And the three ideas that popped into my head just now were, first I think Aldo Leopold would say to study the work of the people sitting here on this panel around me. They've done amazing work, and it's to be learned from. Second, I think he would look at me and he would say, "Make sure you read Leopold *before* the young woman who's talking about me did. She was 25 or 26 when she first encountered Leopold. Make sure your children are reading it when

they're 9 and 10 and 11 and 12, it should be required reading for the human race."

And then the third thing he might say is, can you, class of 2009, manage to create a life and a career that actually does for yourselves what he had hoped the Land Ethic would do for the land? Can you have a career that preserves your own integrity, your own stability, and your own beauty, something that gives you hope, something that fills you with love?

And so I think those are three good challenges the class of 2009 could take from Leopold. Now here are my prepared remarks.

I think, first, Leopold would say, "Congratulations. This is an important time in the environmental movement. This is perhaps the fist time in history that environmentalists, conservationists, and the food people are talking together – food, forestry, agriculture have come together. For the first time food has not just become something that gourmets and elites are talking about, as something fancy to go out to dinner for.

Nor is it just the food security community and the food banks that are talking about food. The nation is talking about food and saying, "We need to pay attention to food if we are going to preserve the health of the nation, of our children, and of the land.

So I think he would say, "Commit yourselves to this movement. Commit yourselves to this work," the way Sally was saying, "and figure out how to harness this energy and this time. It's a rare opportunity."

Then I think he might be critical, as he sometimes was, and he would say, rather kindly, "Quit being dopes. There are some things that have been said a long time ago, and you just need to get on with fixing them." I think particularly of two of his writings. First he talked about how agriculture has to impact the health of the nation and the quality of the produce we eat.

He said "I think the way we're farming today probably means that the nutritional value of produce is going down." And it turns out sure enough, Leopold was right, but it's taken us 60 years to put the science behind this idea. That's too long to be eating carrots and broccoli with a decreasing amount of nutrients.

So I think he would say, "Get on with it. Follow the Land Ethic but worry a little bit less about the science.

The other area where I think he might say we've been dopey is with farm subsidies. He reminds us the best approach would be to get at people's heartstrings, rather than to subsidize or incentivize the farmer. He calls this "baiting the farmer." And I think he would be disappointed with the farm subsidy structure that gives about $20 billion every year to an agriculture that doesn't feed the health of the nation or feed the health of the land.

I think those are areas where he would say, "Start paying attention. Start putting effort in." To do this, we need to work very closely with farmers and change the idea of what beauty, achievement, and success is on a farm.

I don't know how many of you farm, but if you talk to conventional farmers, they talk about fields being clean. And when they talk about fields being clean, they're talking about fields being weed-free, which means sprayed with herbicides. And so we might need to redefine that notion of what beauty is in an agricultural

landscape. In addition to this education, we could incentivize sustainable agriculture practices going forward.

I think he would say, "So if you are working on those issues you're in a big bureaucracy that can be unwieldy and difficult, so you better plant a garden. It's one of the most simple, most direct acts you can take." When Leopold writes about his time at The Shack, he says, "There are two spiritual dangers in not having a farm. One is supposing that breakfast comes from the grocery store. The other is supposing that heat comes from the furnace." A farm, a garden, a small plot in your backyard, guard against these illusions.

President Levin understood the power of a garden. Here at Yale, through the Yale Farm, we demonstrate that a garden or a farm creates attachment to the land. We don't become attached to the environment in the abstract; it's that particular piece of land, the particular work done there, that gives us an attachment and makes us stewards of the land. So "Get to work, plant a garden."

Finally, I think Leopold would applaud Michelle Obama's efforts at the White House garden, I think he would urge on Secretary of Agriculture Tom Vilsack and his People's Garden initiative. And I would suggest that when you're planting that garden you invite people over. Ask them to work with you. Invite them over to dinner and get them connected to the land through that food."

[APPLAUSE]

MARY EVELYN TUCKER:

Thank you. Thank you so much, wonderful comments. Now we have time for some questions from the floor. Hopefully you'll keep it short and brief so we'll have a few responses.

Mary:

My name is Mary, and I'm really glad that Melina brought up that last point: "Come on you dopes, get on with it." I came to Leopold even later than you did, at age 32, and it was amazing to me to read from 60, 70, 80 years ago, things like "We have a deer problem and we really need to fix that." And then to move to New York State last year and find out that we have a deer problem, and we haven't fixed it.

I know we've spent a lot of time talking today about the big issue of climate change, and I recognize that that's important and we need to address it, but I'm curious what the panel thinks about these small pieces that it seems to me Leopold figured out a long time ago, and that we already have the science, in some ways, to address. Why haven't we addressed them? Why aren't we solving them?

