The Solari Report

September 20, 2016

Solari Food Series Vital Soils - The Foundation of Life, Part II with Angela Curtes

the Food Series

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Angela Curtes: My name is Angela Curtes. I am the sole proprietor of Grounded, LLC, a company that I started in the last year to create humus-structured compost and to continue my work as a land preservation specialist.

Harry Blazer: Tell us a little bit about your history with this character, Chris Mann.

Angela Curtes: I was working for eight years as a Land Protection Specialist for the Ozaukee Washington Land Trust, which is a nonprofit land trust. Their ability to preserve farmland, especially organic farmland, was dismal. That was prior to 2008.

A friend of mine stumbled across a job announcement for Yggdrasil Land Foundation as a Project Director. After reading the announcement and not having a clue what biodynamic agriculture was, I decided to submit a resume because regardless of what biodynamics was, what I did know about it was that it brought a sacred, spiritual aspect into agriculture. I felt like that was missing not only in agriculture, but in life in general outside of church. So it was a new, exciting opportunity.

I was hired as a consultant, and I eventually became their acting Executive Director up until 2011 when they ran out of funding. Then Christopher Mann took me on privately to help him with his estate and land preservation of 900 acres and buildings and residential/commercial that would eventually all go to Yggdrasil Land Foundation.

Harry Blazer: So who is this guy, Chris Mann? Who was this character?

Angela Curtes: Christopher Mann is my friend. He is my mentor. He is my colleague, my boss, and now he is just a dear friend who I gain inspiration from.

Christopher was born in England. He is an Englishman, although his family's roots are from Germany – Kaufmann. My understanding is that he is from royalty. His grandfather used to do oil exploration in the Carpathian Mountains of Europe.

Christopher married Martina (Mann) Voigt and started them on an incredible journey of eventually coming to America in the 1970's to bring biodynamic agriculture and education to the United States, which originally came in the 1940's by Ehrenfried Pfeiffer who helped to start the Biodynamic Association. He (Pfeiffer) was one of the prime students of Rudolf Steiner back in the 1920's.

Biodynamics is a living biological and always changing agriculture.

So the Mann's have done incredible work with their wealth for humanity through land preservation and through interested individuals and sustainable agriculture and organics, and particularly biodynamic agriculture with some of their projects being here in the United States – Michael Fields Agricultural Institute and Yggdrasil Land Foundation, which is a land trust that works nationally to preserve organic and biodynamic farms.

They have a host of accomplishments in Europe with land trusts and social investment banks as well as through projects of residential green development, of agricultural institutes, of preservation initiatives, and mostly of trying to build awareness and higher consciousness in individuals that he meets. I guess I'm one of those lucky individuals who have met Christopher Mann.

Harry Blazer: What is biodynamics?

Angela Curtes: Biodynamics is a living biological and always changing agriculture. Agriculture being the land and culture being part of it, which has been removed since the industrialization of agriculture and the onset of synthetics and chemicals in the 1950's. Biodynamic agriculture was coined by Rudolf Steiner in 1924, and it preceded organic agriculture.

Biodynamics is similar to organics in terms of inputs and having a closed farm loop fertility system, but it also differs from organics in that it brings ancient

agriculture concepts to the table, one being utilizing planetary and cosmic forces as well as moon forces to propagate healthy plants and to build soil fertility through use of herbs and anthroposophogal medicines.

Harry Blazer: Anthroposophogal – what does that word mean?

Angela Curtes: Anthroposophy is something that Steiner coined, but it is the study of human wisdom. It's the study of human knowledge. His work as an artist and as a scientist and as an engineer and as a mathematician and as a naturalist and as an educator and as a seer and a clairvoyant was to look at humans' evolutionary development through time and how we have the capacity to meet and live in a world that is non-physical as much as the spiritual. It's a way to increase our capabilities of being good people on the planet, of caring for each other, of loving, of caring for the earth and all that it provides us. It spawned off of the Theosophy movement that was moving in Europe back in the late 1800's and early 1900's.

It's a form of study as much as it is a way of being and living in the world.

Harry Blazer: So Rudolf Steiner is the founder of biodynamics?

Angela Curtes: Yes.

Harry Blazer: And did he borrow a lot of practices from someone, or did he basically invent these practices himself?

Angela Curtes: Steiner was able to sense things from the plant world just like a rainforest shaman could identify a medicinal plant and know that it could cure a headache or a toothache in the rainforest. So he had indications of what different plants could do to benefit the living plant world. He also looked at animals as being sacred and important and a vital part of agriculture. In fact, when you say 'biodynamic agriculture' it includes animals for fertility as much as for product or sustenance.

