

**Show Transcript  
Deconstructing Dinner  
Kootenay Co-op Radio CJLY  
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**Title: Agroinnovations Podcast w/ Paul Stamets, Rob Hopkins & Richard Manning**

**Producer/Host - Jon Steinman  
Transcript - Tia Alexander**

*Jon Steinman:* And welcome to Deconstructing Dinner – a syndicated radio show and podcast produced each week at Kootenay Co-op Radio CJLY in Nelson, British Columbia and listened to around the world on radio stations such as KOWA 106.5FM Olympia, Washington. I'm Jon Steinman.

From time to time here on the show we get the opportunity to share the work of other producers of food and agricultural media – most often, it's been the work of *radio* producers... but on today's show, we'll feature the work of the AgroInnovations *Podcast* – an exclusively on-line based weekly program offering information that nicely complements what we offer here on Deconstructing Dinner each week.

Back in January 2009, the Agroinnovations Podcast featured Deconstructing Dinner on its show and today, the tables have turned and we'll listen in on segments from past episodes of the Agroinnovations Podcast featuring well-known figures like Paul Stamets – a mycologist (aka mushroom specialist) from Olympia, Washington, we'll hear from the U.K's Rob Hopkins who has popularized the Transition Town Movement (a movement that seeks to equip communities to respond to the challenges of climate change and peak oil), and we'll hear from Montana journalist and author Richard Manning who possesses a keen interest in the history and future of the American prairie and agriculture.

**increase music and fade out**

*JS:* The Agroinnovations podcast is based in Albuquerque New Mexico and is hosted weekly by Frank Aragona. Having now produced 70 episodes, the podcast delves into some of the more technical and hands-on side of topics that Deconstructing Dinner likes to examine each week. It's certainly a podcast that we highly recommend and we're happy to be sharing just *some* segments from past episodes of the show today.

In the first half of today's episode we'll dig into the Agroinnovation archives and listen to segments from a July 2007 interview with Paul Stamets of Olympia, Washington. Paul is a mycologist and the well-known author of *Mycelium Running*. Paul runs *Fungi Perfecti* – a company specializing in using gourmet and medicinal mushrooms to improve the health of the planet and its people.

While Deconstructing Dinner has explored the role of at-home mushroom cultivation, on this episode of the Agroinnovations Podcast, host Frank Aragona speaks with Paul on the history of mushrooms and the symbiosis between them and humans.

### **increase music and fade out**

*Frank Aragona:* Hello and welcome to the agroinnovations.com podcast. All things related and debated in agriculture. Today we are with Paul Stamets. Why don't we get started by you telling us about the role of mushrooms in human history? Now I know you can probably talk an entire interview about that but just give people a general idea of the role mushrooms have played in history.

*Paul Stamets:* Well much of this has recently come to light because of the concentration on the fossil records. I'd like to go way back in time to give people sort of the history of life in the universe at least as far as we know it. 13.8 billion years ago there was a big bang (we all know about that) and then the earth coalesced out of stardust around 4.5 billion years ago. The first organisms appeared in the ocean but the first organisms that came onto land were fungi. They appeared onto land about 1.3 billion years ago, they washed onto land and plants followed 600 million years later. And so fungi munch rocks. They produce acids and enzymes that mineralize rocks. They take calcium and manganese and iron out of the rock mantle and in doing so crumble it. And so these are the vanguard species that enter into habitats and then other organisms follow.

Now we have a more common ancestry with fungi than we do with any other kingdom. Actually fungi are our ancestors. We split from fungi 600 million years ago. In The Journal of Eukaryotic Microbiology a new super kingdom was proposed. I think 25 eukaryotic microbiologists co-authored this paper and they propose Opisthokontum as the new super kingdom joining Animalia and Fungi together. We are animals of course and we respire carbon dioxide, so do fungi. Fungi inhale oxygen just like we do. We have lots of other similarities. As we split from fungi, fungi went underground, so to speak, and we went over ground. We digest our nutrients internally and we have specialized organs like, you know, lungs and brains and stomachs. When the fungi went underground, they produce this filamentous mat called mycelium and these are very fine, thin, threadlike cells that form networks. And these networks are very interesting because the mycelium digests these nutrients externally and then draws in those nutrients that it needs to its cell walls. These cell walls are very thin but the mycelium is pervasive and in most all soils. There's up to eight miles of mycelium in a single cubic inch and the largest organism in the world is mycelial mat thus far known in the eastern Oregon. Over 2000 acres in size and yet it's one cell wall thick. Now we have five or six skin layers that protect us from infection, the mycelium has one and it's surrounded by all sorts of millions of hungry microbes that want to consume it because it's so nutritious. How is it the largest organism in the world can be one cell wall thick? These are highly evolved organisms. These mycelial mats are in constant biomolecular communication with the ecosphere and they can articulate their defenses custom specific to the antagonist that they encounter.

