

**Show Transcript
Deconstructing Dinner
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TRANSCRIPT: Pat Yama

JON STEINMAN: And you're tuned in to Deconstructing Dinner, a weekly one hour program heard on radio stations across Canada, and the focus of this program is to better understand our food, to better reconnect ourselves to those inescapable moments of our day – eating. And while we often lack the opportunity to go out and visit a farm, walk into a factory producing packaged snacks, or just simply understand how processed food is processed, this program is one that hopes to foster a greater awareness of our complicated food system.

One recurring comment on Deconstructing Dinner, and one that now appears often throughout the media when speaking of where our food is coming from, is recognizing the level of disconnect that exists between the origins of our food, and our stomachs. As the desire to reconnect ourselves to food may come through the increased understanding of agricultural inputs, or perhaps by better understanding the economics of farming, could this maybe, be getting ahead of ourselves?

And why could we maybe be getting ahead of ourselves? Well, can we really connect ourselves to food, if we're not sufficiently connected to plants and nature itself. And so on today's broadcast of Deconstructing Dinner we will deconstruct human and plant interactions and by doing so, we will hopefully achieve a heightened appreciation of the foundation of our food.

This broadcast marks the second of an ongoing series that will feature radio programs produced by the Collective Heritage Institute's Bioneers radio project. On today's broadcast we will hear the voices of Michael Pollan, John Jeavons, Starhawk, Cathrine Sneed, Bob Cannard, and Penny Livingston.

increase music and fade out

A quick reminder that you can stay updated to this ongoing Bioneers series on Deconstructing Dinner by visiting the program's website, which is www.cjly.net/deconstructingdinner. On the main page is a link to this Bioneers series, which lists all shows recently aired.

And an additional note about the Bioneers series – both Kenny Ausubel and Nina Simons founded the Bioneers in 1990 as an annual conference of individuals who have in one way or another demonstrated models for restoring the Earth and restoring communities. From there the project spawned into offering programs in the fields of agriculture, environmental restoration, community and cultural diversity. And the Bioneers radio series also sprouted from this project. And I do encourage you to explore their website. And that is www.bioneers.org.

And so the focus for today's broadcast will be to step back a little and look at alternative ways in which we as Canadians and North Americans can better connect ourselves to food. Our food system has been allowed to take shape with very little input from you and I of the general public, and arguably, this has been a result of a significant disconnect that the general public has with food. And as the foundation of our food system is plants, perhaps what holds our culture back from truly appreciating food and truly appreciating how our food got to our plate, is not so much a result of being disconnected to methods of food production, but a result of being disconnected from nature and the intricacies of how nature works.

And in helping better understand the fragile nature of the earth that grows our food, we will take a listen to the Bioneers recording titled "Plants and People: Who's Cultivating Whom." Author Michael Pollan, most recently known for his book "The Omnivore's Dilemma," is also the author of "The Botany of Desire." And this recording takes a glimpse into a very unique outlook on how plants and people have shaped one another. As Pollan believes, the initiative belongs to the plants.

And one of these plants that Pollan focuses on is the *apple*. In a PBS interview, Pollan pointed out that a bumblebee who makes his way into a flower and finds the nectar, flies off thinking that he's making off with the better of the deal. But, in fact, it's the flower that has tricked the bumblebee into doing the work for him, to take his pollen from flower to flower to flower, and thereby reproduce itself. And it was then that Pollan realized - how do we as humans look like, to plants? And he concluded that we're more like bumblebees than we think. And while we consider ourselves to be domesticating plants, plants on the other hand, are equally, domesticating us.

And here's the Bioneers recording, "Plants and People: Who's Cultivating Whom."

Bioneers: Plants and People: Who's Cultivating Whom

MICHAEL TOMS: What if we couldn't walk? What if we couldn't walk for millions of years? How would this shape your view of the world? To be rooted in one spot from your birth to your death is a constraint that plants have been working with for a long time. They don't walk from place to place but they sure do get around. Crossing creeks, crossing mountain ranges, crossing continents, they have developed ingenious ways to travel, to defend themselves, change the course of life around them and so expand their ranges and evolutionary possibilities. To do this, the rooted have cultivated relationships with the mobile. One of the most mobile is us, the recently arrived humans. Bioneers are, just to remember that plants are not just the vased, potted, mowed, landscaped and eaten.

They suggest that the influence of plants in our lives have been greatly underestimated, that we would do well in fact to take a moment to see the world from a plant's perspective. Our future evolutionary possibilities could depend on it.

In this program author Michael Pollan takes a fresh look at the co-evolution of people and plants. Join us for the next half hour as we explore "Plants and People: Who's Cultivating Whom."

My name is Michael Toms. I'll be your host. Welcome to the Bioneers: Revolution from the Heart of Nature.

MICHAEL POLLAN: The apple I think is one of the great winners of this process. I mean here is this fruit in the forest of Kazakhstan that managed to get itself out of the forest along the Silk Route by being red and sweet. Sweet is a very important human desire. It's a great animal desire too.

