

**Show Transcript
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**The End of Food
The Evolution of Nutrition and Human Health**

**Producer/Host – Jon Steinman
Transcript – Mary Rahn**

And you're tuned in to Deconstructing Dinner produced at Kootenay CO-op Radio in Nelson, British Columbia. I'm Jon Steinman, your host of this weekly guide to more educated eating.

One of the fundamental reasons why we eat is of course to gather enough fuel to sustain us through our daily activities and our lives. Nutrition is often an inherent constituent of each broadcast of Deconstructing Dinner, but on today's show nutrition will be the sole focus, and the title of the broadcast is The End of Food, The Evolution of Nutrition and Human Health.

The End of Food is the title of a best-selling book by author Thomas Pawlick, and Thomas will lend his voice to the show today. If any of you tuned in to our recent broadcast titled Is Organic Worth the Price, that show used material recorded back in February of this year, at the 2007 Growing Up Organic conference held in Toronto. As Deconstructing Dinner was in attendance to record the conference, we will share with you today two additional speakers from that event, who along with Thomas Pawlick was Ellen Desjardins, a public health nutritionist and registered dietitian for the Region of Waterloo Public Health. Ellen was also heard during that recent broadcast of Is Organic Worth the Price. But on today's show Ellen will answer whether organic food is more nutritious.

Launching today's broadcast will be Thomas Pawlick's presentation at the conference, and along the same path that his book takes, Thomas provides some shocking insight into the plummeting decline of the nutrient content of Canadian food since the 1950s.

And so rounding off today's broadcast, we will dive into the history books, and listen to a circa 1943 recording titled Food for Fighters – a propaganda piece created to educate the American public on the importance of good nutrition for American soldiers during World War II. But of greatest significance, is that this recording, will tell us, quite literally, how the civilian food system of today, is a product of World War II.

For listeners who did not catch our recent broadcast featuring recordings from the Growing Up Organic conference, the event was hosted by the Canadian Organic Growers, a national, member-based education and networking organization.

And thanks to our friends at CKLN in Toronto, Heather Douglas attended the February conference and recorded all of the speakers. And I thank Heather for that.

I'll also note that a number of the recorded speakers from the event will exclusively be available on the Deconstructing Dinner web site. One of these speakers is Rick Smith – Executive Director of Environmental Defense, and he spoke to the audience on the topic of toxins in the bodies of Canadians. I did interview another member of that organization during our October 12, 2006 broadcast titled Chemical Food Part I. And that broadcast along with Rick Smith's presentation will both be available on our web site at cjly.net/deconstructingdinner

soundbite

The first segment of today's show will feature author Thomas Pawlick. Thomas has become a rather well-known figure since the release of his investigative book titled *The End of Food: How the Food Industry is Destroying our Food Supply – And What We Can Do About It*.

Thomas is on the Faculty of the School of Journalism at the University of Regina. He is a veteran newspaper and magazine journalist with more than 30 years experience in Canada and abroad. He has taught at Canadian and Foreign universities and colleges, and he is the author of several books, including *The Invisible Farm*.

Through his research of Government of Canada documents, *The End of Food* is filled with facts on how modern industrial farming techniques have reduced the available nutrients in food, and his presentation we're about to hear captures some of his findings. What is perhaps even more shocking than the content of his book is that following the book achieving best-seller status, the University of Regina cut his salary, cut his research funding, removed him from email lists, and removed all copies of his book from the shelves of the campus book store. And here's Thomas Pawlick.

Thomas Pawlick: Ever since I lived in Kenya, a few years back, I've been very interested in animal species that eat or kill their own young. In Kenya, lions do this. Every pride of lions has a male that's the dominant male and sires most of the cubs but as that dominant male grows older, he gets weaker and younger males challenge him. And eventually, when he gets old enough, they chase him off. And the younger male, once the old boy has been chased off, he goes and kills all of the cubs so that only his genes will survive. Well, maybe for lions that works. If nothing else, it assures that their gene pool will have the most energetic and strong male lion running it, and that's good for their future.

But the thing that has always puzzled me is, and I really don't have an explanation for it is why the human species should want to destroy its own young. This may sound a little

strong to you, but it's not—literally. We are destroying the next two generations. We're destroying it not only through the toxic contaminants that the other speakers have talked about here tonight, or this morning, which are terrible. We're also destroying them through the effects on the environment of global warming which it's going to create an environment where they are going to have to struggle and face terrific challenges. But worst of all, we're hurting them and destroying them by providing them with poor nutrition. A very, very, very bad diet.

