Reading for reflection in Order of Service

From "Paradise Wild: Reimagining American Nature," David Oates, OSU Press, 2003

"Humility, awe, participation: not withdrawal into the pretence (sic) of purity. That's not a bad place for wiseacre readers and cosmopolites to go to—and we're all such now. Black Elk prayed to *Wakan Tanka*, the "Great Mystery." So should we. That is the mystery of killing and loving at the same time; of accepting one's place in the round of life, with its hard decisions of cherishing and use."

Reading prior to presentation

From Stewart Brand, Creator of the "Whole Earth Catalog," and recent author of the book "Whole Earth Discipline: An Ecopragmatist manifesto"

When roles shift, ideologies have to shift, and ideologies hate to shift. The workaround is pragmatism—"a practical way of thinking concerned with results rather than with theories and principles. "The shift is deeper than moving from one ideology to another; the shift is to discard ideology entirely."

Layers of Meaning and Ideology: What the GMO controversy tells us about ourselves

Presentation to UU – June 29, 2014

Good morning. It's a great pleasure to be able to reflect with you the complex and often polarizing subject of genetic engineering in agriculture, which is very dear to my heart and daily work. Throughout my career I have struggled to understand how this set of scientific techniques has become so hotly contested, and this search has brought me to explanations that go far beyond the details of the science. It has brought me to consideration of the underlying ideologies, which are often underneath what masquerade as technical or legal disputes.

This topic is directly related to the summer theme here at the UUFC of *The Earth Our Home*, as we will consider whether this new breeding method helps us to grow food more efficiently and with minimal use of resources, or is too ecologically harsh or socially disruptive to play a significant role. My thanks to Wolfgang, Jill and the others that have made this possible.

What is the method as the root of this dispute? GMOs are defined as breeding by the direct modification of DNA. This is in contrast to the indirect modification of DNA that we have done for millennia by human selection in choosing among natural or human created variations based on how an organism performs, who its parents are, or its innate DNA variations. There's a lot more to it than that, but as I suspect you are pleased to hear but that's about it for the molecular biology lesson today.

It may surprise you to learn that I am not in support of all GMOs, nor do I think we have chosen and managed all of the ones that have come along very well. Many concerns over GMOs have their basis in reality, and the tradeoffs are complex. For example, we have seen large ecological benefits in the form of reduced tillage of soil as a result of using GMO crops engineered to be resistant to herbicides like Roundup. (It allows you to kill weeds without harming the nearby crops, and also to plant without the need to till the soil.) But we have also exacerbated the longstanding agricultural problem of the proliferation of herbicide resistant weeds as a consequence. These cool fixes seem to have distracted us from attention to longer term sustainability. Thus, having concerns about GMOs is not the province of econuts or ecoterrorists. It's a matter of balancing tradeoffs, of scale and perspective, and of embracing complexity. For me the issues are all about management by companies and society; there is nothing inherently good or bad about GMOs—it just refers to a method that can be used in highly diverse ways and for highly diverse goals. The pragmatic ideology of Stewart Brand, and the large majority of scientists, say that we should look at each case on its own with an open mind; don't adopt yes or no ideologies or policies, nor stigmatizing labeling schemes for all of them—which we will come back to later. An ideology, by the way, as we will be using that term a lot today, is simply a way of thinking. Unfortunately most ideologies, explicitly or implicitly, tend to over-simplify and foreclose alternative ways of thinking. And that is clearly a key factor driving this debate; impassioned people who see the world simply and very differently.

Passions are strong, and there is abundant information on the internet that fuel them. And of course the internet is now wired to reinforce beliefs, allowing advertisers to target those who want non-GMO or similarly labeled products, and all the correlates with those beliefs. Yes, my google search using the term GMO will yield very different results from those of you who are anti-GMO. The alternative health, supplements, environmental, and organic food industries—many of them very wealthy and influential now—are very active and spend generously in this area of online "consumer education." And the big mainstream food and grocery companies come along for the ride along as well; the margins for non-GMO and organic (also non-GMO) are too financially attractive to do otherwise. So yes there is serious financial as well as ideological self-interest providing generous fuel for this debate, on both sides, playing out in the online world.