MICHAEL TOMS: Michael Pollan is the author of "Second Nature: A Gardener's Education" and "The Botany of Desire," a plant's eye view of the world. His investigations have focused on the amazing process of co-evolution between plants and people. By shifting the lens to look at the world from a plant's perspective he is revealing fascinating insights into what it means to be human. He spoke with producer, Neil Harvey.

MICHAEL POLLAN: And the apple got itself noticed by being red and big and sweet and got itself out of the forest of Kazakhstan and along the Silk Route to the classical world where it settled down. The Romans knew the technique of grafting. Got itself into the Bible where it really didn't belong. I mean the fruit of the tree in the middle of the garden is actually never specified in the Bible but all of us believed it to be an apple. And that's because the apple got itself into the consciousness of some painters in northern Europe, Durer and Kronick, and they were drawing these scenes and they needed to put in a fruit and the fruit they knew best was the apple. And from there it made its way to England and across to the Atlantic where it ran into a problem. The first boats coming to America had apples on them, grafted known varieties and they planted them in New England and they did very badly. They didn't fruit, it was too cold, frost in Maine nipped their buds and the apple looked like it was doomed in America and that would be the end of it's mark following the arc of civilization. But fortunately the Colonists also had seeds because they had been eating apples aboard ship. And the Colonists used apples for something we don't which is hard cider. And the fact that Americans drank hard cider which we did in *enormous* quantities, I mean *gallons* a day; three meals a day; morning, noon, and night.

NEIL HARVEY: Because water purification was not great, that safe.

MICHAEL POLLAN: Well exactly, it was healthier, healthier than water. It was a great thing for the apple because if you're making cider, seedling apples are fine. Seedling apples are basically inedible. If you cut a Red Delicious in half you'll find five seeds and

every seed will produce a completely different apple and the odds are very good that it will be neither red nor delicious. It's a quality called heterozygosity. So if we only wanted apples for eating we would have stuck with grafted varieties and not have planted from seed and not have allowed the apple to undergo this vast evolutionary experiment.

So what Johnny Appleseed was doing, he was planting apples from seed. But it was very useful for us because we got this alcohol. What Johnny Appleseed was really doing was bringing alcohol to the frontier. He's not the American St. Francis. He's really the American Dionysus.

But the fact that we planted apples from seed allowed the apple to adapt, to evolve, to experiment with all these genetic combinations because of this heterozygosity. And it threw out all these traits and from that came the varieties that could thrive in the New World.

So Johnny Appleseed and others people like him were sponsoring this evolutionary process. It was an enormous boom to the apples, an enormous boom to us. So, you see through that story - I'm telling a long story in a short form. But it's this wonderful, reciprocal relationship (Neil agrees) where the apple gave us alcohol and the fact that we were drinking our apples rather than eating them allowed us to plant them from seed and allowed the apple to do what it needed to do to become American.

NEIL HARVEY: Well just the concept, the kind of role reversal – there's a sense that human beings are being used or host for this fruit to get out and about.

MICHAEL POLLAN: Oh no question. This fruit's goal is to overspread the Earth and claim these new continents for itself and it could not have done that without us. As much as it needed the bumblebee, it needed us. And we do that. And the two have got itself out of Turkey and Iran the same way – by being beautiful, by evolving to gratify our desires. It's a wonderful relationship in lots of ways and I give the plants a lot of credit.

MICHAEL TOMS: So the apple, rooted to one spot, evolved toward the skin colour and sweetness that the seed spreading human would most desire. The apple is just one example, Michael Pollan sees it as a larger plant strategy towards world conquest. He spoke at a recent Bioneers conference.

MICHAEL POLLAN: You have to understand that one simple basic fact of plant life which is immobility or really, inability to locomote. Because they move obviously on the wind, in the air, and vines move and that kind of stuff but they cannot pick themselves up the way we can and walk around. So what they've done is used chemicals by and large instead of feet – molecules that will either attract or repel other species, usually for defense or as an aid in reproduction.

But it wasn't always this way and we're going to take a quick tour through the last 100 million years. Just to remind you that this was – it didn't start this way. Plants learned how to do this. You go back 100 million years ago or 150 million years ago and the

world looked very different. There were no flowers to speak of. There were no big flowers and no fruit, no nuts. This is before the rise of what you call the angiosperms – those are the plants that make large flowers and showy flowers and nuts and seeds. Before that, there was sex in the plant world and there were certain tiny flowers but basically it was a greener, leafier world. So much so that in fact it didn't support a lot of warm-blooded creatures. It was a world where the reptiles did quite well and we're talking about the age of the dinosaurs. And if you think about it if you've ever been to one of those natural history museums, I'm thinking of the Peabody at Yale has one of those great murals of the dinosaur world - you'll see it's very green and you've got ferns and cycads, but there are very few flowering plants. The one you'll see toward the end of that diorama is a magnolia, which is one of the earliest of the angiosperms. And it's an interesting plant to look at in this connection because when I look at a Magnolia, it's kind of big and sort of crude. It's really sort of God's first draft of what a flower could be. And from that Magnolia, an infinite range of refinements have been worked out.