So the mycelium serves as lungs because it's respiring CO<sub>2</sub> and inhaling oxygen. It is an externalize stomach because it's digesting its nutrients outside of its cellular network and drawing in the nutrients that it needs. And I propose that these are neurobiological landscapes

and that mycelium, I know, is ancient and I have a deep belief that mycelium is inherently intelligent. And these vast neuromicrological networks pervade all ecosystems and they really are the foundation of the food web. Life has emerged off of roughly six inches of soil and the fungi, the grand molecular disassemblers in nature, give rise to plant and animal communities through the soil matrix that they are creating. So this is a foundational platform of life and fungi breakdown rocks, create soil and recycle plant and animal after they die and in doing so humus is created.

So that kind of gives you a rough idea about how fungi have entered into the landscape but what really has steered evolution and symbiosis with fungi to the best of our knowledge is two cataclysmic events. There was an asteroid impact on earth 250 million years ago and when the asteroid hit the earth there was a huge amount of debris was jettisoned into the atmosphere the skies darkened with dust, light was choked off, and over 90% of the species that sit at the border of the Permian and Triassic period became extinct. And this massive loss of species obviously fuelled lots of debris fields and the fungi surged and the fungi inherited the earth. There's organisms that paired with fungi, since fungi do not require light, then benefited into natural selection they were favoured and they surged to the forefront. Now species rediversification occurred and we march forward to 65 million years ago and bam, we get hit by another asteroid. There's a reoccurring theme here folks and the same thing happened. The skies were darkened, light was shut off and fungi re-inherited the earth.

So these two cataclysmic asteroid events pairing with fungi was rewarded and so those organisms animals, insects and plants that pair with fungi had an added advantage in terms of gathering nutrients and being able to survive these long periods of darkness. Then there's other factors of course that have rewarded symbiosis but this is just two examples. In *The Journal of Geology* two months ago there was an excellent article that was produced speaking to a fossil group that's been a mystery for over 150 years. Around 1850 I think the first fossil of prototaxites was found in Saudi Arabia and they've also found these fossils in Quebec and elsewhere. I think there's several dozen of this fossil have been found and according to the geological record, they existed 420 million years ago.

420 million years ago, the tallest plant on earth were under two feet tall and yet this prototaxites which scientist now believe is a mushroom stood 30ft tall and was four feet in diameter. So 420 million years ago the tallest organisms on the planet of earth were these giant mushrooms and then plants ascended. We don't know why these things don't exist today but 99% of the species that have ever existed are now extinct and that's an interesting concept that we're less than 1% of the species that we see today of all the species that have ever existed but we march forward. And the oldest mushrooms found in amber is 100 million years old. Now if you go back 100 million years ago and you walk through the forest and you saw mushrooms you'd recognize them but if you looked around for something that look like a human there'd be nothing in your viewscape or on earth that even resembled hominids whatsoever.

Mushrooms had their form long before we had ours. There's a form of biological racism unfortunately that I've been confronting all of my life and people are prejudiced against mushrooms. You say mushrooms and people implore Portobello or magic mushrooms. Very few people have any clue that we evolved from fungi and fungi are our ancestors. And understanding

how they emerge to these landscapes and how they have a mothering influence to the benefit of the ecological community becomes a big surprise to those who are not familiar with this subject. It's an extremely exciting field right now because through the theatre of evolution there's been, you know, more than a billion years of experiments in nature that I think we can benefit from and that's what I'm really focused on is looking at that which nature has already invented and seeing how we can apply it, or cross-apply it, to some of the catastrophes that humans are committing today.

*FA:* So let's fast forward a little bit and talk about, you know the emergence of civilizations, the formation of communities; how have people interacted with mushrooms and how have mushrooms shaped the course of history?

*PS:* Excellent question. The famous Iceman was found in the fall, I believe, of 1991 on the border of Austria and Italy. It's the best preserved remains of a human so far found in a "natural setting" which means it wasn't buried. And he apparently died from an infection from an arrowhead in his back and the Iceman had with him two polypore mushrooms. Now these are wood shelf conk mushrooms, they are in the shape of a woof, and they mostly attached to trees. And one mushroom that he had in particular has been known throughout the ages as amadou and amadou is the latin name for the mushroom is *Fomes Fomentarius* is a birch polypore. So they are very common in birch forests throughout the world and this mushroom is a fire starter mushroom. You can hollow this mushroom out, put embers of a fire in it and keep fire alive for days. This literally allowed and helped the migration of humans out of Africa into Europe because when we moved out of Africa into Europe we discovered something new called winter. Oops! And if you didn't have fire your clan would die. And so having the portability of fire enabled human migration and to keep fire alive (and the fire keeper of any clan of course historically has been an extremely important role).