Now what do I mean by that? Are there very many nutritionists in the audience, people who work as professional nutritionists, have a terminal degree in nutrition? Good, I'm glad. Then you probably have heard of these. Every few years, the governments in the United States, Canada and the UK publish what are loosely termed—food tables. These tables have a variety of titles when they come out but, basically what they are is, people are sent out from the various laboratories, to make samples at supermarkets of various foods. They bring them back to the lab and they analyze them to see what the ingredients are in terms of vitamins, minerals, enzymes, fats, etc. And then they publish them in the food tables. Now, people have been doing this, in the United States they have been doing it since the 1890's. But unfortunately in the 1890's they tested for different things and they used different sampling methods and their science was way behind ours so we can't really compare, it's like comparing apples and oranges. But since about fifty years ago, the substances tested for, and the sampling methods and the analyses were similar enough, that you can compare.

Well, I decided to do that. I went back and I got a hold of all the published food tables going back about fifty years, and I pulled out my little pocket calculator, and started to do the numbers. And as I went along, doing those numbers, I became more and more and more profoundly shocked! To the point where, I doubted that I was doing this right. So, I called up a friend of mine who is a math teacher and I said, "Look, would you come over? I'm trying to do some figures and I'm not sure if I'm doing it right." So, she came over and this lady teaches math. I showed her the table and gave her my calculator and she started to tot them up and she said, "Yeah, you're doing it right Tom." And then she stopped, and she looked at me and she said, "Holy Croak!" That was my reaction.

For the past fifty years, in North America, and probably in a good part of the developed world, the nutrient content of virtually every single food on the supermarket shelf, every one, has been declining at a point where decline is too weak a verb. I would say plummeting, like a piece of lead. Some minor examples: I looked up tomatoes, and since I open the book with tomatoes, I will start with them. Since 1963, the year John Kennedy was shot in Dallas, 100 grams of today's fresh tomato contain 30.7% less vitamin A than they did in 1963. They contain almost 17% less vitamin C, 61.5% less calcium, 11.1% less phosphorus, 9% less potassium, 7.97% less niacin, and 10% less iron, and 1% less thiamin. And that's just since 1963. And that's just tomatoes. If you go back farther than 1963, to the time of the Korean War, you've all watched MASH on television, with Hawkeye and everybody...well at the time that the real Korean War was going on (the amount of iron in 100 grams of raw red tomato in 1963 was 10% higher than today) but

in 1950, it was fully 25% higher than today. The nutrients are being leached from our food.

In potatoes, white potatoes in Canada, 57% of the vitamin C has been lost since 1963. And, since 1963 100% of the vitamin A has been lost. There ain't any more vitamin A in white potatoes, at least not in the samples that were taken off the shelves by the USDA people.

This, to me, is just as shocking as the amount of toxic substances in our food. In fact, if you put these two things on a graph, the declining nutrients and the rising toxic contaminants, they'd eventually form an X and the point where those two trend lines intersect, that's the end of food. That's where you have food which has so little nutritional value, that you may as well eat plaster of Paris. And at the same time, the number of toxic chemicals in it has gotten to the point where you may as well have Lucrezia Borgia dump her ring into your food, because it's largely poison.

This is not imaginary, these aren't my figures, these are government figures. They come from the US Department of Agriculture, Agriculture and Agrifood Canada, Health Canada and the British Ministry of Agriculture. They're all there. You can get them on the web. Nutritionists, I'm sure probably have them in your university libraries. They're not my figures. They don't pop out of my head. They're there, and they're real.

And this is a real emergency. How are our children going to face the dangers of global warming and all the problems that brings about if they themselves are weakened and debilitated by all sorts of ailments born of poor nutrition? If in essence, they're starving. They're eating food, and it gives them the sensation of swallowing something, and they have something solid in their stomach, but in terms of real nutrition, they're starving. And all sorts of diseases are starting to crop up and they're not all due to toxic contaminants. A number of them are due to lack of nutrients—anemia, lack of iron, and iron is one of the minerals that's been plummeting out of our foods; osteoporosis, it's a lack of calcium, lack of vitamin D; diabetes, that's partly caused by the increase in sugars and fats.

Another figure I came up with was the amount of nutrients, or you could call them nutrients, in foods that have not decreased, but increased. The amount of fats—lipids in fresh tomatoes has climbed by 65% since 1963. And the amount of sodium, sodium chloride is table salt (NaCl) has climbed by an astounding 200%. So, it's almost as if, the food industry has sat down and said lets create food that is the very opposite of what any nutritionist would recommend. And then, they've done it. And we're seeing increased figures for anemia, osteoporosis, diabetes, asthma—I noticed all the hands that went up for asthma. My son has asthma. Obesity, of course, and all sorts of cancers. Two of the vitamins that are lacking in our modern food are vitamin C and E which help generate anti-oxidants in the human body, which combat the free radicals that cause cancer. So, it's not only a question of bad stuff going in, it's a question of all the good stuff going out.