Darwin called this "rise of the angiosperms." He called it the abominable mystery. And I think what he meant by that is one, it didn't have to happen. Evolution was happening. Plants were reproducing. They were doing a lot more cloning and they were depending on a lot more haphazard pollination – spread some pollen on the wind and hopefully it will reach another pine tree or something like that and pollinate it. It was not as sufficient a system – there was as I say a lot more cloning. So evolution proceeded more slowly. Life in general was more local. There was not quite as much variation. And then this new idea, this whole new way of doing business in nature comes – the rise of the angiosperms. And the other aspect of the mystery was in the Fossil Record apparently, angiosperms spread so rapidly by evolutionary standards, across the world, that it clearly was a very good way of doing business in nature. Basically it involved co-evolution. It involved enlisting other creatures to help you reproduce either by enlisting the help of pollinators or animals, red fruit, to attract mammals. Get them to carry your seeds somewhere else.

So this goes on for a 100 million years. We're going to jump right ahead to about 10,000 years ago, 15,000 years ago. And there's a debate over exactly when. When a particular group of angiosperms hit on in what is in some ways an even more clever strategy and that was, to put to work a particular animal with a very large brain, a tool-making capability, and a propensity to do a lot of wandering around the world. And that of course is us and that event, that new way of doing business in nature we call the invention of agriculture. Now that's a phrase that seems a little bit conceited to me and a little bit self-centred. If the plants were naming it they would call it something like the domestication of humans (audience laughs). Because think, we changed easily as much as they did in this new deal. We settled down. We gave up our life as nomads - a life that had many advantages and was very healthy in many ways and required a lot less work than agriculture, had less disease than agriculture. So, we gave up a lot. I don't know exactly why we did. But we settled down; we became farmers; we cleared the world of its trees by and large to make these plants very happy because a lot of these plants compete with trees for sunlight.

The grasses as I said were great beneficiaries. In my view it makes just as much sense to regard the invention of agriculture as a strategy hit upon by the grasses to conquer the trees (audience chuckles). They got us to chop down the trees. And I realize now when I'm on my lawn that's also going on there. In my first book I wrote about lawns as nature under cultures boot and this total domination – we cut these plants to within an inch of their lives. We don't let them seed and we don't let them flower and they don't die. It's totally artificial. But when I started working on this book I realized well it's a little more complicated than that. All that is true enough but what do these grasses in my lawn need more than anything else? They need me to keep the forest from coming back. And in Connecticut that's what the forest is bent on doing. If I stop mowing there would be shrubs in a succession and very soon you'd have second growth forest. So, by getting me to mow the lawn I'm keeping the forest at bay on behalf of the grasses.

Now, this point of view which may not sit with you, it may sound kind of whanky (audience laughs) - I just want to suggest that there's nothing I'm saying that – it's not in Darwin, really. We tend to see the world in terms of – this is embedded in our grammar in terms of subjects and objects. I mow the lawn. I pull the weeds. We domesticate the crops. And this is a very Cartesian way of looking at things. Even though we have this Darwinian revolution 150 years ago and he taught us that all species are acting on one another - that there are no subjects and objects in nature. That for every subject there's an object and for every object there's a subject and that nobody's on top. We understand this intellectually but I don't think we believe it in our bones. We're still Cartesians when we look at the world, to judge by our actions. You look at something like genetic engineering and there's still in the whole machine metaphor that they've brought to plants this idea of the inertness of nature and the human subject acting on that, taking parts from this machine and putting it in this machine and getting it to produce the same thing there. What I'm really trying to do in this book is tell stories about plants that make us not just think like Darwinians but feel like Darwinians. So that this idea, this wonderful idea of reciprocity in nature is something that we begin to feel in our bones because I think that is the next step. I think that's where we have to go.

When you look at the world from the plant's point of view you see us in a new light. And finally I'm as interested in homo-sapiens as I am in Tulipa or Cannabis or all the other plants I write about. I use the plants as a mirror in which to see ourselves and that's because these plants are brilliant students of our desires. They have gotten ahead, by figuring out what we desire. And the other thing that comes out of looking at the world from the plant's point of view is obviously deepens your respect for their genius. And there are countless examples. We think we're more advanced than other species but it really depends on what advances you value. The plants have been evolving longer than we have, they're just going in a different direction. They're working on different projects. They're dealing with this locomotion problem. And to do that, while we were nailing down consciousness and toolmaking and languages, they were perfecting, inventing organic chemistry at which they excel beyond our most brilliant chemists.

Photosynthesis is a trick we have not mastered - this amazing trick of converting sunlight and air and water and a few common minerals into energy, into sugar. Our idea of solar

power is crude by comparison. One example I'll cite, there are so many but the lima bean – I was just reading about this on the plane out – has come up with this brilliant chemical defence. When a lima bean plant is attacked by a spider mite do you know what it does? It releases a volatile chemical from its leaves that goes out in the air and summons an insect that dines exclusively on spider mites (audience laughs). Okay, it calls for help, chemically. So I'm not prepared to say we're more advanced. I think we judge advances by what we got good at. If the plants were writing the book it would have a lot more attention to organic chemistry and they would look a lot better. They've just been evolving in another direction.