So, this wood conk when you boil it in water and you pound it, it separates into the fibers which are mycelium. And when you pound this mushroom up, you boil it in water it separates into a fabric and this fabric is highly flammable and it also revolutionized warfare because this is literally the punk that enabled spark rifles to work. Because the spark would fall unto this mycelial fabric, which is highly flammable, it would then burn and then it would ignite the gun powder. So this mushroom also revolutionized warfare and of course any clan or tribe or group that had these weapons versus a tribe that did not would have a strong competitive advantage. There's dozens of examples such as this that mushrooms have played a pivotal role. And 10,000 years ago we were forest people. We were in intimate contact with nature, we were dependent upon the forest ecosystems, our body intellectual knowledge of fungi in the ecosystem I think 10,000 years ago exceeds from a practical point of view the knowledge that we have today.

*FA:* So could you talk a little about when people started cultivating mushrooms, what species did they start cultivating, how was it done and where did this occur?

*PS:* The first species. Well, being woods people we would gather wood for fires and so it's hard to say when this was first noticed but no doubt in my mind it goes back 100's of 1000's of years. In that when you collect firewood (and this is seen today) and you have it broken by your house and if it gets wet, mushrooms sprout from the wood. When Asia the Shiitake mushroom was first

discovered, (it's interesting the Chinese say that they discovered it, Koreans say that they discovered it, the Japanese say that they discovered it) that you could grow Shiitake mushrooms on wood no doubt there is a common truth amongst the three claims. And a woodworker, a wood gathering people would notice that the very delicious Shiitake mushrooms would fruit on the wood that they gather and they also realized if you took freshly cut wood and you put it in between the logs or limbs that were producing the Shiitake, the spore casts from the mushrooms drifting a few inches would land on the adjacent logs and then those logs would become infected or inoculated and then that way they could perpetually keep the Shiitake mushrooms and culture.

In Europe, the cultivation of button mushrooms really was pioneered in France and it was one of the gardeners of one of the kings, I think it's King Louis XIV (and I have to go back to my notes to check on that) and realizing that the mushrooms were growing on horse paddocks and then looking for a moist constant temperature controlled environment. There was a nearby cave and compose was taken down into the cave and it turned out to be a wonderful environment to grow mushrooms. So there is two separate paths that clearly the Eurasians and Asians preceded the western Europeans by several hundred if not several thousand years.

*JS:* This is Deconstructing Dinner. On today's episode we're listening to segments from the Agroinnovations Podcast – a weekly program on food and agriculture out of Albuquerque, New Mexico. More info on their podcast is at [agroinnovations.com/podcast](http://agroinnovations.com/podcast).

In this first half-hour of the show, we're listening to segments from an interview with mycologist Paul Stamets – the author of the popular book - Mycelium Running. Paul lives in Olympia, Washington.

Here again is Agroinnovations Podcast host, Frank Aragona.

*FA:* So let's talk a little bit about yourself and certainly modern technology has impacted our ability to cultivate mushrooms and you are probably the quintessential example of that. Tell us how you got started as a mushroom cultivator.

*PS:* Well, okay. I first was fascinated with the cultivation of the magic mushrooms, Psilocybin mushrooms and I was in the woods a lot hunting for these mushrooms but I could never find them. But I found lots of edibles and I steered towards those and learnt how to identify several dozen edible and poisonous species and eventually when to the Evergreen State College in Olympia, Washington and my interest refocused on the Psilocybinatic species and I was covered by a Drug Enforcement and Administration License for over 20 years through Dr. Michael Beug who was my professor and a very good organic chemist who published actually some of the protocols that the DEA still uses today for the accurate analysis of Psilocybin content.

My focus was taxonomy and scanning electron microscopy and I spent a lot of time in front of the electron microscope. In the winter time I didn't have fresh specimens and so I honed my culture skills so I could start looking at mycelium and primordial and morphological development of these mushrooms because they lead to taxonomic features that are significant. Most people may not know that the majority of mushrooms at the earliest stages of their formation, much like an embryo with humans, their features are defined and so looking at these

mushrooms at a very young state gave me a lot of information on the morphological development of the mushrooms that lead to taxonomically significant features. So I pursued that for a long time and I have published four new species in the genus *psilocybe* all of which still survive today. I'm happy to say that because lots of people are thrown out or thought to be conspecific with other names and so it's the way of taxonomy names change but my species concepts are still valid taxa. And then I've also published some other non-psychoactive species that I have found in nature or have participated with others.