Harry Blazer: What is compost?

Angela Curtes: Compost is the end result of taking organic, natural

resources and allowing nature to go through a decomposition process through microbial action to break down substance and to turn it into a nutritious supplement or amendment for the land. Compost comes in many flavors and many structures. The goal of compost is to feed the organisms that live in the soil – the microbial life – which are truly the beings that transfer nutrients to our plants.

Unlike conventional agriculture where plants are forced to drink soluble nutrients and synthetic nitrogens, in biodynamic agriculture the microbes are able to digest every macro and micro element that exists within the soil and digest it and structure it within a humus-structured complex that the roots of a plant then target and access for their sustenance. That includes water and nitrogen and all of the other elements that we need for a healthy diet.

Harry Blazer: What is humus?

Angela Curtes: Humus is a structure at the surface of the earth that is broken down plant and mineral material that have gone through a digestive process through microbial action. Again, it is the living aspect of our surface structure of the earth. Humus is made up of a colloidal clay which is elastic and many-sided so other nutrients and elements can attach to those clay particulates. It also incorporates the secretion of these microorganisms of all the things that they've digested in the soil.

They've designed an insoluble structured 'food source' for plants to find their sustenance through. Then we find our sustenance through it. So it's really the living top structure of our planet that has taken millions of years to create in which we've taken hundreds of years to excavate and destroy.

Harry Blazer: So is it soil or is it a component of soil?

Angela Curtes: It's the living part of soil. It can be made up of sand and particulates of clay and organic matter and of microbes.

Harry Blazer: You mentioned that there are different kinds of composts – different styles. Can you give us some insight into some of those?

Angela Curtes: What I'm finding is that a lot of companies are using dry matter carbon to decompose and break down through mechanical processes. They're using industrial systems, they're using turning machines, and they're processing dry mulches or wood chips and leaves and other carbacious materials – possibly food scraps that bring in a nitrogen component.

Very infrequently for commercial compost are you finding manures in compost. Essentially utilizing compost that is made up of animal manures not only brings rich microbial presence through the digestive process of that animal, but it also brings this high nitrogen-base and phosphorus-base to a compost system. If properly mixed with carbon at a 30:1 ratio (30-parts carbon to 1-part nitrogen), which is the ratio that microorganisms function best on in terms of what they prefer or how they prefer to digest material at, it is really important to have a balance of your carbon to nitrogen ratio.

Very infrequently for commercial compost are you finding manures in compost.

If you're using only an industrialized source of carbon in a compost system, you basically have "empty nutrition" as the end result. Often it's very black and it's very airy. When you look at a black forest soil, there is a lot of leaf litter and a lot of broken down decomposed forest material, and it is rich, but it's not to say that it's filled with all the nutrients that a plant that we as humans need to eat.

The structure of a humus-structured compost is one that looks and feels and smells like soil. It could be mistaken for a rich topsoil that has a nice humus structure to it. So it's moved through the decomposition process by natural microbial activity, and it's moved those random materials of manures and straws and lake weeds from surrounding lakes into a soil complex which is a much heartier food for farm fields, gardens, lawns and flowers.

It adds elasticity to the structure, it adds a soil retention capacity to that structure in drought conditions, and it adds a very self-sustained slow release complex to the nutrients. So in a flood period they're not all going to wash out like you would with a raw manure. Those nutrients are going to stay adhered to

the structure of the compost because of its natural design.

Harry Blazer: You use a hot method, correct?

Angela Curtes: Yes.

Harry Blazer: Can you tell us a little bit about that?

Angela Curtes: It's called a 'heat-guided' or 'hot-fermented' compost method. My understanding is that it was a method used back in the 12th century by the Cistercian Monks and the Templars to guide the life forces of microorganisms and to provide them the best environment for their proper digestion of material.

In having the correct carbon to nitrogen ratio and having the correct moisture content and having a correct aeration bringing aerobic activity to the pile, the microorganisms can function and digest at a very rapid pace which causes the heat.

So these microbes create the heat that we find in a 'hot system'. To imagine taking a teaspoon and that there are millions of microorganisms in one teaspoon, it's just a phenomenal life process. The hot fermentation is an incredible process that is very fast. From three to five months you can go from a raw material to a finished, beautiful soil-structured, earth-smelling compost. Your carbon loss in the whole process is maybe 20% whereas in a cold process your carbon loss is 50-60%.