JON STEINMAN: And you're tuned in to Deconstructing Dinner, a weekly one-hour program produced at Kootenay Co-op Radio in Nelson, British Columbia. Today's broadcast marks the second of an ongoing series featuring the Bioneers radio series. And you are currently listening to Michael Pollan speak on the program titled "Plants and People: Who's Cultivating Whom."

And you can find out more about the Bioneers series on Deconstructing Dinner by visiting www.cjly.net/deconstructingdinner.

Later on today's program we will be hearing yet another Bioneers recording that will introduce the intricate relationships we have to plants and the relationships that plants have to each other. As is the focus of today's program, this increased awareness of human plant relationships, is one that can only increase our appreciation of food, as plants represent the foundation of our food supply. But first, we will continue hearing from author Michael Pollan, who suggests that when you look at the world from a plant's point of view, you see us in a new light. And just after this short musical break, Pollan continues from his previous example of the apple and introduces the relationship that cannabis has cultivated with humans.

musical break

MICHAEL TOMS: As Michael Pollan says humans have invested great evolutionary capital in developing consciousness. Plants on the other hand have developed the use of organic chemistry to a degree far beyond our own. Another fascinating arena in which to observe the co-evolutionary people-plant dance is where human consciousness and plant organic chemistry converge. Americans settlers thirst for apple cider boosted apple evolution and expanded its range. How have plant-produced-cycle-active chemicals influenced human evolution and our cultural reach? Michael Pollan has been examining the human consciousness plant organic chemistry connection through his studies into Cannabis and THC.

MICHAEL POLLAN: THC, I mean is another and amazing invention of plants. It probably was not invented to get people high. The plant had its own purposes for doing this but once humans discovered what it did to them the plants co-evolution took it down that path until it was stronger and stronger and stronger, on that path. On another path it became a longer and stronger fibre. Cannabis goes down these two paths, both human-

directed. So the whole issue of drugs – these are the most astonishing chemicals in many ways that the plants have come up with and think of the implications. That a plant out in the world can manufacture a chemical that changes what goes on in here! We have these very simple notions of mind and body, matter and spirit but this throws all those up in the air. And this fact, that plants can do this to our brains, have done it, has had an enormous effect on us; has changed us.

I truly believe you could write a natural history of the imagination, just in the West and show how at various crucial junctures the use of drugs has changed culture by creating a new mental construct in the mind of Samuel Taylor Coleridge. Right, his notion of the imagination owes to his use of opium. And that notion of the transformative imagination, his secondary imagination, all modern art comes out of that. Jazz comes out of that. Modern painting comes out of that - this idea of you taking an inert, what he calls the kind of dead inert bits of story or image and break them up and put them together in new ways. And we may find some day that Plato's metaphysics come out of his experience with drugs. All the Classical Greeks used a hallucinogen we're told - once a year. And so there's a lot in our culture. So I do believe we could write a natural history of the imagination. And that suggests a whole new connection between nature and culture than we've thought about so far.

Nietzsche called Dionysus an intoxication – nature overpowering mind, nature having her way with us. And that's a powerful and paralysis idea in the West especially and I argue it's really what's going on in the Garden of Eden.

MICHAEL TOMS: Michael Pollan. Research shows us that nearly every culture in the history of humanity on the planet has sought healing, insight, refuge or release through altering the mind. Many have uncovered keys to the gates of perception through the use of psychoactive compounds found in the bodies of the plants and mushrooms living at their feet. Michael Pollan suggests that looking at the human endeavour through the mirror of plants is vitally important to our next steps together in our co-evolutionary dance.

MICHAEL POLLAN: What I'm interested in doing in my work and in the "Botany of Desire" is in the plants but I'm actually more interested in us. And the plants are a mirror in which you can see us. You can study flowers and learn about beauty. You can study Cannabis and learn about well why as a species have we been so interested in intoxication for so long. You can study the apple and learn about sweetness.

The great thing about studying reciprocal relationship is you – in the same way you can look at a wildflower and learn a lot about what bees regard as beautiful and tasty; that bees like a certain kind of symmetry; they're attracted to this colour and not that colour. You can read a lot about the bee mind in what flowers are. Well you can read a lot about the human mind in looking at domesticated species such as the potato and the apple, the tulip. They are great mirrors in which to see ourselves.

MICHAEL TOMS: There is a power that accrues to us when we can begin to see from the perspective of other species. We, the bi-pedal human, do have the remarkable ability to imagine how life is carrying on beyond our own skin. With or without the help of plants we humans can project our consciousness at will, expand our awareness to planetary dimensions or contract it to the microscopic. This gift can give rise to great compassion as in “my heart goes out to you.” It may be the most important tool available in the work to restore the Earth’s living systems. Can we imagine a world that supports all life for all time? A tectonic change in world view would need to be called forth for many of us. A beginning could be to look at ourselves from a plant’s perspective.