So that really led into my cultivation skills but then I became more and more fascinated about fungi in the ecosystem and mushrooms have a tendency to follow catastrophic events. Who knew? You know also related to the deep evolutionary history of this fungi responding to catastrophes with a catastrophe as your foot breaking a stick. Whether it's an asteroid hitting the earth, these fungi surge up to capture newly available nutrients and so I was fascinated my debris trails and humans create enormous debris trails as they walk landscapes and we build houses and we cut the forests. So fungi that is associated with humans became a focus of mine and the majority of the *psilocybe* mushrooms are as intimately associated with human activity. So if you want to find *psilocybe* mushrooms in the Northwest you can go to any building, landscaping area that have used wood chips. And classically those are universities, churches, law enforcement facilities, courthouses, schoolyards etc. So the bark mulching or wood chip mulching around buildings for landscaping cause a huge surge in the species which were otherwise rarely found in truly wild environments. I mean to this day I have never found *psilocybe cyanescens* and *strictipes* and a number of other species in truly wild environments. They are all closely and intimately associated with human activity. As my research continued then I got more and more interested in the medicinal properties of mushrooms and so my horizons quickly expanded and though I am an expert on *psilocybin* mushrooms, and I've published a lot on that subject my more recent work in the past ten years have been more focused on gourmet and medicinal mushrooms.

*FA:* You have often argued and you've suggested that as you are speaking today that mushroom mycelium is one of the key components missing in sustainable food production. Could you explain what you mean by this?

*PS:* Because fungi recycle and because fungi create soils a big missing component that I see in permaculture and other agricultural practices people talk about soil without really defining how it's made or the processes that lead to its making and this is where engaging fungi enhances soil development far faster if you knowingly and purposely introduce fungi on for instance wood chips, or corn stalks, or wheat, or grasses, or anything that's a consequence of farming or forestry you can recycle these nutrients quickly into the soil bank.

We generate soil here when we grow Shiitake mushrooms on sawdust. We can create beautiful dark shinosen-like soil in a matter of three to four months and some people said it takes a thousand years to develop an inch of soil. You know, true from one perspective, if you actively engage fungi and steer their decomposition specifically you can generate soil within a year. And so soil enhancement, and the adverse soil, the loss of soil, is what is impugning the food chains and causing famines and leads to drought and desertification because thickening the humus and recycling these plants and animal nutrients back in the carbon bank thickens the soil, increasing

its carrying capacity leading to more and more biodiversity. And a more biodiverse ecosystem that is constructed, so to speak, on thickening soils leads to greater sustainability and thinning soils lead to less sustainability. For three years I actually was a logger and young men I think have this death wish you know when they're between the age 18 to 25 and it could be testosterone poisoning. Who knows? But I think as a group, young men like to test themselves to see what they're made of and maybe that was my urge when I was a long-haired hippie and went into the woods and unfortunately cut down the old growth forest. And I was mesmerized and conflicted, you know, going into these old growth that are so beautiful. Then the chainsaws would start in the morning and by the afternoon you'd see sky and all the trees will be laying down and a massive evaporation, massive heat increase and then the logging trucks. Some of these logging trucks are three log loads. Three logs on logging trucks the trees are that big. And I was wondering to myself where's all this carbon coming from? I can see where it's going. It's going on the logging trucks but where did it come from?

If you think back now for what's happened we're in the third generation to fourth generation of forest now here in the Northwest (except for the 5% of the old growth forest that still remain). Let's just go back in time again. 1900, you know, the first European settlers came to the Northwest and they cut the forest usually near to the waterways, near to the salt water, or near rivers because they can float the logs. So, 1900 they first cut the forest and then they burnt. So that's two insults on the carbon bank. Now two insults on the carbon bank of soil that was built only in 10,000 years cause the last ice age ended about 10,000 years ago and as the ice receded it scraped the soil and flushed it into the ocean. Anyone seen this around has watched glaciers recede. It's a moraine gravelly-like, non-soil that is left and there's small lenses of soil that do survive. And these lenses then rebound and plant successions occur and they die and then the lens get a little bit bigger. Well it's mycelium that's creating that through the entire process. So 1900 we cut the forest, we burn it (two insults on the carbon banks), 1950 there's a second cut. And they cut and they burn again. So that's four insults on the carbon bank. Year 2000, or in this period now, the forest was cut a third time and then they're burned. Six insults on our carbon bank which took 10,000 years to create. Now it doesn't take a rocket scientist to understand that that is not sustainable.

And as a result we get premature decline, trees are toppling earlier because the root wads can't support the trees if the soil is not there. And so the logging industry goes "uh, oh" we better cut the trees sooner. And so we've gone down a slippery slope of diminishing returns and this is not sustainable. And so I think engaging this fungi and getting them to actively recycle nutrients is a much better path than that which has been practiced. And I'm opposed to burning. I know its controversial for people around Lake Tahoe right now because all these million dollar homes have burned up because of the brush control has been restricted. But we are a species that have invaded a native landscape and I think that we have to have some sensibilities about how to live within an ecosystem in such a way that our children will also enjoy it. The problem that I think we face in the world today is the eagerness for short term benefits and not looking downstream into future generations. If our ancestors had behaved the way that we are behaving now 2000 years ago, and in some places they have, the ecosystems would not be thriving as well as they are today.