Part of the rapidness is also a way to utilize as many resources as you can without losing your resource. The hot fermentation also integrates biodynamic principles. So there are six different inoculants of herbs that are used to treat the compost windrows. They're done at a succession at the beginning of the process, but they're placed within the compost to actually increase temperature. They all represent different elements that are randomly within that material, and they also have association relationships with the different planetary forces that are streaming in towards our planet that affect us as well as plant life.

It's a way of creating harmony and organization of random material to allow a

quickening process as part of the effect.

Harry Blazer: There's only so hot that you go with your compost, right? What is that temperature and why?

Angela Curtes: I was trained to not let the compost go beyond 158 degrees. At that temperature you can get a die-off of the microbes that you are encouraging to break down the matter. So if the compost goes beyond that temperature, you need to open up the pile. You need to give it water, because water will decrease the temperature.

But remember that when you open a pile, you're also giving it air, which microbes also need. The microbes need moisture and they need air just like we do. So this hot process is basically a guided process of maintaining temperatures, of maintaining air, of maintaining turns. It's not frequent turns; it's usually on a three to four week cycle because your goal is to allow those microbes to continue to upbuild and digest and to create a design or a structure within the material over time. If we turn too much, it would actually be a detriment to their building up process, which is the true goal.

So I guess it's a process of balance and a watchful eye of what you're trying to provide, which is the best condition for microbial activity.

Harry Blazer: What is modern agriculture doing to our soil?

Angela Curtes: Back in the early 1900's Europe was going through what they called the 'Green Revolution'. Today we look at the words 'Green Revolution' as being something beneficial to the environment and to prosper green, but back then it was the 'greening' movement of using chemicals and synthetics to increase agriculture production.

In 1924 when Rudolf Steiner gave the agricultural course, it was at the call of farmers who were practitioners who were noticing that they could no longer plant year after year of crops, and that they were finding depletion in the soil nutrients. The new form of agriculture that was supposed to 'green' and bring more agriculture production seemed to be having ill effects on the productivity of the soil and the soil life.

Steiner gave a series of lectures that they called 'The Agricultural Course' that looked at these man-made synthetics and chemicals and the detriment that they were having on microbial activity, which is truly the key component to proper nutritional transfer of soil nutrients to the plants and then to us. When you kill your microbes, you are actually just decimating the function of a living soil to transfer those nutrients.

As a replacement, we feed it NPK in industrial systems.

Harry Blazer: Which are nitrogen, phosphorus and potassium.

Angela Curtes: Correct. We give it to them often in a soluble form that the plant drinks, like it's drinking water. Because of that effect, the plants grow big and robust, but they don't necessarily grow strong. Then we have issues with pests and insects.

Harry Blazer: And they may be nutritionally compromised as well.

Angela Curtes: Exactly, because they are only getting three nutrients versus a whole panel of micro and macro elements. So the plants are weak and they're more prone to pass (die) and to infestation by weeds. Because the soil is unhealthy, a weed basically represents an unhealthy soil. A pest basically represents an unhealthy soil.

Our industrial system then attacks those two entities (weeds and animal pests) with chemicals and then that brings on a whole new slew of challenges to the soil and the death of microbes. So you get into this vicious cycle, and eventually your soil becomes dead; it becomes a substrate to hold a plant upright instead of a living system that is providing a full spectrum of nutrients that the plant needs.

Harry Blazer: A structure to hold the plant upright, and also a medium for the application of agricultural pharmaceuticals.

Angela Curtes: Exactly. With the increase of chemicals and pesticides, there had to be a change then in how plants are structured. The advent of genetic modification of plants took place in 1995, and if you look at statistics –

especially in Brazil and South America and I'm sure here in the United States as well – you can look at bell curves of how the advent of chemicals and the advent of GMOs also correlate to the increases in cancers and different illnesses that people are experiencing.

We as a culture are now faced with many sicknesses and many illnesses. The words of, "You are what you eat," are truly what's happening today. If we eat and digest (synthetic) chemicals, we will become sick creatures. That is what is happening in our world today.

Harry Blazer: So Rudolf Steiner felt that wholesome, vital food coming from vital soils was absolutely essential for human beings to be able to think clearly and also be at their peak and also be truly spiritual beings, too. Is that correct?

Angela Curtes: That is correct. He had a whole book or pamphlet that he wrote. Pfeiffer wrote as well, and probably wrote more on nutrition. Essentially Steiner said just that. In order for humans to have the potential to be the best that we can be physically, spiritually and mentally, we need proper nutrition. We should take that very seriously because people's mental, physical and spiritual qualities today in the 21st century are suffering.

Harry Blazer: So a lot of the aberrations we see out there might be due to poor nutrition.

Angela Curtes: Yes.