MICHAEL POLLAN: Plants with the power to revise our thoughts and perceptions, to provoke metaphor and wonder, to challenge the cherished Judeo-Christian belief that our conscious thinking cells somehow stand apart from nature, have achieved a kind of transcendence. Just what happens to this flattering self-portrait if we discover that transcendence itself owes to molecules that flow through our brains and at the same time through the plants in the garden - if some of the brightest fruits of human culture are in fact rooted deeply in the black earth with the plants and the fungi. Is matter then still as mute as we’ve come to think? Does it mean that spirit too is part of nature? There may be no older idea in the world. Letting nature have her way with us now and again seems like a useful thing to do if only to bring our abstracted upward gaze back down to Earth for a time. What a re-enchantment of the world that would be to look around and see that the plants and the trees of knowledge grow in the garden still.

JON STEINMAN: And you’re tuned in to Deconstructing Dinner, and that was Michael Pollan featured on the Bioneers recording titled, “Plants and People: Who’s Cultivating Whom.” And you can find out more about the Bioneers radio series by visiting bioneers.org, and there will also be info linked from the main page of the Deconstructing Dinner website where this broadcast will also be available to download and listen to.

In the next half hour of today’s broadcast, we will hear another Bioneers program, titled “Wisdom at the End of a Hoe: Farming as if Biology Mattered.” But first, we’ll hear from a musician who is beginning to get some healthy air time here on Deconstructing Dinner, and that is Salt Spring Island’s Phil Vernon. Back in July of this year, 2006, correspondent Andrea Langlois visited the Organic Islands Festival taking place in Victoria where she recorded Phil Vernon and this short piece, titled, “The Rocking Chair Song.” And this is the first broadcast of this recording.

Rocking Chair Song – Phil Vernon

*Late summer day my love and I went walkin’
Over hills and fields we walked laughin’ and talkin’.
Came upon an old farmhouse standin’ broken and bare
It use to be someone’s home now no one lives there.*

*There’s a red barn standin’ held together with nails and dust
And a tired old messy harness all wires and rust
Weeds overgrown in a garden sown with care*

It used to be someone's home now no one lives there.

*And through the crack in the window pane, I heard the sound of fallin' rain
Another farm being left to run down, another family moved into town
Had a life that they tried to save, but the banks took it all away
Hung a sign on a torn screen door - Nobody Lives Here No More.*

*They worked their fingers to the bone, nothin' left they could call their own
Packed it in under leaden sky, waving them all goodbye.
Had a life that they tried to save, but the banks took it all away
Hung a sign on a torn screen door - Nobody Lives Here No More.*

*Had a life that they tried to save, but the banks took it all away
Hung a sign on a torn screen door - Nobody Lives Here No More.*

JON STEINMAN: And that was Salt Spring Island's Phil Vernon performing at the Organic Islands Festival in Victoria. And this recording will be available on the Deconstructing Dinner website. And while his song is certainly not a happy song, it does represent the reality of farming in many parts of Canada, a reality that perhaps only exists as a result of the value, which consumers, industry and government alike have placed on food. And so today's broadcast of Deconstructing Dinner, we're looking to foster a greater appreciation for the foundation of our food – plants. And this marks the second of an ongoing series that will feature programs produced by the Collective Heritage Institutes Bioneers radio series.

Now this next recording is titled, "Wisdom at the End of a Hoe: Farming as if Biology Mattered." And while the foundation of our food is plants, the foundation of plants is soil. And one statistic that will be mentioned in this next recording is how topsoil on this planet is being eroded 18 times faster than it is being built up in nature. And this is an even more startling statistic when it takes 500 years for an inch of topsoil to form in nature. But unique approaches to agriculture have taken shape that respond to this concern, and some of which have been featured on previous broadcasts of Deconstructing Dinner. But these unique approaches are only being practiced on a small scale, and the vast majority of the foods that we purchase on a daily basis are grown in such a way that this previous statistic has become just that.

And here is the first part of the Bioneers recording, "Wisdom at the End of a Hoe."

Bioneers: Wisdom At The End Of A Hoe

MICHAEL TOMS: "When the sun rises, I go to work. When the sun goes down I take my rest. I dig the well from which I drink. My farm's the soil that yields my food. I share the creation. Kings can do no more." Author Unknown, China 2500 BCE.

Imagine spending the day in the garden. Throttle back for a moment and breathe the beat slower. Loosen your clothes, tie up your hair, select a sun hat. Choose shoes for working or bare feet for feeling. Unlatch the gate and address the morning. Check the climbing

beans. Hmmm, flowers on the tallest, cucumbers dark and smooth with spinehooks – getting a little longer. Carrot tops dainty, tussled – when shall we try one? Bold broccolis heading up; squashes are cabbing out of control; submerged onions with firework flowerballs powered skyward; lettuces – polite, refined and turnips, happy together all over each other, riddled from the snails but doing fine, bigger spacings next year.

What is our relationship with those species that feed us? What is it like living in a plant's pace? Is the gardener growing the garden or the garden transforming the gardener? How would possessing roots inching into the soil day and night change my perception of reality? What would the waxy, waning and full moon mean to me then?