MARY EVELYN TUCKER:

Thank you. Maybe either Sally or Gene might want to pick up on that. Would you like to make a response?

SALLY COLLINS:

Well, I think especially the deer population issue is an absolutely political issue. And I think it goes back to what a lot of people said today. There's science and there's policy. And science informs the policy, but there's a lot about policy that's informed by a whole lot of other things. And in that case you've got a lot of incentives built into the system that create a lot more deer than is healthy for the

land. And a lot of it goes to how hunting fees are established and who has influence on all of that. That's political.

And I guess the advice I have about that to the graduates is that there are a lot of those subtle, behind-the-curtain incentives that have to be tackled. We have to take those on. And we can't blush or run away from those hard, hard, hard issues that we've allowed to sort of creep into our everyday life and not challenge. What are those incentives that allow that kind of thing to continue to find its way into policy and to challenge those things?

MARY EVELYN TUCKER:

Gene?

GENE LIKENS:

Yes, just very briefly, I agree with that, but as you well know there are human health issues associated with deer: Lyme disease for example, or running into one with your car. I think we've all seen the importance of global climate change – and it's huge, no question about that. However, I would argue that right now, at this moment, land use change across the world is the most important issue that we face. Right now. It's not the future one maybe, but it's very much linked with climate change.

As for the issues of dealing with increased deer or moose or turkey or whatever you might want to bring up. Let me give an example. We have a deer culling management operation on the Cary Arboretum where the Institution of Ecosystems Studies is, and it works very well. Actually it works extremely well, and it's fairly effective in the control of Lyme disease as a related factor. However, we're finding that the hunters that are available and want to hunt are decreasing in number, they're increasing in age. There's not a cohort coming up

underneath, and so the point you make about this being a political issue – it is a political, cultural, social issue.

MARY EVELYN TUCKER:

Thank you. Yes, Luke Bassett. Graduate of the school and also Divinity now too.

Luke Bassett:

I'm a member of the class of 2010, and since I have another year to sit and absorb here I wanted to ask who would you consider to be the cultural critics to whom we should be looking if we want to be Luddites and undermine the system in which we find ourselves.

MARY EVELYN TUCKER:

I think that's a Clive and Wes question.

CLIVE HAMILTON:

That is a very tricky one. In discussions held here at Forestry over the last few days, we've been agonizing over the question of what type of political-economic system we would prefer to replace the current one. Of course, there is a unique opportunity historically for those with a more progressive and ecologically oriented vision to start arguing and agitating for some replacement system. But it isn't too apparent what that system would be.

We're at a stage where capitalism has a large number of powerful and articulate critics, but very few visionaries for its replacement. So I'm afraid I can't adequately answer your question.

MARY EVELYN TUCKER:

Except that you should read Gus Speth's new book, *Bridge at the Edge of the World.*

WES JACKSON:

Well, Wendell Berry in 1977 wrote *The Unsettling of America*, which was intended to be corrective and ended up being more prophetic. So there's a guru. And also I think it's possible - I'd like to talk to the likes of Gene Likens and other ecologists - that if we look at nature's economy, nature's ecosystems, which as I mentioned are real economies, and compare them to the possibility of an agriculture that's trying to mimic those economies – at that interface, at least from, say, a thermodynamic point of view, looking at various efficiencies that are inherent within the natural integrities, we can increase our imagination about analogs, to come up with analogs for a different economy, one that is resilient.

I don't know where else to turn. I realize that the human economy is very different than a natural ecosystem. But is there not something about the way ecosystems have evolved over millions of years, having to deal with the second law? Because Georgescu-Roegen wrote a book called *Economics and the Entropy Law* several years ago. There are mistakes in that book, quite a few mistakes, but in there it seems to me he introduced to all of us the necessity to think about economics in terms of the second law. And we have been ignoring that with this extractive economy.

So, this is where the discussion has to go, it seems to me. We can't continue to try to give what we got, patch it up a lick and a promise. Dan Luten, who's dead now, was in Geography at Berkeley, he was a chemist. Dan Luten wrote a piece many years ago in which he said, "We came as a poor people to a seemingly empty land that was rich in resources, and we built our institutions for that perception of reality. Poor people, empty land, rich. Our economic institutions,

our political institutions, even our religious institutions are predicated on that assumption."

Well now we've become rich people in an increasingly poor land that's filling up, and those institutions don't hold. And yet we keep saluting to them. So we've got to rethink this whole thing, and to me the best place to begin is with nature's economy and try to figure out how that works.