Why is it going out? It's directly attributable, directly attributable to the methods used by modern, industrial, factory farms. I'm not talking about your little family farm off in Podunk like mine, I only have 150 acres. I'm not talking about organic growers who are part of the solution, and not part of the problem. I'm talking about these big factory farms and the contract farmers who work for them. I've seen them, I've seen them in California, I've seen them in the US, all over the place. I've seen them in Saskatchewan, and I've seen them in Ontario, and I know what these places are like. The methods they use are inimical to health and inimical to nutrition.

The choice of varieties for example. I interviewed a number of people from industry, and asked them, "What makes you choose a particular variety of tomato or potato or bean or even a breed of chicken?" And they would say, oh, these are the reasons, and they would give me a big list. Sometimes it was ten or fifteen items, and the lists were quite good. They would say, it has to be tough--like a tomato, the variety of tomato has to be strong because it's going to be put in a truck and driven several thousand miles across the continent and if you have a weak tomato in there, it'll just come up, it will be all smushed. So, we want a tough tomato. We also want a BIG tomato that's BIG and looks big on the, I don't know big is beautiful. We want a tomato that's going to be bright red and it will ripen at exactly the same time, all the tomatoes in the patch will ripen at the same time so that we can minimize the amount of manpower that's used in the harvest. So they would continue and give me this list and at the end of the list, I'd say, and I went through this with something like seventeen university horticulturalists and spokesmen for several different growers associations and I would say, "Is there anything you've left out?" And they'd say, "No, no, no, we've covered the ground, that's pretty much it." They left out two things, every single list, and I'm not exaggerating. This blew my mind, every single list left out the two things that you or I would consider necessary. Flavor and nutrition. They're not on the map; they don't even pay attention to it. So, that shocked me. That's just choice of variety.

Irrigation regimes, fertilizer regimes, for example fertilizers—how many farmers have we got in the audience today? Any dirt farmers out there like me? Good for you. Well, everybody who ever farms knows N, P, K. The famous trio—N, P, K. Nitrogen, phosphorus and potassium. All these big bags of fertilizer you get at the co-op are various varieties of N, P, K and especially if you run a big factory farm, or if you are under contract to a big company that requires you to use factory farm methods. Nitrogen is always the heaviest one. Nitrogen is the biggest one because nitrogen increases volume and it increases the size of the crop. It gives you lots of tomatoes and it gives you big tomatoes, so dump on the nitrogen. But what people don't seem to think, and organic farmers know this, organic farmers know this very well, I'm preaching to the converted here—for plants to be healthy, they need a minimum of seventeen nutrients, macro-nutrients and micro-nutrients. Macro-nutrients are needed in large amounts; micro-nutrients are needed in small amounts. But there's seventeen of the bloody things! And what are the factory farms putting on? Three, only three. And you ask them don't you think you're a little short on nutrients in your fertilizer regime? They say, oh, no, no, no, no, there's enough of these other ingredients out there in nature, it takes care of itself. But

it doesn't take care of itself. And that's one of the reasons why we see these foods coming out with almost no nutritional value.

Irrigation regimes—you have the same problem. And then, when you get into raising of livestock from poultry to hogs to cattle and you go to the factory farm method of raising livestock, you find these same terrible methods are decreasing the content of what's needed. Let's see if I have it here, the comparison between organically grown, free range hens as compared to battery hens raised in a factory farm environment. Eggs from free range hens have 30% more vitamin E and vitamin B-12, and 50% more folic acid than battery hens from a factory farm. So, the modern methods that our food system has fallen prey to which are basically, I think you could sum it up as do it quick, do it cheap, time is money, and money is all that counts.

The large food processors, the large food corporations, and all of these companies have interlocking directorates, you've probably heard that term in and economics class somewhere—that means where a member of a board of say, Ralston Purina or Cargill might also sit on the board of some company making farm equipment or machinery or maybe on the board of Monsanto chemical or somebody who makes pesticides or herbicides. These interlocking directorates mean there's like a system out there. And the system has one thought in its mind—maximize profit, cut overhead. And if you're dependent on a system that has that as its basic goal, sooner or later they're not going to be able to maximize profit every single quarter. Sooner or later, they're going to have to start cutting corners. They've already started. They started fifty years ago. And our children and our grandchildren, if God help us, we have grandchildren are paying the price. Any questions?

Ha, ha, ha, ha...now that's gloom and doom, eh? But, there is a way to turn it around, a lot of ways to turn it around. I talk about them in my book, in fact, I devote one third of the book to ways of turning this whole system around. One of them, as you already well know is to buy local, patronize your farmer's markets, Toronto here has several farmer's markets, they're really good and in the season you get good food there. If you don't have a farmer's market nearby get together and start what they call a community supported agriculture group. This is where a neighborhood or an apartment building get together and they contract with a farmer to buy their produce for that season. I recently ran into a situation where a university dormitory, all the students in that dormitory building decided they were going to have their own community supported agriculture group and they hired three farmers to supply the students with all their fresh vegetables during the season. So, that's another method.