A clear example is I've been to Shanghai twice and Shanghai has committed ecological

suicide. There's no way there's enough plants that are producing enough oxygen for the city of Shanghai. In fact, a well-known ecologist that I was in correspondence with told me that there was no amphibians within 30 miles of Shanghai. There's no frogs, no amphibians and he was absolutely in despair because he was basing his studies on prior work talking about the biodiversity in the landscapes around Shanghai. Now take Shanghai for an example, if that's our model, and if we look into our glass ball into the future and if the whole planet becomes like Shanghai well obviously there's not going to be enough oxygen and we're going to have a tremendous collapse of ecosystems including the ecosystems that support us. And so we need to come into balance with our growth (with our population growth) and how these ecosystems are protected and preserved because protecting and preserving them is preserving our own future and that of our descendants.

*FA:* That does it for part one of our interview with Paul Stamets. Thanks so much for joining us. I'm Frank Aragona this is the [agroinnovations.com](http://agroinnovations.com) Podcast. Saludos!

### **increase music and fade out**

*JS:* This is Deconstructing Dinner – a weekly radio show and podcast produced in Nelson, British Columbia at Kootenay Co-op Radio CJLY. I'm Jon Steinman. If you miss any of today's episode, it is archived on-line at [deconstructingdinner.ca](http://deconstructingdinner.ca) and posted under the November 19<sup>th</sup>, 2009 episode.

Today's show is featuring segments from the Agroinnovations Podcast – a weekly program produced in Albuquerque, New Mexico. Back in January 2009, Deconstructing Dinner was featured on the Podcast and today, we're happy to share some of *their* work *here*. That last interview featured Paul Stamets – a mycologist from Olympia Washington and the full-one hour of that interview can be heard by visiting [agroinnovations.com/podcast](http://agroinnovations.com/podcast)

In the next half-hour we'll listen to more segments from Agroinnovations featuring author and journalist Richard Manning who spoke to Frank Aragona on the role that annual grasses have played in shaping agriculture and civilization. But first, a *short* segment with the U.K's Rob Hopkins – who has popularized the Transition Town Movement (a movement that seeks to equip communities to respond to the challenges of climate change and peak oil). Here's a short segment from that November 2009 interview.

### **increase music and fade out**

*FA:* Hello and welcome to episode number 69 of the Agroinnovations Podcast – all things related and debated in agriculture. I'm your host Frank Aragona. All of our episodes are available online, free of charge at [agroinnovations.com/podcast](http://agroinnovations.com/podcast). We have many previous episodes online on the Agroinnovations Podcast. Full of information that is useful for gardeners, permaculturalists, food activists, and people who are just generally interested in issues related to

sustainable agriculture, and agricultural technology, peak oil, climate change, all of the issues that are very important in our day and age. Today on the Agroinnovations Podcast, we are joined by Rob Hopkins. Rob is a permaculture practitioner and teacher and author of many books including *The Transition Handbook: From Oil Dependence to Local Resilience* and also the founder of the Transition Network. Rob also blogs at [transitionculture.org](http://transitionculture.org). Rob Hopkins welcome to the Agroinnovations Podcast.

*Rob Hopkins:* Hi. Thank you very much for having me.

*FA:* What are the origins of the transition culture?

*RH:* Well the transition idea started forming, I suppose, at around 2004 when I was teaching permaculture at a college in Ireland and I found out about peak oil. And I got my second year students to do a project where they looked at the town of Kinsale, where the course was and tried to design using permaculture principles a pathway; a way from oil dependency for the town. And we spent a long time looking around the world thinking somebody else must have thought about this, somebody else must be on the case of this already and we couldn't find anybody who'd even started thinking about it really in any sort of tangible way. So the project that they did was just trying to look across food, energy, housing, building; what that move away from oil dependency might look like if it was based on the idea that you start with a vision of how you'd like it to be and then you and then you backcast as to how you would actually get there. And the resulting plan was something that became quite viral on the internet and it was lots and lots of places started getting rather excited about it.

And then later that year I then moved back to the UK which is where I was from originally at Totnes in Devon and then that was when we started an initiative here that wasn't called Transition Town Totnes to start with but after a year or so we started to call it that. And really that was when we started to design the model. And I think really for me it's like what transition is a bit like how in music, you know, a lot of the most exciting innovations in music come when people think what happens if you put this with this? You know, what happens if you put that kind of music over the beat from that kind of music? You get a whole new genre of music. And so for me really where transition emerged from was trying to design a response to peak oil using permaculture principles.

*FA:* In the process of developing this you have articulated a 12 step approach. What is this 12 step approach and how exactly does it work?