But there are not really two sides. There are many sides and flavors of sentiment. The GMO issue is a divisive issue that does not align so neatly with the usual right-left schisms; it acts more like a "biological stain" for much deeper and more diverse ideologies within our society. A stain, as you may recall from Bio 101, is where you take a tissue sample, which might look bland and uninteresting even under the microscope, and add a chemical that allows you to detect the sub-structures and cell types within it, often strikingly so. GMOs seem to do that for society, which is why I think people's responses to the GMO issue does, singly and as groups,

indeed tell us a lot about who we are and how we think. It is clear that the GMO controversy is predominantly a non-scientific one. In a 2005 report on Agricultural Ethics, Burkhart and three other ethicists wrote "It is accurate to say that many of the real issues [of agricultural biotechnology] have little to do with the use of transgenic technology." Science, and the ample ways that it can be twisted and abused, seems more a weapon than a light here.

Like many genetic scientists, I was awoken to this realization late in my career. At a conference on the grounds of Oxford University in 1999, the only GMO trees growing out of doors in the UK were vandalized on the eve of the conference—a clear message for the scientists that such research, which they viewed as part of a corporate invasion of the natural environment, would not be tolerated. The headlines in a mainstream British newspaper the next day said "Whilst public attention has been focused on the threat of Frankenstein foods…the same corporations have been quietly perpetrating another crime against the environment." So this was not just a view held by a few criminals; it was mainstream in Europe at the time, as numerous other broadly supported ecovandalisms there, which continue to this day, have shown.

This was an international conference on the use of biotechnology of all forms for breeding of trees, GMO and otherwise. I was then Chairman of the international group that was meeting there, and this was a time when the science and technology was really blooming in every respect; we were giddy with confidence and enthusiasm as we sipped wine and chatted with our international colleagues at the welcome reception on Sunday evening. The feeling of progress was further amplified by the towering, ancient halls of Oxford that surrounded us, where you felt that you were a part of a centuries-long march of scholarly advance. But that night, prior to the opening of the conference, we had a rude awakening that society was not, at least not then and there, celebrating with us. Even though those trees had been modified, domesticated as scientists often say, to make their wood amenable for use for pulp or biofuels with less energy and chemical inputs—and doing so by modifying expression of a native gene. The potential environmental benefits were clear, but the larger social discussion was pre-occupied with very different things.

I wish to comment on four ideologies that I think reveal major aspects of our values and how we think, and have played a major role in the GMO debate —which I call the anti-capitalist, naturalistic, technophilic, and humanist. As you will see, I endorse some more than others!

Anti-capitalist and anti-corporate ideologies are major factors in this debate. We live in a time when income inequality is at near to historical levels, corporate influence in politics is out of control, huge investment banks have nearly crippled our economics, and everyone seems to love to hate Monsanto, period. Yet we treasure our cars, frigs, smart phones and online/social worlds thanks to Ford, GE, Google and all the rest. Advanced technology seems to need corporate focus and efficiency, and it would seem that we will need advanced technology of all

sorts in growing food to feed the coming 9 billion humans as sustainably as possible. Farming, whether you look at seeds, irrigation, or global positioning for tractors, is incredibly high tech and getting more so every day. But, based on those anti-GMO passions and fears, our regulations have been pushed to where producing a GMO crop is so costly and financially risky that—with only a few small exceptions—only the multinationals like Monsanto and Du Pont are able to play the GMO game. And thus only a tiny few of the numerous potential biotech crops ever make it out of the lab. So ironically, by pushing for more and more stringent regulations it is the anti-GMO activists that have done more than anyone else to make it a corporate game. Also ironically, the big patents that help to make it a corporate game are running out, so almost anyone with a few simple lab tools could do many types of biotech now….if only we can figure out how to get ourselves, and our global government bureaucracies—out of the way. Sadly for me, there is no prospect of this in my lifetime, nor likely that of my children.