Harry Blazer: Tell me a little bit about who brought biodynamics to this country and the role that Chris Mann plays in that whole sequence.

Angela Curtes: Well, the biodynamic movement in the United States started in 1944 when Ehrenfried Pfeiffer, the student of Steiner, was a biochemist from Germany, and he started to do a lot of the experiments of the indications that Steiner gave around the preparations and the sprays.

Pfeiffer came to the United States. He lectured and he also was a scientist. He began trying to disseminate the information of biodynamics, and he also began implementing this hot-fermented compost method in two areas of the United States back in the 1960's – one in Oakland, California to handle municipal

waste and one in Pennsylvania with a poultry farm.

A year or so after those projects, he passed away. He did write a manual, though, for industrial composting. To my understanding, this is what we base our industrial systems off of – these hot, windrows systems – although today we've taken it one step further with the use of heavy mechanical turning machines that are using pulverization for decomposition versus what he intended, which was microbial activity for proper decomposition and humus structure.

Harry Blazer: It seems like as soon as these guys start getting into (commercial) agriculture they die, right? Rudolf Steiner died a year after his agricultural lectures, and this guy dies a year after he's introducing biodynamics (large scale biodynamic composting) in the United States. It's interesting.

Angela Curtes: A twist of fate, I guess.

So the biodynamic movement has been going on in the United States since the 1940's, and the Biodynamic Association was created at that time. The Manns had visits to the United States through Martina's family's work. One of her childhood friends had met a man whose family was from Germany and lived in this East Troy region.

Harry Blazer: East Troy, Wisconsin.

Angela Curtes: Yes. That is the Zinniker farm, which is the oldest biodynamic farm in the United States. They really felt drawn to this region because it was very similar to the geography of Germany. It was formed by the glaciers 10,000 years ago. Many Germans have moved to Wisconsin because of those reasons – not only the beer and the brandy.

They really felt that they wanted to bring the knowledge that they grew up with. Their parents had studied anthroposophy. Their parents grew biodynamically. They had gardens, and the Manns felt like the United States needed to have a place for people to study and to learn about agriculture and biodynamic agriculture. That was East Troy, Wisconsin where they then started the Michael Fields Agricultural Institute about 30 years ago.

That institute does research, education and policy work around organic systems. Over the years they have implemented here and there the biodynamic aspect of the Mann's dream and have provided over 900 acres of land for local farmers studying biodynamics and organics to do their practical work.

Harry Blazer: What are the main differences between organic farming and biodynamic farming?

Angela Curtes: Organic farming uses the National Organic Program standards. They have allowable inputs that some would argue aren't the best organic inputs that could be used. Essentially it's a natural system, so we're removing anything man-made and synthetic. In terms of nutrients we're removing any forms of chemicals for pests or herbaceous removal.

Harry Blazer: You're removing synthetic chemicals.

Angela Curtes: Yes. So it's a natural system. I would say that the big difference with the biodynamic concept of agriculture is that every biodynamic farm truly should have animals because animals bring the best form of fertility to the land as closed loop amendments and fertility for proper soil structuring.

So with biodynamics you are not only using all natural inputs, but you are also trying to farm in a way that is holistic and in harmony with natural rhythms of the world that actually promote growth.

It also works, like I said earlier, with ancient wisdom of our relationship as humans, as animals, and as plants and how we – all of that – is affected by the rhythms of the outer universe, of forces of planets, how we move through the solar system, and of the phases of the moon. So with biodynamics you are not only using all natural inputs, but you are also trying to farm in a way that is holistic and in harmony with natural rhythms of the world that actually promote growth. There have been many studies done on this and research to show that when we plant a plant at a full moon versus a new moon, there is a different growth rate. When we use different applications of herbs, there is a difference in the increase of compost temperature.

These are subtle things that we don't recognize today as being significant in

how we grow food and yet they were how people grew food in ancient times. So it's nothing new. It's just being re-practiced, and biodynamics brings that dynamic – that truly living, changing dynamic way to produce food for a healthy culture – into context with really what is happening in the world around us.

Harry Blazer: There is a society that sets standards for biodynamic farming in Europe, correct?

Angela Curtes: Yes. There is Demeter International and then there's Demeter USA. Demeter was the Greek goddess of agriculture. I'm not sure what year it was founded, but it's a certification program for biodynamics. It is similar to organic certification. Biodynamics has its own named certification called Demeter, and it adheres not only to many of the national organic standards, but it goes one step further in how we treat the animals and into how much natural and wild lands and hedge rows you have on your property to promote pollinators, to have closed farm fertility loop systems where you're encouraging animals and natural manuring and amendments. So there are many components to reach those certifications for Demeter.