In this program John Jeavons, Starhawk, Cathrine Sneed, Bob Cannard and Penny Livingston give voice to the insights and concerns coming from the vegetable intelligence realms. Please join us for the next half-hour as we explore Wisdom at the End of a Hoe. My name is Michael Toms. I'll be your host. Welcome to the Bioneers: Revolution from the Heart of Nature.

Will Rogers once said, "They're making people every day but they ain't making anymore dirt." In a pinch of compost lives six billion microbial life forms. Microbial action in the soil combined with water, air and sunlight are the essential ingredients for plant growth on the earth. In the top eight inches or so on an acre of healthy land lives one ton of microbes. That top eight inches or so is what we call topsoil. The average person eats approximately one ton of food every year. Studies have shown that for every ton of food grown with conventional mechanized, agricultural practices, six tons of topsoil are lost to wind and water erosion. It takes nature an average of five centuries, 500 years to create one inch of topsoil. To grow good crops agriculturally, six inches of topsoil are required.

In the United States soil is being depleted in an average year approximately 18 times faster than it is being built up in nature. These startling facts come from the work of Ecology Action, an organization research in biointensive farming practices directed by John Jeavons. Concerned with the rapid loss of topsoils around the world, Jeavons has spent more than a quarter century working on the question "How can I grow the most food in the smallest amount of space, sustainably?" Jeavons is recognized as an expert in the field of sustainable agriculture. Here he illustrates the precarious condition of the earth's soils and by extension the world's potential and future food supplies.

JOHN JEAVONS: Go get an apple and a paring knife, hold the apple in front of you. Now this apple represents the Earth. Now take the knife and cut away three-quarters of the apple and discard it because those are the Earth's oceans which comprise 75% of the planet. So now we're still holding 1/4 of the apple, 1/4 of the Earth. This one-quarter represents the Earth's land surface. So we're not really living on the whole Earth, we're living on just a 1/4 of the Earth. So now I would like you to take your knife and cut away 2/3rds of the remaining part of the apple (cutting sounds) and discard it because this is the part of the Earth's land surface that has already been desertified and/or is under ice. So really what we're actually living on is only 1/12th of the Earth. Now before we continue it's important to take your knife and cut away about 3/4 of the skin of the 1/12th of the

apple and discard it (cutting sound) because this is the part of the remaining part of the Earth from which we've already lost farmable soil. So actually we're only living on 1/48th of the planet. It's at this point that I begin to get a little claustrophobic because we're really living in a very tiny area if you look at it in this manner. Now you may have been wondering if we've now pared down our farmable soil this far, what's going to happen to the last 1/48th of the Earth. So what I'd like you now to do is to take this 1/12th of the apple including that 1/48th and eat it because that's what we're going to do in the next 23 - 96 years to that remaining part of the farmable soil.

MICHAEL TOMS: John Jeavons. The apple demonstration is a disturbing one. With a little looking however, we discover hope in a growing movement of farmers throughout the world who are turning to restorative farming, farming practices that restore the topsoil faster than is being depleted. Jeavons, the author of "How to Grow More Vegetables Than You Ever Thought Possible on Less Land Than You Can Ever Imagine" is the developer of biointensive farming and gardening which using deep digging techniques, lazy bed design, compost, close plant spacings and companion planting research builds more topsoil than it uses – in some cases by as much as 20 to 1. The biointensive approach is truly a restorative means of growing food.

Another restorative model for growing food with desirable by-product of transforming the gardener is permaculture. First formulated by Australian Bill Mollison, permaculture or permanent agriculture encompasses sustainable building design, low impact living and landscape management as well as food production. Drawing on indigenous agricultural practices, permaculture practitioners approach the land from an eco-centred world view.

Starhawk is an author, feminist and peace activist. She's also a student of permaculture. Here she poses a Mollison question.

STARHAWK: He has this great exercise. He says just go out there and say "I wonder." I wonder if those trees are native or if they were planted? I wonder where they are in terms of their lifespan? I wonder why that particular understory is there and not some other group? I wonder what those trees are? I wonder how they interact with each other? To start to look at patterns – what's growing with what. How are things moving? How is energy moving through this system? Why are these trees bending in that direction? To start to really open your ears and listen and the more you do that the more you realize that we all have this capacity to learn directly from nature. In fact it's a biological capacity. We couldn't have gotten this far in evolution without it. And however long we may have lived in cities and human-simplified environments we're basically designed to live in very complex environments where we need to alert looking around us, taking information in and all the time.

MICHAEL TOMS: Starhawk works and teaches with the reclaiming collective offering classes, workshops and public rituals in the goddess tradition. The author of "Dreaming the Dark: The Fifth Sacred Thing" and "Walking to Mercury" she spoke at a recent Bioneers conference.