*RH:* There are 12 of them largely by accident but actually I quite like the thing that it's like an addictions model because our relationship with fossil fuels in the West is such an addictive and such a dependent relationship. But that came about because after we've been doing stuff here in

Totnes for a while we got the people from other communities getting in touch saying what are you doing? And how do you do that exactly? And we had no idea really because we had very much made up spontaneously on the hoof as we'd gone along really. And it was that kind of a distilling of very eclectic inspirations from psychology and environmental activism and a whole range of different disciplines. So we started just pulling together what some of those ingredients were that are dependent based on what we'd been doing in Totnes. So the first one is forming a steering group and designing its demise from the offset which is based on the idea of trying to get away from groups just getting stuck inside of their group. But it is actually designed for its own evolution as the process goes along. And then it moves into awareness raising. And a lot of transition groups spend their first year or so doing a lot of awareness raising because really what transition groups act as is as a catalyst. And it is not a process that comes in with all the ideas already in a little bag and then takes them all out. It's really a process, which is about catalyzing the community to design its own response. So that awareness raising stage is really, really important.

Then there's laying the foundations about networking with other organizations that are already there because the chances are you're not going to be the first organization that ever thought a green thought in the history of the town. Then there's having what we call an unleashing which is the kind of launch event. It's designed to be a celebration of the place and of the local culture and in such a way that designed through the evening people will look back to historically as the point where it all began. Then groups start to form around specific subjects like energy and housing and that brings out the people who are really passionate about that subject because transition is designed to be a process driven not by guilt and despair and angst but rather to be driven by what it is those people are really passionate about and what really what fires them up.

*JS:* Rob Hopkins of the Transition Town movement interviewed in November 2009 on the Agroinnovations Podcast. The full interview with Rob can be heard on-line at [agroinnovations.com/podcast](http://agroinnovations.com/podcast). This is Deconstructing Dinner.

And taking us to the end of today's episode, we'll listen to another sample from the Agroinnovations Podcast featuring Montana author and journalist Richard Manning. Richard has authored a number of books on agriculture and civilization and Agroinnovation's Frank Aragona spoke with Richard in August 2008. They spoke of the beginning of agriculture and the role that annual grasses have played in shaping agriculture and civilization.

### **increase music and fade out**

*FA:* Hello and welcome to the agroinnovations.com Podcast – all things related and debated in agriculture. Today we are with Richard Manning who is the author of several books and essays including: *Against the Grain, How Agriculture has Hijacked Civilization, Grassland, The*

*History, Politics, Biology and Promise of the American Prairie* and the essay *The Oil we Eat: Following the Food Chain back to Iraq*. Richard thanks for joining us today on the Agroinnovations Podcast.

*Richard Manning*: Thanks very much for having me.

*FA*: Let's start with some of the things that you've written about quite extensively which is the development of agriculture and the transition from a hunter gatherer society to a sedentary agricultural society. Can you give us a brief summary of this transition and some of its key points?

*RM*: That's probably the pivotal point in human history. I mean it's when we became something different than what we had then for a very long time. If we were to mark a transition to humans that's probably (depending on where you would put the mark) 300,000 years ago 200,000 something in that order. And for a very short period of that, the last 10,000 years, we've been farmers; agriculturalists. For all of the rest of the time 97/98% of the time we were hunter gatherers. And why that's relevant is that we became what we are through evolution as hunter gatherers; a very different mode of existence. Basically we ate differently (much differently than we eat today), we lived differently, we were nomadic, we tended to wander around a lot, we were not as organized. All those things were the conditions of our existence and when you have conditions of your existence you evolve.

Not only that, the planet evolved with that sort of existence (in other words wild systems) and we change those to farm systems almost overnight (now 10,000 years ago). And so I regard the last 10,000 years as an experiment almost. And the results of that are mixed at best, at the very best. But that's I think that the kind of the context for the discussion that we need to have today.

*FA*: Can you talk about how agriculture has been a force and a mechanism in European imperialism and the conquest of indigenous cultures?

*RM*: And it's kind of interesting in that it comes out more strongly in the European tradition. I mean basically there are three or four traditions of domestication depending on which ones you look at of around three or four different crops. Certainly wheat and that's the one we talk about the most and I talk about the most. But also rice which was the Asian domestication, corn which was the Central American domestication and potatoes. And if we look at those four crops they really explain pretty much all of human history.

European history is wound up in wheat. It's based in wheat agriculture, which was domesticated in the Middle East. And I think it's no accident at all that the Middle East is our most trouble spot on the planet today. It's a direct result of this. But all of these things have something in

common. They are all annual grasses; humans are grass eaters. We basically eat the seeds. We derive something like 70% of our nutrition from the seeds of grasses. And there are not only grasses they are an interesting kind of grass. They are an annual grass. Which means that they set seed every year and die. They're not perennial plants. So it's kind of a minority strategy in the plant world but as a result of that they deplete the soil as opposed to build up the soil as most other plants do. And that's key. That is absolutely the bedrock fact of domestication. That we domesticated annual grasses that deplete the soil. And because they deplete the soil we have to move on. So we raise wheat for a long time on our landscape but not a long time at all. Sometimes 10/15 years it's no longer capable of raising that wheat any longer and so we move on. That simple fact was the engine of imperialism for Europe. And it started about 6,000 years ago and it has never stopped. Or it didn't stop until about 1960 when we had really farmed all the new land. We'd move on as far as we you could go onto anything that would raise wheat. Wheat was raising wheat. At that point we adopted somewhat different strategy of taking hydro-carbons (that is chemical fertilizer) to replace the fertility in the soil. So we are now moving on to different lands, they're just oil bearing lands as opposed to wheat bearing lands. And so it's a different sort but that fact that wheat, the annual grass that depleted the soil, was the determining factor of imperialism and it's what drove everything it became since.