Harry Blazer: Very few US farmers are actually certified under Demeter. Is this correct?

Angela Curtes: That is correct.

Harry Blazer: So how does somebody know when they go buy something biodynamic that it is the real deal and being done properly?

Angela Curtes: I think we are at a time when many people are questioning the organic standards. Like I said, some people are saying that there are too many allowances. For example at farmer's markets there are a lot of vendors that are not organic certified, but they are selling 'natural' products. It really all starts with knowing your farmer and asking questions and having enough knowledge yourself to know what GMOs are and what questions to ask – if there are truly no chemicals and no synthetics and no GMOs in the food that that farmer produces

In the same way, if a farm was practicing biodynamics but was not Demeter

certified, and if they were they would have a label on it just like you would see a 'USDA' or another named organic certification, and if they didn't want to go through the certification process – which can be costly and involves a lot of red tape – then that farmer would in his literature and information tell his clients the types of practices they use to be biodynamic.

Utilizing biodynamic principles of a planting calendar or the preparations in compost or using two different sprays that are typically used - the Horn Silica and the cow manure compost or sprays - these are things that the biodynamic practitioners would be using. So I guess it's all about knowing your farmer.

Harry Blazer: They aren't sprays in the typical sense that we think of in agricultural sprays. These are more probiotics for the soil, right?

Angela Curtes: Yes, in a sense.

Harry Blazer: There is quite a pocket of biodynamic activity here.

Angela Curtes: There is. Michael Fields does use biodynamics in its garden program, which is an international intern education program to teach young people how to produce food and vegetables. They do teach about biodynamics.

Harry Blazer: And Mr. Mann has a number of farms in this area.

Angela Curtes: Yes. Mr. Mann and Martina have many properties that are either rented by Michael Fields for research purposes, which they do want to do more trials in the future with conventional organic and biodynamic, and over the course of 30 years there has been biodynamic farmers who have farmed here. There have also been organic certified farmers. But there are also other young people who grow flowers or who work on other farms or who have taught at Michael Fields in the past and have gone off on their own who integrate and implement the biodynamic principles in their farming practices.

Harry Blazer: How far away from here is that original farm (the Zinniker farm)?

Angela Curtes: It's less than a quarter-mile. It's probably 200 feet away – right here.

Harry Blazer: And then there is you. Give us your contact information because you sell biodynamic compost, and you go out of your way to make sure that the feedstocks for that are very pure and very high quality as opposed to sludges and other things that a lot of other people use.

Tell us again the name of your company and the way to get in touch with you in case somebody wants to buy some of your magical stuff.

Angela Curtes: It's Grounded, LLC. Go online at www.GroundedLLC.net. My contact information is JazCurtes@Earthlink.net.

I would love to not only get people to integrate this compost into their farming systems, but to learn how to make this compost. It truly is a wonderful process to reach a very high quality compost. These same principles that are used in this hot fermentation are actually quite easily replicated in a cold backyard compost system.

If we look at the four elements of earth and air and water and fire (heat), and if we practice those different things and participate, compost needs our participation. The earth's healing needs our participation. We need to all be active in what we purchase and what we consume and being responsible for our local food sustenance, compost is key. We need to give back and to feed our soil in order for it to produce food to feed us with highly nutritional foods.

Harry Blazer: Heal the earth and heal ourselves with biodynamic composts.

Angela Curtes: That's right.

Harry Blazer: How is that for a slogan?

Angela Curtes: That sounds great!

Harry Blazer: Thank you so much for your time.

Angela Curtes: Thank you.

I conducted several other segments of interviews in the field but have not included the vocal portion because of the severity of background wind noise. I

will summarize some other important information that Angela shared with me during the course of those other segments.

Information on Chromatography:

I have been studying Chromatography for 4 years. So I would call myself a student in that realm. While I was in Germany, I had the opportunity to spend two months with Roland Ulrich and Bruno Folladar – Roland an East German and Bruno a Brazilian studying under Roland – and these gentlemen became my mentors not only in the compost process I practice, that Ehrenfried E. Pfeiffer developed from a 12th century method, but also for a "picture forming process", called Chromatography, to study the qualities of living forces within the soil and not just elemental properties like we do with common soil test (NPK). Soil is comprised of three components – chemical (elemental), structural and living/biological. Chromatography was developed to help analyze the living/ biological components.