The other method of course, is to raise a garden of your own. You don't need to have a big back yard. I lived for a while in Regina, Saskatchewan, and I just had a little flower bed. But I ran strings up from the flower bed, up to the upper windows and up to the eaves trough, and I put pole beans there and I put climbing tomatoes and a whole bunch of other things and the whole back of my house was covered in green. And it was a little thing about this wide...and I got almost a whole summer's worth of fresh beans and tomatoes out of that. You can grow your own garden; anybody can grow their own

garden. Start with heritage seeds. Don't buy the commercial stuff from McKenzie. Go and look on the internet and look up heritage seed groups, then you'll get the good stuff. There's lots of ways. And of course, buy organic! That's the whole point of this conference is organic food is always, always, without exception, better than the non-organic product.

There's one last thing I'd like to mention because Wendy Mesley mentioned it and she was talking about the difficulty for university researchers to find money to research this sort of thing. And that sure rang a bell with me, at the time this book hit the best seller list which was around September, my university, the University of Regina, Saskatchewan, cut my salary off entirely, cut my research budget entirely, blocked me from access to the University email list and took this book and removed it from the shelves of the student University book store.

Jon Steinman: And this is Deconstructing Dinner, produced at Kootenay Co-op Radio in Nelson, British Columbia. That was Thomas Pawlick, author of the book *The End of Food, How the Food Industry is Destroying our Food Supply – And What We Can Do About It*. Thomas spoke to an audience at the February 17th Growing Up Organic conference in Toronto. Thomas is currently on leave from his position at the University of Regina, and he is now helping his son get an organic farm up and running near Kingston, Ontario.

soundbite

Again, if you miss any of today's broadcast or would like to find more info on the show, you can visit our web site at cjly.net/deconstructingdinner. And if you have any comments about this program, send us an email to the address deconstructingdinner@cjly.net

In this next segment of today's nutrition-focused broadcast we will hear yet another presentation from the Growing Up Organic Conference, and this will be Ellen Desjardins – a public health nutritionist and registered dietitian with the Region of Waterloo Public Health. Ellen was most recently heard during the March 22 broadcast titled *Is Organic Worth the Price*. But in this presentation she answers whether Organic food is more nutritious than conventionally grown food. As Ellen suggests, the question of whether or not organic food is more nutritious is the wrong question to ask. And here she introduces what are known as phyto-chemicals. For those listening near a computer, Ellen does use a PowerPoint presentation for her lecture, and while it's not essential, the presentation is available on the Deconstructing Dinner web site under the show titled "The End of Food". Her presentation also followed another presentation by Phil Warman, who is adjunct professor at the Nova Scotia Agricultural College and Dalhousie University. Warman is currently researching the nutritional composition of organic vs. conventionally grown crops, and an audio and PowerPoint version of his presentation will also be available on our web site. And again, that web site is cjly.net/deconstructingdinner

Ellen Desjardins: Hello everyone. I feel really honored to be invited to speak to you today. My organic roots go back to the West Coast in the 1970's, need I say more? Those were heady days, in more ways than one. But, that aside, it was a paradigm shift at that point. It was the end of green Jell-O and Wonder Bread and the beginning of thinking differently about food. So, up front I just want to stress that as a public health nutritionist, I am going to be speaking just like Phil did about the nutrient issues around food but I do want you to know that it is the whole issues around food that interest me. I eat organic because of the pesticides that are so much reduced and absent in organic food. However, I am going to focus on nutrients here.

When I started to do this presentation to answer the question that so many people seem to ask all the time: "Are organic foods more nutritious?" And I really think that is the wrong question to ask because of the complexity of the word nutritious. So, I am going to answer the first question fairly quickly and I will be agreeing with Phil Warman on this one. The second question "Does organic production enhance phyto-chemical content of fruit and vegetable?" I am going to spend most of the presentation on that because I think you will find it very interesting what the research says about phyto-chemicals and it is actually quite good news. And, finally I will just wrap up by a little bit of musing about how we can use this information to benefit our health.

So first a little word about essential nutrients. You have all seen the new Canada's food guide that came out a few weeks ago. What this is all about really is about essential nutrients; proteins, carbohydrates, fats, vitamins and minerals and the food guide is there to insure that we get sort of the right proportions of these nutrients in our daily diet. But I'm going to be right up front with what the literature seems to say about essential nutrients in organic and conventional foods. You know, many, many, many studies have been done on this and every once in a while they come and do a meta analysis and so someone like these authors here do a review of maybe thirty or forty different articles and try to summarize what they all say. So the first case you have is article from 2002, very well researched article by the way, that looked at thirty-four different studies and came to the conclusion that with the possible exception of nitrate content that there is no strong evidence that organic and conventional foods differ in the concentration of various essential nutrients.