Another element of this ideology says that patents on life, though we have had various forms of them, globally, for most of this century, are fundamentally wrong; all seed should be free and farmers should be allowed to save them if they wish to. It should all be open source. In this case, where is the incentive for companies to form and to innovate? How many writers and musicians could survive without copyrights and royalties on their creations? A ban on patented organisms—which by the way you may be voting on one as a ballot measure in Benton County this fall—would be a fundamental turn from a system that has been confirmed by the Supreme Court, and many other high courts around the world, numerous times. Among the many urban myths about GMOs, perhaps the most prevalent is that Monsanto is suing farmers who innocently find that patented seed or pollen falls on their farms. In fact, this has never happened, even once. Farmers remain free to choose to save their own seed, or to use patented non-GMO seed (as many organic farmers do). What has happened is that Monsanto and other companies will sue if you knowingly use and benefit from patented seed without paying the fees, which they do police diligently and have won lawsuits over numerous times. The patent system is quite imperfect, and is usually far behind the very fast moving technologies it was created to recognize. But the basic system has been accepted, both by the public and private sector, worldwide.

The naturalistic ideology says that if its natural, its good and healthy. Anything that moves away from natural should be banned, or where possible regulated and labeled to obscurity. And the purer the better. In fact, nature is by and large hostile to our interests, and food is contaminated to various degrees by toxins, microbes, genes, and more. The majority of plants are highly toxic to us, and natural products are among the very most toxic ones known. Agriculture and crop breeding are inherently non-natural, as we forcibly take over an ecosystem, and fundamentally modify crop genetics, to suit human interests. This does not mean we should not learn from nature, and try to mobilize natural processes, at every step.

That is just smart engineering, and a laudable focus of organic systems. This ideology is also very suspicious of anything that changes the environment and its species, ignoring the fact that due to climate change the environment itself has begun to change so fast, and will continue changing even faster, that such sentiments only delay the urgent action—by genetics and many other fronts—needed to help natural and agricultural ecosystems to survive and adapt. Yes, our entire concept of the natural and its conservation needs to undergo radical transformation– hard news and a painful paradigmatic change for long term Nature Conservancy members like myself.

This ideology also produces chemophobia, where we are afraid of anything labeled as a chemical or a pesticide in any dose, regardless of how carefully they have been regulated, and what their environmental and economic benefits are. And of course, most relevant to this presentation, the ideology produces genophobia, where mention of genetics or DNA invokes fear. Surveys around the world have continued to show that approximately half the people surveyed think that only GMO tomatoes contain genes, not natural ones, and that only the GMO forms can modify our own genes. Lack of basic science literacy makes people gullible, thus its easy to make people afraid with the right "education." In capitalist ideology—where only the market, not science, provides real "truth"—most companies have now discovered that the naturalistic ideology is a fine system for increasing price and demand for so-called natural and non-GMO products. Just ask Whole Foods, the Organic Consumers Association, Chipotle, or even Safeway. Its an ideology few food companies are not interested in promoting because of its resonance with consumers.

The technophile ideology is the view, especially among the technologically oriented, that tech will save us, and the more techy it is, the more cool it is. I think this produces some real conflicts among the young and tech savvy—who know that tech is what they like, but also see all the anti-tech food ideology surrounding them and try to reconcile it with their techy views. Not surprisingly some of the best and most balanced journalism about ag biotech has been in tech magazines like Wired, Slate and Grist. I am looking forward to the show on Portlandia that takes this on, if its not too un-Portland to do so. Maybe that will have to be Palo Alto-landia. I am part of this ideology. I find smart gene technology really cool. After all, genetic engineering is based on understanding nature down to the gene level, then trying to harness that knowledge to solve a problem. When it works, and you see incredible reductions of insecticide use and increased biodiversity on farms as a result of learning how to create a new, very safe pesticide <u>within</u> a crop—rather than by spraying it in the air (where it can hurt all manner of living things, and only a tiny percent ever hits the target pest)—is really cool to me. And we have done just this in corn and cotton on a massive scale in dozens of countries around the world—and reduced the spraying of some pretty bad insecticides by millions of pounds. The new GMO potato that should be on the market next year, which produces less acrylamide (a

potent human toxin) when you fry it, and browns more slowly when stored so reduces waste, is also really cool—and was done by simply modifying expression of some natural potato genes. These things are awe-inspiring to geeks like me, but another aspect of tech that gets less play is that they must also be used intelligently at the farm, ecosystem and society levels, another tech challenge in management and communication—and that is where the real debate should focus.