STARHAWK: Well I learned was that I had to totally change my way of thinking because my way of thinking is like “Look at these beautiful irises and these bells of Ireland and the purple and the chartreuse, they look so well together. That’s what I want in my garden.” And it’s a lot different when you start saying “Yes they look beautiful together but how do they interact together?” Every plant creates its own soil – creates a different kind of soil – how is that going to work together? So I feel like I’m still beginning to hear a thing. I like to go out and meditate in the garden every night and listen to the sounds around and really hear that is the voice of the Earth. And what I know is if I do that long enough over time, I would be able to tell you from the sound of the frogs, what time it is and what season it is and what the temperature is and what else is going on. And if you think about the wisdom of indigenous cultures, what that is, is thousands and thousands of generations of that observation compiled upon itself and passed down and turned into story and turned into song and chant and ritual. People who interact it so deeply with their place. The people where I live, the Plomo, the things the Plomo say about the trees and the plants is that if you don’t use the plants, if you don’t talk to them, if you don’t chant and pray and praise them, they’ll die. They need human interaction to thrive. And it is true that the plants and the sedge that they use for basketry thrived when it was used, when it was dug because of the way they dug it. The trees and the bushes and the things that they burned were all fire resistant. Just about everything where we live is fire composites – burns down, cut it down, it grows back. It helped them to thrive because the fires would keep the bugs out. It would keep open areas where it could grow back. So if we want to develop that kind of attunement again, we want to learn that kind of attunement, I think one of the things we really need to do is to make part of our spiritual practice and part of our activism practice, this making of a deep and personal connection with the Earth.

JON STEINMAN: And you’re tuned in to Deconstructing Dinner, produced at Kootenay Co-op Radio in Nelson, British Columbia. We are currently listening to the Bioneers Radio Series, and their program titled “Wisdom at the End of a Hoe.” The focus of today’s broadcast is to better understand our food, by better understanding the plants and soil that provide us with this food.

And in the remainder of this Bioneers recording we will hear from Cathrine Sneed and Bob Cannard.

MICHAEL TOMS: If plants need human interaction to thrive perhaps humans need more interaction with plants to thrive.

CATHRINE SNEED: What really is for me the most important part of our project is that we have people who are in need of restoration. And the people that are in need of restoration are the ones that are working very hard to restore themselves but also to restore their neighbourhoods, to restore their communities, to restore their families. That’s very important to me.

MICHAEL TOMS: Cathrine Sneed, founder of the Garden Project, works with prisoners to realize new potential and dignity through horticultural therapy. The prisoners provide free

and nutritious food for the homeless, schools, and institutions. She also oversees a post-release program growing vegetables for many of the best restaurants in the San Francisco Bay area while helping former prisoners transition back into society. She spoke to a Bioneers audience.

CATHRINE SNEED: The project has three parts. The first is the program and the jail. I started in 1982 and since then more than 10,000 prisoners have been in the program. Since then we've grown a lot of food that we've given to soup kitchens and senior centres and community centres (audience applause). But in growing food, in giving the food to these places, I think that's what's helped to restore the prisoners and the participants in the program because they are able to give something, they are able to give of themselves. Over the years people have asked me, well why don't we sell the food instead of giving it to the community centres? And I think that's probably one of the most important things we do because you do have to give to live. And in giving the food that the people work very hard to grow, they begin to care about themselves, they begin to care about other people. Most of the people that are in our jails and prisons throughout the country are there because they're poor. They're there because they sold and used drugs. In growing the food for the soup kitchens and growing food that we give to the jails to feed the people, they begin to learn about their bodies. They begin to learn about health. We invite people from the community to come to the Garden. We invite seniors to come and they come in and they bring other people. But also what happens at the Garden Project, while the seniors are picking the vegetables, what happens is the seniors see the same people that maybe were on the corner trying to take their purses, they see the same people now giving back and trying to help and that changes something for them. I know for the prisoners, prisoners begin to see and feel badly about what they have done in order to support their habit, in preying on other people. And the Garden does that, growing this food does that I think.

MICHAEL TOMS: Cathrine Sneed of the Garden Project. Is the gardener growing the garden or is the garden transforming the gardener? What is it like to live at a plant's pace? These are the kind of questions Bob Cannard can answer if you asked him. He is a master organic gardener, skilled in numerous restorative farming practices. He grows some of the finest most nutritious produce anywhere and has long been a supplier for Chez Panisse.

BOB CANNARD: We look so little to the organism that we cultivate. Now I'd like us to actually look at the plant as if it were one of our children – know the plant, truly sensory connect with the plant. Listen to its speech, its speech of anchorage. Like we go out there into the garden and we want to pull a weed and that weed doesn't want to get pulled. It's well bonded with its thought – *it likes it there. It's there of its choice.* So we could learn something from that pestiferous plant organism, the weed, why it likes it there. Plants that like it where they are have good anchorage. Plants that don't like it where they are don't have good anchorage. Plants that don't like where they are that don't have good anchorage that are fed and their needs begin to met increase in anchorage qualities and characteristics. Anchorage is one of the ways of speech of that group of plants. Bugs are one of the ways of speech. The plant population that has it together, that is happy in its

environmental structure doesn't have problems. Bugs and plants, these creatures have grown up together beautifully for the life of this planet. If they truly had adversity between each other, one or the other would have won out long time ago. And it probably would have been the bugs. But they can't do that. They have completely sympathetic activities. The bugs are the cleaners and the gleaners and the improvers of life. They're the bathers, they eat up the old leaves off of that old, no longer low-level, once the present part of the plant now it's passed into being the past of the plant. The plant doesn't need it anymore. It's drawn needed nutritional support from that past in order to put it into its present, into its flowering into its seed bearing time of its life.