However, the new food guide also emphasizes plant foods. You may have noticed that the outer arc of the rainbow which used to be grains, is now fruits and vegetables. And the food guide also specifies that we should be eating at least one serving of dark green vegetables and one serving of dark orange vegetables a day. Now what's with the color here? Well, because there is more to food than just essential nutrients as many epidemiological and clinical trials have shown. In fact, whole plant foods contain beneficial phyto-chemicals. They contain complex mixtures of phyto-chemicals which are bio-active compounds that are produced by plants. Diets that are rich in fruits, vegetables, legumes, whole grains and nuts are associated with a lower risk of chronic disease like cancer and heart disease because of these phyto-chemicals. So let's be clear here. Phyto-chemicals are not essential nutrients. The thing to remember is that foods that contain phyto-chemicals have health promoting properties. So, it's the whole foods, not

just the individual phyto-chemicals that are in them. They seem to work together and the health effects might be due to combinations of nutrients and/or phyto-chemicals acting together in synergy.

So having set the stage, what I want to do is focus on phyto-chemicals now. There's thousands of them in plants and hundreds in edible plants and in the next four slides I am going to show you some technical terms related to phyto-chemicals so bear with me. For example, phenols are the phyto-chemical group that is the largest of all. And plants synthesize these phyto-chemicals, these phenols because of their protection that they get from oxidative damage. And then, they seem to have that same kind of activity when we eat them ourselves, in humans.

So, there is a sub-class of phenols called flavinoids. You may have heard of them. And flavinoids are associated with reduced risk of heart disease and also with estrogen related cancers. Here are some examples of flavinoids, and you don't have to remember these words but it is kind of helpful because sometimes if you go to the literature, you are going to see these names and then you can equate them in your mind with the part of the plants that are called phyto-chemicals. For example, anthocyanidins. They are responsible for the red, blue and purple colors that you see in berries and grapes and other brightly colored food. Same with flavonols. They are the ones that are responsible for the colors in many of the green and yellow fruits and vegetables. You've probably heard of isoflavones as well, they are the phyto-chemicals in soybeans and soy foods and legumes that have many health benefits that we are starting to get more research in that area. Carotenoids is another type of phyto-chemicals. They are the yellow, orange and red pigments in plants. We had a question earlier I think from someone who was wondering about the yolks of eggs and in fact, when chickens run around the yard and peck the plants, the egg yolks are darker and that's because of the carotenoids that they get through the plants. Carotenoids of course provide high anti-oxidant activity and when you've heard of words like beta-carotene, lutein, zeaxanthin, lycopenes, those are carotenoids. And the diets that are high in carotenoid rich fruits and vegetables are associated again with reduced risk of cardiovascular disease and some cancers.

You've heard also of the health benefits of cruciferous vegetables like cabbage, bok choy, broccoli, all those yummy things we had for lunch today. They contain glucosinolates which are sulfur containing phyto-chemicals and these are also very active in the body. They can activate liver detoxification enzymes. They can provide protection against carcinogens and mutagens. So they're being studied for their cancer preventive properties and even for the tumor reducing capacity in people who already have cancer.

So how do phyto-chemicals act in the body? Plants produce them for their own purposes but they also have an effect on the human body when we eat them. It's been shown that phyto-chemicals do take part in biochemical reactions in the body. So they influence what happens in our body. Phyto-chemicals bind to and eliminate undesirable compounds in the intestine. Phyto-chemicals can act as anti-oxidants, they can enhance the absorption of essential nutrients, they can aid the growth of beneficial gastrointestinal bacteria, and they can selectively inhibit harmful intestinal bacteria as well. So knowing these health

benefits, how can we maximize the beneficial phyto-chemical content of our diet? And I just have to say as an aside here, that not all phyto-chemicals are beneficial, there are ones that are not such as the tannins in some foods but most of them seem to act together to be beneficial. I'm just going to give two different ways that we can do this, to maximize the phyto-chemicals in our diet.

First of all, we can try to eat minimally processed foods because, for example, when you take the juice out of an orange, you're not getting all those phyto-chemicals that are in the pulp of that orange or of any juice that you're extracting. So juice is still good, I'm not saying juice isn't good but eating whole fruits is one way to maximize the phyto-chemicals in your diet. When you take potatoes and you peel them, and then you throw them in hot oil, you're really reducing the phyto-chemical content big time. Similarly, you know, when they take the whole grains and remove the fiber and the wheat germ, they're not just taking out just fiber, there's a whole host of phyto-chemicals that are gone when you end up with white bread.

This is really where the crux of this matter is for this particular presentation and that is that the method of production does affect the phyto-chemical content of plant foods. It's less visible, except maybe with the different heirloom varieties that are grown by organic farmers as well as the taste, but it's a more subtle difference.