This particular lab test takes 8 hours to prepare and then up to a week to finalize an image. Essentially this test can be done on any organic substance (compost, soil, vegetative matter, even milk). Depending on the substance, there are various ways to prepare it for analysis. But basically the substance is wicked onto a piece of filter paper that has been recently impregnated with silver nitrate. You basically are developing a photographic slide on filter paper. You process it over time in a lab box that has a particular temp and humidity (using natural light where possible). What the pictures reveal is the structure or living part of the soils.

In the case of soil or compost, these pictures reveal the quantity of humus, organic matter, and amount of compaction. (Hugh Lovel (http://www.quantumagriculture.com) who does "quantum agriculture" has shown how to use this technique to decipher certain elemental components also - calcium for example). The trickiest part is not only getting the 8 hour process correct so the picture can develop, but the greater trick is to learn how to decipher what you see. And that is why it is not regarded by traditional science as a primary way to assess the vitality of the substance we are examining. Yet in combination with modern soil tests, you can determine a lot about the health of a soil or compost or material you are testing.

So for example, you could have excellent NPK results but your plants suffer. Why is that? You could be missing other important trace elements e.g. Boron, Sulfur or the proper ratio of Calcium/Magnesium. And then the micro-biome could be compromised. There are studies that correlate healthy profiles with specific chemical and biological conditions. Pfeiffer has done a book on Chromatography where this is examined. I use the "chromas" to obtain a snapshot of the health of farmland.

A Primary source on Chromatography as it applies to Biodynamic Agriculture:
Chromatography Applied to Quality Testing: The Art and Science of Composting Revised Edition
by Ehrenfried E. Pfeiffer (Author)

ISBN-13: 978-0938250210
ISBN-10: 0938250213
Paperback: 44 pages
Publisher: Bio-Dynamic Literature; Revised edition (January 1, 1984)

The following is an excerpt from this book:

The test described is a qualitative one in order to separate different fractions of humus extracts by means of the capillarity of suitable filter papers. The filter paper is prepared with a photo-reactive substance (for instance, silver nitrate), which also reacts with the extraction substances.

The precipitation of this reaction occurs at various distances from the point of application of the substance to be tested. The distance, the pattern, the color and the shape of the reaction area are significant for an interpretation of the substances contained in the extracts. In using this method, no attempt is made to identify the chemical nature of the reacting substance, since the pattern obtained can itself be used as a diagnostic means. However, identification is possible. Of the different possible techniques for chromatography, the circular method of chromatography (round filter paper) was selected since it gives easily obtainable results with simple equipment and is easy to interpret.

Regarding Ulrich's book <u>Creating Humus on the Farm: The Controlled Heat Method of Composting,</u> which is no longer in print, here is some information from Amazon regarding the book (Angela studied with

Ulrich):

Roland Ulrich's *Creating Humus on the Farm: the Controlled Heat Method of Composting,* published by Outskirts Press, is thorough, technical, and a complete resource for any individual, particularly farmers, interested in how our suffering soils can be replenished and invigorated step by step in an efficient and effective manner. Control is the operative word in the Controlled Heat method of composting: Regular monitoring of the supporting elements -- warmth, water, light and air -- is most important in this time-saving process of converting organic material into humus. Regulation during every phase of this process leads to the surest, most consistent way to nurture the bacterial life that will transform dead organic substance into life-supporting humus for the earth.

Following each step of the Controlled Heat method of composting to create humus increases our awareness of this magical transformation process; it inspires enthusiasm and re-enliven determination to develop, individually and in community, our knowledge and abilities to restore life supporting humus. This age-old method, modified especially for the modern organic/biodynamic farmer, focusing primarily on farming operations with animals or access to manure, is described in this book. "Humus is more than an ingredient helping to provide our everyday food. Rather, it is a complex interaction between man, animal, plant, and mineral, a true effect of interaction of the whole world's living forces."

Roland Ulrich's extensive knowledge and practice has resulted in modifying the controlled heat method of transforming compost for large-scale *barnyard* use. Although he makes no claim to the superiority of this method compared with other composting methods, the product speaks for itself in the resulting quality and quantity of foodstuff produced; it is a fast and efficient method, thus serving as a great aid to good farm management.

From the Author:
Beginning with my educational studies in forestry and forestry economics, I was confronted by the serious problem of the dying forests in Europe. One of the most outstanding facts was the loss of humus, the living element of the soil. Water, soil, and air are the very pillars of life! A United Nation's report in 1947 stated that more than sixty percent of the world's humus had already been destroyed. The destruction of humus in the last hundred years has assumed shocking proportions and it will continue unless we stop it. The earth's food production is

thereby greatly endangered: The increasing desertification of the continents results in hunger, poverty, and destruction of the land. The increasing loss of humus creates continuous erosion, water shortage, water pollution and land loss.