*FA:* Now the title of your book is very compelling *How Agriculture has Hijacked Civilization*. How has agriculture hijacked civilization?

*RM:* Well, in the long term we've been talking about here and thinking about it. In biological terms we say well humans conquered the world and they did so as a result of agriculture and the ability to store food so we could range all over the place but in biological terms it's every bit as accurate, and its valid and its illuminating to say wheat conquered the world. Or dandelions conquered the world because there are these collections of species, this coalition of plants that around wheat that are every bit as successful as humans are and that's what counts in biology and if you propagate and take over a new territory you're a successful species. So wheat took over a new species, just as dandelions did, just as Spotted Knapweed did, just as horses did. So there are a number of this coalition around plants and animals.

And if you think of this for a while it's every bit as accurate from a wheat point of view (I know that sounds strange but think of it for a second, from a wheat point of view) to say wheat domesticated humans because these plants use us to propagate their genes and spread their genes around the world. And so it's that necessity of that coalition that really determines how we live; the way we live. The fact that we're imperialistic, the fact that we farm, the fact that we plough, the fact that we burn hydrocarbons. And the demand of those annual grasses that they're so deterministic is such a driving force in human civilization it's almost accurate to say, I think it is accurate to say, that the plant hijacked us. And that farming hijacked us in a way and converted humans to it's on purpose. So that's kind of the derivation of that. It is also an irony to say that at

the same time because of course civilization itself the concept is based in agriculture. In other words, what we think of as civilization, living in cities, writing, having leisure time, philosophy, cultural evolution, all those things are based in the fact that we were able to have that because of agriculture because we had leisure time, because we could build cities, because we could raise armies. So, agriculture in a way created civilization but at the same time it determined that flow of that civilization and the outlines of it.

*FA:* You've also written extensively about the loss and the potential recovery of grasslands and prairies. What are some of the key points about these vital ecosystems and how we manage them that you think the listeners should know about?

*RM:* And that's get right at the heart of the matter. The fact that prairie is a very different animal. In fact all other ecosystems. If you look at farming, the average cultivated field, and I mentioned soil depletion, what that really does is allow organic matter in the soil to decay.

So if we look at prairie soils in the American Midwest that are now solely used to raise corn. When the settlers first came in they had something like 9 to 10 to 12% organic matter. They are now down in the area of 5/4% organic matter and that's huge. I mean that's an enormous change. And what is happening there is farming inevitably depletes organic matter and in the process by the way releasing carbon dioxide which is another part of this story. But is a sharp distinction to every other ecosystem (and farming of course is not an ecosystem but) every natural ecosystem be it prairie, be it forest, even dessert adds organic matter to the soil. And the difference of course is perennial; perennial plants. Prairie is based in perennial plants; a grass that doesn't succeed every year but in fact lives from year to year and usually there are two types of grasses in every prairie: a cold season and a warm season grass.

Every prairie has some sort of legume in it and the value of these things is they affix nitrogen in the soil. So they actually pull nitrogen out of the air to fertilize the whole business. And then everyone has a yellow composite some form of some kind of yellow composite flower and those things go together to do something called over-yielding. Meaning if you grow them separately then they are less than they would be if you grow them all together. It's as simple as that. And that over-yielding is what is really important and the principle we've lost in farming. So it's permaculture, it can go on forever, it builds the soil, it produces far more biomass and farming beds and it's really where we need to get our instructions on where we go forward by going back to the prairie, by understanding how it works and by creating a farming that mimics that so we can go on indefinitely into the future.

*JS:* Montana author and journalist Richard Manning interviewed on the weekly Agroinnovations Podcast. This is Deconstructing Dinner where we've been featuring segments *from* the weekly Agroinnovations Podcast out of Albuquerque, New Mexico. The entire interview with Richard

Manning is archived on their web site at [agroinnovations.com/podcast](http://agroinnovations.com/podcast).

But to take us to the end of today's show, we'll leave you with one last segment *from* that interview where Richard shares some thoughtful remarks on how each of us can find our place within *our* communities and help work towards ensuring a stable and ecologically sound food supply for today and for future generations. Here again, Frank Aragona.

*FA:* And let's talk about some of these alternatives as you've written extensively about food systems one of the things you've stated is that there are little niches in every system and each person's individual charge is to find such niches. Could you explain to people what those niches might be and how to find them?