This observation of past and present and conceptualization of where that is leading us is, oh my so important in growing a plant's that – if we don't have a plant that has energy and completeness and contentment and maybe hear it's sweetness in itself – if we have a plant that we've cultivated with adversity – we go look at the garden and we think of all those hateful weeds and all those horrid bugs and all these pests, if we carry this adversity energy into the garden well that's what we're very likely to harvest. If we can go out there and utilize those resources of the bugs and if we strengthen up that plant we can learn about nutritional support and in the process we can harvest a more complete meal. And our food is not grown that way. I really *feel* that it's because we don't look at plants. We instinctively know something about our own organisms. Not very much quite frankly but I seems like we do have some sort of capacity but plants we hardly even address the issue. And to me this is truly restorative. We've got to drop to the creature that we are actually interacting with and very rarely do we do this.

MICHAEL TOMS: Bob Cannard.

PENNY LIVINGSTON: We don't really believe in weeds. I believe that the plants that are normally known as weeds are healers.

MICHAEL TOMS: Penny Livingston is a permaculture designer and educator. She's the Director of the Permaculture Institute of Northern California and a partner in Sustainable Living Designs, an architectural design, build and consulting firm integrating landscapes and structures. She has taught intensive design courses internationally. She lives and works with her partner, James Stark in the town of Point Reyes Station.

PENNY LIVINGSTON: Permaculture doesn't just address food production it addresses energy, water, community economic systems, culture, finance, trade. The way that I approach my garden and my farm is through the question - what do you need? What can I do? And in some ways in our language it isn't even about what do you need, it's more about what do we need. Because it's a co-creation. We are nature and I am as much a part of the land as the birds and the elk and the fish and the buffalo and the bear and the mountain lion and I think we're kindred spirits with all those creatures.

I regard the land as my teacher and I try things on small scale first and then see how the response is and pay close attention to the response. What's so exciting is being able to take a shower and know that I'm feeding my pond and the pond's filling up and then the

ducks are going to go to the pond. And they're going to be really happy because then they're going to go out into the garden and eat the bugs and then the soil from the pond. When I built the pond it was made into an office which I really needed. And so then when I'm in my office I'm connected to the pond which is connected to the garden and then the house and the roof. Water from the house is running into the pond as well and the pond also is reflecting light up into the grapes and the nectarine trees and ripening them.

When we do pull plants from the earth they're usually going to some value somewhere else whether it be for medicines or for compost or for feeding for chickens or something but there is no waste. Waste equals food.

I believe that people need to be ecologically literate. The children need to be ecologically literate as well as the elders. And that's another thing that we've lost. It's coming back. Fortunately, children are learning how to garden in the schools and children are starting to learn more about their place but we've got a lot of work to do on that realm (small laugh).

Our best potato harvest this year was from our brush pile. And we have other perennials perennializing and other tubers perennializing like Mashua and we've got Burdock in there and we've even added tomatoes. But this is a pile of prunings and woody stuff and logs and things you can't put in a regular compost pile because they don't break down fast enough. And we've got a whole soil mound of the sweetest soil that's also being built in this brush pile so that anytime when we harvest everything in the winter we've got a huge soil yield of probably now about 18 inches after three years. And we're still pulling potatoes out of that pile.

MICHAEL TOMS: Penny Livingston. In three years her brush pile has produced joy, potatoes and 18 inches of rich soil. Even more impressive when you consider that in one gram of healthy soil lives several billion bacteria, one million fungi, 10-20 million actinomycetes and 800,000 algae. What a harvest. By listening to nature, to the voice of the earth, these Bioneers are restoring soils and restoring souls. Kings can do no more.

JON STEINMAN: And that wraps up today's second installment of the Bioneers radio series that we are featuring here on Deconstructing Dinner. And you can take a listen to past broadcasts or stay informed of upcoming ones by checking out the Bioneers page of the Deconstructing Dinner website, www.cjlv.net/deconstructingdinner. And you can additionally find out more about the Collective Heritage Institute's Bioneers project by visiting their website, www.bioneers.org.

ending theme

That was this week's edition of Deconstructing Dinner, produced and recorded at Nelson, British Columbia's Kootenay Co-op Radio. I've been your host Jon Steinman. I thank my technical assistant Dianne Matenko. The theme music for Deconstructing Dinner is courtesy of Nelson-area resident, Adham Shaikh.

All of those affiliated with this station are volunteers, and financial support for this station is received through membership, donations and sponsorship from local businesses and organizations. And should you have any comments about today's show, want to learn more about topics covered, or would like to listen to previous broadcasts, you can visit the website for Deconstructing Dinner at www.cjly.net/deconstructingdinner. Till next week...