The humanist ideology puts people, and their needs, including their need for a livable environment, first and foremost. It has been very discouraging to the anti-GMO movement that there are real, big, promising GMO products for the developing world, and many more are coming if politics does not stop them. Some celebrated environmental leaders such as Vandana Shiva and Michael Pollan work hard to diminish their value, despite what the Gates Foundation with its millions in funding for such crops, and what leading humanists such as Nobel laureate Norman Borlaug and President Jimmy Carter, say. The large majority of farm families who grow GMO crops, about 65 million people, are in the developing world. The breeds of interest to them include the simple, widespread products like pest resistant corn, as pest control is a life or death proposition for many of them, and insecticides that must otherwise be used are often too costly, ineffective, or dangerous to farmers and their families. It also includes directly life-promoting crops such as the well-known Golden Rice that is fortified with Vitamin A and was recently blessed by the pope. Micronutrient deficiencies, including Vitamin A deficiency, affect more than half the world's population and give rise to blindness and host of other diseases as a secondary consequence. Yes that is what I said. Billions. And most of them don't get, and cannot afford, the diverse diet and fortified foods that we get. That is why conventional breeding for micronutrients, when its effective, is underway throughout the developing world today. GMO methods can clearly help when conventional breeding for nutrition doesn't, or is too slow.

Finally, I wish to say a word about tactics because it is highly relevant to the debates ongoing in Oregon today. The main tactic to prevent or reduce the use of GMO crops, and it has been successful in many places in the world, is to create stringent regulations that slow, and often prevent, their development or use. And these are all created in the name of improved safety and public disclosure. The requirement for prominent and stringent labels, even when GMO content is low and the foods have been tested for safety extensively, is an example of such regulation. Labeling as we have seen in Europe increased costs and brand risks for companies, and made it easy for activists to organize boycotts, thus keeping GMO-containing foods off the shelves and out of the fields almost entirely. And that outcome was the intention from the start, as we know it is here from what the labeling proponents have written and said in public. Its not about "right to know," its about creating a tool to further scare consumers and intimidate food companies by increasing costs and brand risks. Although there are ways to create labels that don't do this, including the use of smart-phone readable codes on products,

the types of measures we have seen in California, Washington, will again see this fall in Oregon—and was recently passed in Vermont (and is now under legal challenge)—are examples of stigmatizing label laws. I urge you to consider them carefully when you vote.

I started with a reading from environmentalist legend Stewart Brand about the urgent need to get past ideology and be pragmatic about environmental issues, including GMOs, and I wish to begin to close with another reading from that great man. "I daresay the environmental movement has done more harm with its opposition to genetic engineering than with any other thing we've been wrong about. We've starved people, hindered science, hurt the natural environment and denied our own practitioners a crucial tool. In defense of a bizarre idea of what is "natural," we reject the very thing Rachel Carson encouraged us to pursue—the science of biotic controls. We make ourselves look as conspicuously irrational as those who espouse "intelligent design" or ban stem-cell research, and we teach that irrationality to the public and to decision makers."

Returning to David Oates and Black Elk, who provided the reflection in your order of service. Its clear that they could have been talking about agriculture, of how we grow food for people efficiently but also care for the larger environment, when they spoke of "… the mystery of killing and loving at the same time; of accepting one's place in the round of life, with its hard decisions of cherishing and use." Or in UU terms, the hard work of defining right relations with our food, our environment, and with each other. That's where our focus needs to be, not on simple feel-good solutions over details of crop breeding.

Time is short, and the stakes are too high.

Thanks for listening.