Okay, I'll just go a little bit into a summary of what the research says about why the phyto-chemical content might differ when we're comparing foods by their method of production. As I've said before, plant foods do not differ significantly in amounts of essential nutrients like the vitamins and minerals however, a great deal of recent research, a growing amount of recent research, is showing that a key source of the difference lies in types and levels of phyto-chemicals. I just want to be again clear here, and this is to reinforce again what Phil Warman said, it's not like organic produce has phyto-chemicals and industrially produced produce does not, it's not like there is a fixed amount of phyto-chemicals that you could put in a chart like we do with some nutrients. The levels of phyto-chemicals in a plant vary. They vary by cultivar as we heard from Phil, by species, variety, soil conditions, tillage, they vary by pest infestation, if pesticides and fertilizer are used, they vary by the weather, the light, everything. So you'll see quite a bit of variation.

What actually determines the nutritional values of food plants? The main difference in organic production is that of course, and as you are all very, very aware of is because organic production does not involve pesticides and therefore the plants are encouraged to activate their own defense mechanisms and this is where you get the development of phyto-chemicals in the plants. And it is because of organic agriculture enhancing the soil and the microbes in the soil you get greater exchange of metabolic compounds between the plant and the soil. Obviously, as well, because in conventional agriculture you will have vast amounts of nitrogen, potassium, and phosphorus added to the soil. This will affect the phyto-chemical content of plants as opposed to the more balanced mineral nutrient uptake that you would get with organic agriculture. This is illustrated in this simple chart that you would all be very well aware of, that in conventional farming on

the left hand side pesticide application to a plant then does not encourage that plant to provide self-defense. It's a little bit like if you would be getting antibiotics all the time, it would not encourage your own immune system to produce antibodies. You become sort of a passive body that receives external help. Whereas, with organic farming, it doesn't work always perfectly but because there are no pesticides applied, the plant must protect itself by producing these phyto-chemicals. And of course in the soil, it's the same thing. If the nutrients come from nitrogen, potassium and phosphorus, it affects the plant differently than when the plant nutrients are supplied in organic form.

So given this difference, is there scientific support for increased phyto-chemicals in organic food? Well again, I'm going to give you a summary of the scientific review. There's two recent review articles. This one came out in December of 2006, just a month ago and it's a wonderful review that really looks at the difference in phyto-chemicals in both conventional and organic agriculture. There's also a really excellent study by Zhao that asks "Does organic production enhance phyto-chemical content of fruit and vegetables?" I'll just summarize. For example, the first author Tarozzi looked at red oranges, tested for the following: phenolics, anthocyanins, ascorbic acid, found they were all significantly higher in those organic red oranges. Young looked at bok choy and found it to be higher in phenolics however, when he looked at lettuce and collards there was no difference in phenolics. So you're seeing kind of the same thing as what Phil has been showing us, there's kind of up and down here but overall if you look at what the findings are, for example this 2004 study with tomatoes, they tested for Vitamin C, carotenoids and polyphenols and found they were all higher in organic. When they looked at plums, the organic plums were higher in phenolic acids and higher in anti-oxidants. We're seeing this more and more and more, there's a trend here. The bottom study looking at berries and corn found that both Vitamin C and phenolics were higher in the organic as opposed to the conventionally grown berries. Another study that looked at potatoes and leafy vegetables studied for Vitamin C, found Vitamin C consistently higher in organic potatoes and leafy vegetables. We are seeing that trend.

Wines, red wines seem to be higher in phyto-chemicals than white wines. I'm not going to dwell on these articles now, I just wanted to give you a taste of what the recent research articles were looking at.

So, the bottom line, in answer to the question "Does organic production enhance phyto-chemical content of fruits and vegetables? The Zhao review concludes, and I am quoting here: "The evidence overall seems to be in favor of enhancement of phyto-chemical content in organically grown produce." Now here's an interesting caveat which is there has been little systematic study of the factors that may contribute to this increased phyto-chemical content. This is where we need more studies like the one that Phil Warman is doing, where he is comparing year by year, comparing geographical areas, comparing differences in weather and in climate and kind of wanting to turn this into a real science. It is already a real science but to find out more from scientific study.

So, what does this mean? I suggest that it means that the enhanced phyto-chemical content of organic foods in general may pay off in terms of health benefits when those

foods are incorporated into the whole diet over the long term. So, it doesn't mean that a single organic tomato is going to cure you. And here's some pictures from The Hungry Planet which I absolutely love because I am now studying geography. What counts is the whole diet over time and here you see a family from I believe that was Ecuador whose diet consists almost totally of fruits and vegetables and you can see that they are going to be getting the benefits of phyto-chemicals quite considerably. Here's the weekly diet of a German family and their fruit and vegetable content is considerably less as it might be more typically in Canada here and I might, with my nutritionist hat on, I might say, "You know, if they're not eating as many fruits and vegetables, it's even more important that the fruits and vegetables they do eat are going to provide a little higher level especially in the phyto-chemicals that we know have health benefits." So that's the end of my slide.