SALLY COLLINS:

And just really quick, because that is beautifully stated, I think the reconstruction requires solutions, not more criticism. So if you're looking for someplace to go with all that energy, anger, frustration, let me tell you: it's really easy to deconstruct, it's really, really hard to construct - so put your mind and energy in this next year to coming up with ideas and solutions. That's what I would say to you.

MARY EVELYN TUCKER:

Thank you Sally. And there was a conference that the Forestry School did last year in Aspen called "Toward a New Consciousness." You can go to the website, there's an incredible report that Tony Leiserowitz and Lisa put together. And there's a series going on now on Visions of Sustainability, which is a legacy of Gus's best challenge precisely along these lines: to envision a sustainable future.

Audience Member:

Hi. Thank you for speaking today. I have a question for Sally. You mentioned that private landowners are the key to conservation, and I wondered what, in your experience, has been the best method or methods of engaging people to create on-the-ground participation in ecosystem services, markets, and other conservation programs that you've worked with in the past?

SALLY COLLINS:

Just very quickly, the Farm Bill in 2002 started a pretty aggressive incentive program for farmers. And NRCS has been implementing those. We just did a review recently of the conservation measures, and it's been astounding the extent to which farmers have responded to those incentives.

But there's a lot more that can be done. What we need to be doing with our farm bill money - besides all these things that this wonderful man has just mentioned, because I'm all about all of that, a complete redesign of our system - is incentivizing through our Farm Bill payments for the right kind of performance on the land. And we can do that.

We can also add to Farm Bill money, public money, with streams of private entrepreneurial money. This is what carbon markets are about: expanding, getting a new economic engine behind conservation. I will tell you, since we opened our doors two months ago, we have had more farming, ranching, and forest landowner groups coming in saying, "We're there, we want to participate. Just help us know what rules to play by and we'll play by those rules."

MELINA SHANNON-DIPIETRO:

Just to add to what Sally is saying, there is much more demand for these program than there is actual funding right now. So talk to people and say you want more funding behind these incentives programs, particularly if you live in Connecticut. Rosa DeLauro is the head of agriculture appropriations. So that's one place to take action.

And I think private solutions are going to be a huge boon. We see more and more individuals owning land for conservation purposes. We also have more

and more young farmers who have no access to land. If we can connect those two, and perhaps think about this as an investment with patient capital behind it, we could have a good solution.

MARY EVELYN TUCKER:

Thank you. I'm getting the signal to wind this up, but I hope that you'll join us this evening at the Peabody Museum for a preview of this wonderful film, "Green Fire," and a reception as well. The Peabody Museum is very close by.

Before we wind up, I would like all of us to thank Lisa Fernandez over here in the corner and her amazing staff. Thank you Lisa.

[APPLAUSE]

Lisa Fernandez (in audience):

Thank you, Mary Evelyn.

MARY EVELYN TUCKER:

If we could just read one final passage from Leopold, and Wes Jackson will have the last word. A student group asked me to let you know that there's a signup sheet out there to support this 350 effort of Bill McKibben, and you're most welcome to join that. He gave a wonderful talk at noon today as well.

Here is Leopold from "Conservation," his essay: "We shall never achieve harmony with land, any more than we shall achieve justice or liberty for people. In these higher aspirations the important thing is not to achieve, but to strive. It is only in mechanical enterprises that we can expect that early or complete fruition of effort which we call success. The problem then is how to bring about a striving for harmony with land among a people many of whom have forgotten there is any

such thing as land, among whom education and culture have become almost synonymous with landlessness. This is the problem of conservation education. When we say *striving,* we admit at the outset that the thing we need must grow from within. No striving for an idea was ever injected wholly from without."

The "striving from within" I think is a great challenge to all of us. Thank you so much for being with us. Thank you, Gus, for helping us organize this day under your leadership. And Wes Jackson will have the last word. Thank you for joining us.

[APPLAUSE]

WES JACKSON:

Thirty-three years ago the Land Institute took it upon itself to try to build an agriculture based on the way nature's ecosystems work, and to perennialize the major crops and domesticate some wild perennials. We're working on rice in China now, corn, sorghum, and others. I want to present to Estella Leopold and to Gus Speth some flour from a perennial wheat from The Land Institute. It will be another ten years before it's farmer-ready, but I would like Estella to be the first one to make pancakes with perennial grain in the state of Washington. And I would like you, Gus, to be the first to make pancakes from a perennial grain in the state of Connecticut.

[APPLAUSE]

GUS SPETH:

Are you working on those grits?

WES JACKSON:

Yes.

[LAUGHTER]

MARY EVELYN TUCKER:

Thank you. Thanks to our panel, to all the other presenters, and thanks for all of your participation. Thank you.

[APPLAUSE]

[END]