*RM:* One of the ways we went wrong with industrial agriculture and the green evolution is through these one size fits all solutions. So in other words and it was deliberately done that way. I mean it was not an accident at all. We wanted one kind of wheat that would grow any place in the world and then you would force the conditions through irrigation and fertilizer to allow that to happen. The antithesis to that approach is to say now we need to do what is locally appropriate. Not only in terms of what people like to eat but what would grow there in terms of the weather, the cropping system, but also the respect things like the parasites and the diseases. If you have a lot of particular rice disease, rice blast for instance, in a given area then you grow crops that are resistant to that.

And so we're becoming much more refined in our ability to think about niches, to think about what's appropriate in a small place and to really to do the kind of science necessary to exploit those niches. And that's the very situation I was talking about for instance grass-fed beef in the Midwest. Those people looked for a niche. They said we don't like doing agriculture this way what else can we do? They looked at the conditions of the landscape saying well this place grows grass well it did so when it was a tall grass prairie and they looked very seriously at cattle saying well the cattle today are wrong for this but there are varieties of cattle and ways of raising cattle that are correct for this. What do those look like? And in some cases they went back to the 1950's methods and 1950's genetics to do it. And by thinking through the complexity of their area and even thinking about their market, you know, what would people eat between cities area they were able to put together a successful solution that works in their niche and that's the key. And that's what's really incumbent on all of us. There's no one solution that's going to solve all this. There's no magic bullet. It's a question of inhabiting your landscape.

*FA:* Now how can an individual do this effectively? What advice would give to someone who says well I'd really like to find my niche but it's all kind of overwhelming? How do I start?

*RM:* Well there are a lot of people working on it and I will bet anyone listening to this that if you

look in your area you'll already find people working on it. Local foodscape ideas and people thinking about local agriculture, local sustainable agriculture. So you plug into that right away and you say who else is working on this where can I buy these kinds of food that are either grown locally or grown sustainably in some way? And you can find you get an education pretty quickly that way. You know, it's much easier to do this than it was 20 years ago. But also when you do that, do it with a little bit of criticism or with a critical eye and simply say you know yes there's a lot of mythology in farming even about locally sustainable stuff so what's really true about this? What really works in one way or another? Be willing to pursue unconventional approaches to things. I live in Montana and one of the solutions that I do that many of my friends do here locally is to hunt. We take venison and we feed ourselves with that. Well that kind of solution isn't making onto the national barometer or the national headlines. In fact it's probably not appropriate in most places and people would object to it. But here it works perfectly and it's worked that way for a long time. So think about your situation, think in totality, think about energy, think about burning wood for instance those kinds of things that go on, it's not just about food and use your intelligence. You'll find out it's a fun process once you get involved in trying to inhabit your own landscape because it's really quite educational and enriching. And in the end it connects you to your place and it connects you to your food in a clearly rewarding fashion

*FA:* Is there anything in this interview that we didn't touch on that you think that's important for people to know about or hear?

*RM:* Well, the one thing I'll tell people is have fun with this and I know that runs counter to this gloom and doom that pervades this discussion and I'm not saying that that's not appropriate; there is a lot of gloom and doom there. But we also can't throw out the fact that we're humans, we're part of our culture and our culture depends on our food in a lot of ways. Ceremony, the idea of family togetherness, ritual, holidays; all marked by food. So thinking the role that plays and you don't throw out the baby with the bath water think about how food enriches your life and how you can enjoy this and you'll find that, I think, that by demanding first of all good food, food that you can enjoy, food that's appropriate, that you do some good and at the same time you have a good time and that's appropriate too.

*FA:* Well Richard Manning, thank you so much for joining us on the Agroinnovations Podcast. I especially take to heart your suggestion that people should have fun with this and maybe lay of a little bit on the gloom and doom. I think that's a great suggestion and there's just so much work to be done and so much enjoyment to be gotten from that work that I think it's really great and helpful to have a reminder from a person like yourself.

*RM:* Well thanks for having me.

*FA:* That does it for this episode of the Agroinnovations Podcast once again I'd like to thank

Richard Manning for joining us. I'm your host, Frank Arogana. This is the Agroinnovations Podcast. Saludos!!

*JS:* This is Deconstructing Dinner. And a thanks to Frank Aragona and the Agroinnovations Podcast for sharing their interviews here on the show today including that last one with Montana author and journalist Richard Manning. Among Richard's books is his 2007 release *Against the Grain – How Agriculture has Hijacked Civilization*. The full interview with Richard can be heard at [agroinnovations.com/podcast](http://agroinnovations.com/podcast), and today's full episode of Deconstructing Dinner is archived on our site at [deconstructingdinner.ca](http://deconstructingdinner.ca) and posted under the November 19<sup>th</sup>, 2009 episode.

### **ending theme**

*JS:* 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.

The theme music for Deconstructing Dinner is courtesy of Nelson-area resident Adham Shaikh.

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