I have one little tiny thing I'd like to add as an afterthought which is: I can't help saying this, health benefits come from whole foods, don't expect these phyto-chemicals to be as beneficial if you eat them in a pill. Thank you very much.

Jon Steinman: And this is Deconstructing Dinner produced at Kootenay CO-op Radio in Nelson, British Columbia, I'm Jon Steinman, and that was Ellen Desjardins, a public health nutritionist with the Region of Waterloo Public Health located in Kitchener, Ontario. Ellen spoke to an audience in February 2007 at the Growing Up Organic conference held in Toronto. The conference was hosted by the Canadian Organic Growers, and more info on that organization can be found on their web site at cog.ca. I'd also like to thank Heather Douglas and CKLN in Toronto for representing Deconstructing Dinner at the conference and recording the last two presentations you just heard. And as mentioned earlier, more recordings from the conference will be available on our web site at cjly.net/deconstructingdinner

soundbite

This last segment of today's broadcast titled the End of Food will provide something new here on the program, as we are about to listen to an audio version of a short film created in 1943, and so the quality of the recording is understandably not so great, but the content has a significant connection to the two speakers we just heard today. There was a common thread tying together both lectures by Thomas Pawlick and Ellen Desjardins, and that was that the nutritional value of the Canadian food supply has plummeted in the last 50 or so years. Both of them suggest that the health concerns that affect the Canadian population can be attributed to this. While Thomas Pawlick researched government studies that indicate such a decline, Ellen Desjardins further highlighted some of the science behind this, and she suggested that Canadians should try to avoid processed foods, and that supplements in the form of pills are not the answer to poor nutrition.

So where did our current food system originate. Well what the following 1943 film will suggest, is that our current food system, is a product of World War II, and much of what we eat today, originated from the transportation and production innovations that the war inspired.

In the case of agriculture, the widespread use of chemical pesticides and fertilizers are directly linked to the very same chemicals used in World War I, World War II and subsequent wars such as Vietnam.

Now in the case of food manufacturing, in 1943, the United States Office of War Information produced a short film titled Food for Fighters. It was designed to promote the innovations that provided soldiers overseas with nutritionally adequate food. And what this film will tell you, is that the prevalence of vitamin enrichment, dehydration of meats and other foods and the prevalent use of soybeans were all products of World War II. Even within the film itself, the narrator indicates that the suppliers who created innovations such as packaged ready to eat meals, recognized that following the war, this would become an entirely new industry for the civilian population of the United States.

And here's the audio from the 1943 film, "Food for Fighters"

Soldier 1: I guess I'm in, when do we eat?

Soldier 2: Well, what's your hurry? All you get from now on is beans.

Narrator: Army food is no longer a matter of beans and guesswork. Since the last war, nutrition has become a science. And our Army Quartermaster Corps uses that science in planning Army meals.

Food correctly used means fighting strength for our soldiers and better health for civilians.

Scientists at food plants, at Universities, and at the Quartermaster Corps own subsistence laboratories in Chicago, study food for energy. The food weapons of our enemies are investigated.

The Japanese are supposed to produce great fighting energy out of a handful of rice. This is the amount of rice one of our soldiers would have to eat to approach the energy in his own rations.

The Nazis are supposed to have a "Superman" vitamin pill. The pill story is checked by Dr. Ancel Keys and his staff at the University of Minnesota.

Vitamins and pills do not help pull weight. But vitamins do help the body use food. Only after eating actual food, can a soldier pull more weight or push a bayonet harder. To discover what foods contain the right vitamins for fighting in various parts of the world experiments are conducted in rooms where any climate can be imitated.

Soldier: Holy Smokes, they got us in the Sahara Desert.

Narrator: In this heat, different foods are tried. What's lost in perspiration is measured. The answer to the vitamin question is not pills but good food in plenty of variety according to Dr. Keys.

Dr. Keys: If vitamins were missing from his food, a soldier might have to take concentrated vitamins. If he had vitamins but no food, he would still starve. The best way naturally is to supply vitamins in the food.

Narrator: It is for this reason that the Army uses only vitamin enriched flour in its bread.

Soldier: Smells good, huh?

Soldier 2: If you lose your oven take a couple of barrels, cover them with clay and bake your bread.

Narrator: The Quartermaster Corps believes in supplying our men everywhere with an abundant variety of fresh food of the kind they like cooked the way they like it. In this country the job is comparatively simple. All Army cooks follow a standard menu prepared by nutritionists in Washington. Vegetables and fruits, milk and eggs, are centrally purchased in vast quantities by Army officers and civilian experts. The pick of the country's fresh meat is bought. Nearly a pound a day per soldier.