These facts moved me to familiarize myself more intensely with the themes of water and soil. The impulse to learn biodynamic agriculture, beginning in 1982, stemmed from my familiarity with anthroposophy. In 1993 came the decision to work for the German Development Service and the German Technical Corporation in the developing countries of Africa. I was responsible for implementing methods of soil and water conservation to grow crops to feed the people.

Along the way I taught myself Dr. Ehrenfried Pfeiffer's laboratory science of chromatography, our indispensable aid in determining soil quality. Chromatography is a holistic method that complements the quantitative methods of soil analysis. With a few pieces of equipment, chromatography makes possible correct decisions to improve soil fertility, thus maintaining the cultivation and preservation of humus.

Humus and Humanity spring from the same Indo-Germanic root word. The loss of humus means the loss of humanity. Erosion in nature brings with it social erosion in human society. We must grasp anew the lofty significance of humus in order to renew the earth's vitality; we must make every effort in this direction. Dr. Ehrenfried Pfeiffer perfected chromatography for many substances, particularly soil types and stages of composting, thus making it possible for us to recognize - in picture form - the invisible spiritual side of the world. Holistic knowledge of the world is at the same time holistic knowledge of ourselves. We must hold onto picture-forming methods in order, as Goethe declares, "to see what holds the world together in its inner nature."

From the Inside Flap

Within these pages the story of the controlled heat method of making compost is told. This method is fast and reliable, thus making it a good choice for efficient farm and garden production. The practitioner can learn to turn plant and animal waste into humus to nourish all of earth life: the soil, its plants, its animals, and us human beings. Humus is compost transformed, organic matter that has reached a point of stability where it will break down no further and might, if conditions do not change, remain as it is for centuries. In this book, a scientific explanation is given for every step of practical work required so that by the end, when all steps have been digested, the reader can feel satisfied that a valuable lesson has been learned. A soil rich in humus produces sweeter

vegetables, animals that eat the plants are healthier, and us human beings who eat both, think and feel better.

Our ability to aid nature in the creation of humus is one of mankind's greatest achievements. We are fortunate to be able to restore to nature the vitamins and minerals we take from the earth. This is humus, a most active and spirit-filled substance, filled with abundant life. Not only can we see it happening but also over time we can develop the sense for the invisible forces working on our behalf. Creating humus is a basic step in preserving our sacred agriculture.

More reflections on soil and compost by Angela Curtes:

In the eyes of biodynamic agriculture, every farm is unique – an organism unto itself which includes the humans interacting with it. In every region there are available resources as components for compost that are distinctive. For example, in Wisconsin in the land of thousands of lakes, lake weed that comes from our local fresh water lakes has been a key resource for the compost. It has a Carbon to Nitrogen ratio of 18 to 1, which is similar to coffee grounds. Whereas a manure is about 26 to 1.

Ideally we want to bring animal manures into the compost. Many people use just vegetative matter – but in the eyes of biodynamics, it is important to get the essence (and microbiology) of the animal into our food production.

Lake weed consists of 5 different vegetative materials. I use old hay. Leaves as a supplemental carbon source. And cow manures from a nearby organic farm.

You could use chopped greens from yards, cover crops and wood chips (which contain a lot of cellulose and the less cellulose the easier for the microbes to break down and the faster the process will go).

Key – get the carbon to nitrogen ratio right. In a hot composting process, that optimum ratio is about 30-parts carbon to 1- part nitrogen. The cow manures come in about 25 or 30 to 1 ratio. But by adding lake weed, I am bringing in more nitrogen and a water element – so will need to balance with more carbon.

You want to make sure that the compost is well mixed (as homogenous as possible). And I add about 10% soil from my farm. It is best to have soil with

more of a clay complex (than sand). In many ways this is a fermentation process (like making bread). Microbials build humus structure around clay particulates. A finished compost that smears your fingers and feels greasy is high quality.

Once you have the ingredients mixed, you would lay a windrow. Should be between 7 to 9 feet wide, any length and not higher than 4 feet. If too high, there would be too much density, which would cause compaction and make aeration difficult. Moisture needs to be kept high (65 to 70%) especially during the first month when microbial activity is the highest.

One of the beauties of this process is that you don't have to turn it very often. Ideally you need to check temperature on a weekly basis. Too much moisture might prevent it from attaining a high enough temperature. Too dry the opposite. We want the mixture to be wet (moist) but not drippy.

FDA and USDA regulations aim to separate animal waste from the vegetable food chain in agriculture so much so that they consider bird droppings a potentially hazardous material. Biodynamics has a very different perspective.