The job of supply gets more difficult as a million men go overseas. For the Quartermaster Corps faces the problem of shipping space. So meat is deboned, saving 60% in bulk. Still more space is saved through dehydration. A greater variety of food can now be shipped in this form. Only the water in them is removed to be replaced before cooking. Thus one ship can carry the load of ten.

For dehydration, every egg is examined. The yolks are separated from the whites and put through a dryer. Our soldiers on the other side of the world will be provided with breakfast omelets made of this pure yolk powder.

Vegetables such as beets go through a new process which preserves color, taste and vitamin content. While these amazing developments in food processing are now used principally for the Army, millions of civilians will be benefited after the war. For in the future, no household need be without vitamin rich vegetables and fruits at any time. Dehydrated food is easy to keep.

The Quartermaster Corps laboratory has established this in exhaustive tests. Only water need be added. When cooked it is often impossible to detect a difference in taste. And constant tests show practically no difference in vitamin content between the dehydrated and the untreated product.

When a soldier is out in the field and away from camp cooks, he must carry his own rations. Pre-cooked meats for emergency rations were developed in the Army laboratory for this purpose. Here too, emphasis is put on taste as well as on the food value of the

rations which consists of a can of meat for each meal and a second unit containing concentrated soup, hard tack, coffee powder and candy. Total weight three and a half pounds for three square meals a day.

But specialized troops in mobile warfare need a still more compact ration. So the Army has developed the now famous k ration. The completely streamlined meal. Originally designed for paratroops, k proved ideal for tent busters, commandos, and all isolated units. Each package contains a balanced, vitamin rich meal. A day's ration weighs about two pounds. K was developed under Colonel Roland A. Isker.

Colonel Isker: The object of the k ration is to provide the soldier with food under emergencies. This ration with its variations is therefore adapted to all climatic conditions, from the tropics to the frigid tundra.

Narrator: Each item in k had to be super nutritious but also appetizing. So each item was tested by Colonel Isker's guinea pig lunch club. Several recipes for instance were tried in picking a soybean biscuit.

Soldier: This biscuit seems to meet specifications.

Soldier 2: Pretty tasty biscuit.

Soldier: You baked this biscuit on existing equipment?

Soldier 3: With a few adjustments.

Soldier: How much soy is there in these?

Soldier 3: About one part in seven.

Soldier: Its good eating.

Narrator: Thus we find ways to use such highly nourishing staples as the soybean which is easily produced in great plenty. The energies in this and other hitherto inefficiently used foods are unlocked for the world by chemists such as Dr. Julian of Illinois, a famous soy expert. Soy flour strengthens wheat flour, eggs, lard in the k ration breakfast biscuit.

With this and other items in k, we are in the possession of new foods, new methods of preparation, which make mankind independent of distance and climate. These war foods are also bulwarks against famine and catastrophe.

To produce them, we have a new industry. When the Army asked its suppliers to build this package food industry overnight, the didn't know they were getting k ready for Africa. A chewing gum company flung together a package assembly line out of bicycle chain. This company intends to make k a package meal business when peace comes.

Millions of k rations, each containing either a tin of meat or cheese; the soy and other biscuits; a concentrated chocolate bar, fruit bar or dextrose candy; coffee, lemon or soup powder instantly soluble in cold or hot water; cigarettes, and that American nerve tonic, chewing gum. And this amazing package requires no strategic material. Tests, such as the bubble test sometimes uncover imperfections. For k cartons must be air and water tight, gas proof and sea worthy.

With science at its service and the greatest food producing country in the world backing him up, the American soldier, no matter where he may be, in the jungle, in the artic, the desert, or in his home camp can rightly consider himself the best fed soldier in the world.

And in the future, the war born knowledge that has made him so, when spread over the world, can guarantee that no one on earth need suffer from malnutrition or from hunger!

Jon Steinman: And you're tuned in to Deconstructing Dinner and that was the audio from the film titled Food for Fighters, produced in 1943 by the United States Office of War Information. What I considered to be one of the most interesting comments made during that film, is when the narrator informs the viewer that the food production systems created during world war II, were designed to make mankind independent of distance and climate. And herein lies what is perhaps the very foundation of where the end of food first began, because as we now, all too clearly realize, mankind is not independent of distance and climate.

I'll also close in mentioning that the film you just heard, is archived in its visual format as part of the Prelinger Collection found at the web site archive.org. And a link to the film will be made available on the Deconstructing Dinner web site.

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ending theme

That was this week's edition of Deconstructing Dinner, produced and recorded at Nelson, British Columbia's Kootenay Co-op Radio. I've been your host Jon Steinman. I thank my technical assistant Bob Olsen.

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

This radio program is provided free of charge to campus/community radio stations across the country, and relies on support from you the listener.

Should you wish to financially contribute to this program, you can do so through our web site at cjly.net/deconstructingdinner or by dialing 250-352-9600.

Till next week.