How do you keep your manure-based compost safe?

One of the beauties of a hot fermentation is not only its rapid decomposition (makes useable compost faster), but it also fries and kills weed seed, pathogens and reduces antibiotics, hormones and pesticides to elemental forms.

The intelligence of the microbes is such that when digesting all the micros and macros that are in the materials, their secretions are binding around clay particulates. The microbes are the ones who are designing this humus structure, which is not only bountiful in minerals, which are time-released, and insoluble and stable, but they also hold moisture.

112 degrees for 72 hours kills weed seed. Our goal is to reach up to 158 degrees (but not higher) to destroy pathogens but not damage the beneficial microbials that are making the process work.

It is wise to have the compost tested prior to use to know how you did. Ironically, certified organic farms can bring in raw manure from conventional

farms that have hormones, antibiotics, pesticides and GMO's in it and use that as a soil supplement. There are waiting periods if what you are growing is for human consumption and it touches the ground. But if the products being grown are for animal consumption, there are no such restrictions.

For me, I don't feel good about making compost from materials that are not as clean as I can find.

A 1/3 compost to 2/3 soil is common ratio for soil that is in decent shape. It is important to get a soil test to see the condition and quality of your soil. It is rich compost. You can start a potting soil mix for seedlings. A lot of folks apply in fall and let it sit through the winter. But also folks apply in spring, about a week or two before planting – just applied on top of existing soil – one to two inches thick. The compost gets naturally incorporated into the soil system underneath (substances naturally move from higher concentrations to lower concentrations).

This is an up-building process. So it is important to combine the surface application of compost with a non-till strategy. Tilling is counter-productive to creating great soil. It will break down the structures that the microbes are trying to create. The most you should do is take a straight fork and stroke the top of the soil to work some of the compost in.

We apply biodynamic compost preparations soon after the windrow is laid. There are 6 different herbs that are used in the preparations: Yarrow, Chamomile, Stinging Nettle, Oak Bark, Dandelion and Valerian – each according to Steiner having different relationships with minerals and also different natural energies.

Biodynamic revives ancient wisdom and practices. There is a communication that occurs between a wise person and the living world. One of the worst catastrophes we are inflicting on the planet is the destruction of our vital soils through industrial practices. We are experiencing a revival in sustainable agriculture. Farmers markets are up 700% in the last 5 years. More and more folks are backyard gardening. We can no longer sit back and think we will be provided for – whether by the government or the land itself – since we have destroyed so much of the vitality of the soils around the world. So we must be proactive in rebuilding fertility and vitality. Composting is one of the tools.

And we need to incorporate others such as cover cropping, green manures, crop rotation, no tilling, buffers along stream banks, pollinator refuges. Synthetic NPK won't do the trick i.e. designing, creating and sustaining vital soils that are heavy, brown, earth-smelling, crumbly, moisture retaining, colloidal, complex and humus and microbe rich.

Steiner claims that there are three things needed for humanity to survive and thrive. One was humus, the second was the dust of butterfly wings and the third was the death process of humans returning to the earth. The current state of affairs – humus has been drastically reduced or compromised, our monarch butterfly population is tanking and a lot of humans are embalmed or cremated. The root derivative of the words humus and humans is the same. The current state of constant war coincides with the constant state of war humans are waging on earth and its resources. Our efforts need to be around regeneration, starting with the regeneration of vital soils. In a way, we are beyond sustainability.

More on the Yggdrasil Land Foundation

The *Yggdrasil* name was chosen because of its significance in Norse mythology as an immense and sacred ash tree with roots that extend to many locations in the earth and branches that extend high into the heavens and is the home of many unique creatures as well as a meeting place for the gods.

The foundation is structured as 501(c)(3) and was created by Chris and Martina Mann. For many years up until 2007, Wisconsin was losing over 21,000 acres of farmland a year to residential and commercial development. Yggdrasil was founded to own and protect farmland in perpetuity and seeks to find long-term tenants as stewards to work the land using organic and biodynamic practices.

In addition to supporting its own goals, the foundation provides support for 3 other organizations including Michael Fields Agriculture Institute, The Biodynamic Agriculture and Farming Association and RSF Social Finance.

Good links:

https://biodynamicsbda.wordpress.com/tag/roland-ulrich/

http://www.demeter-usa.org

http://www.yggdrasillandfoundation.org

https://www.biodynamics.com

http://michaelfields.org

http://rsfsocialfinance.org/

MODIFICATIONS

Transcripts are not always verbatim. Modifications are sometimes made to improve clarity, usefulness and readability, while staying true to the original intent

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