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The concept of vitality

Contribution to the Dynamic Nutrition Network

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Today we live in an era, we should all realize that, certainly in the Western world, that reduces everything to its parts. And that works brilliantly for many things. But it has its drawback when we're trying to regard a living system, being a plant, or an animal, or a human being. It's just the sum of the parts. Vitality is precisely what gets lost, when you look at the parts. This reduced view gives answers to a lot of things, about the constituents of our food for example, but it misses this wholeness, this wholeness thinking of what vitality exactly is. But this is the predominant view we have now, when we regard food. And it's so difficult to get out of this view, because this is what we've been trained on, this is just our culture.

And when, certainly from an organic or biodynamic or anthroposophic world perception, we're really trying to look to the living side of nature. And I think a brilliant example of this two-sided, perception we can have on food quality is the following method. It's the self-healing properties of cucumbers, or the slice healing method.

So, cucumbers are sliced into parts, wrapped into kitchen foil, and put away in a heating cabinet at about 22 degrees for roughly 2 weeks. And as you can imagine, after about 2 weeks, when you unwrap the cucumber, it looks decayed.

The one that is discolored and starting to decay really badly was a conventional cucumber. It's just a pilot test, so it's not a validated test the way I did it. It's being done now at the Universities of Basel (CH) and Kassel (Witzenhausen, D) and in Denmark. When I did the same with a biodynamic cucumber, I had the following outcome. Started it the same day, and ended it the same day. And when I took this biodynamic cucumber in my hand. You could see the parts had all grown together. This is a picture of vitality, or from food as a living whole. The biodynamic sliced cucumber parts grew together again (see picture below, the conventional cucumber above, the biodynamic below). Actually, the organic one and the conventional one also grew together, but decay overrules this growing together.

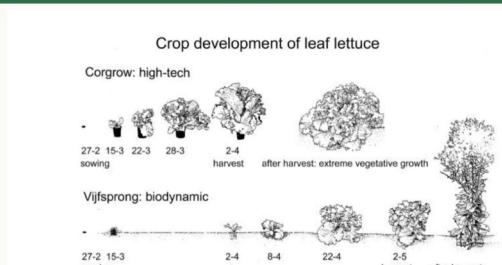
From an analytical point of view, from the reduced thinking, this is just an anomaly. You cannot make sense out of it, because the compounds are more or less the same between the conventional and the biodynamic cucumber.

Self-Healing Properties of Cucumbers



I worked some years in Holland at the Louis Bolk Institute, and there my colleagues, Joke Bloksma and others, did a very interesting research, I think it was back in the 1990s, with lettuce. They followed the development of lettuce, grown under high-tech conditions or biodynamic conditions, was the same lettuce sown on the same day.

Lettuce: Growth vs Differentiation



	High-tech	Biodynamic
	↑ Growth · primary metabolites	Balance · secondary metabolites
CULTIVATION	· Automated, continuous · Mineral feed, 20hr light · 5 weeks to harvest	· Rotation, compost · Natural light · 10 weeks to harvest
CROP	· Loose, immature · Elongated, water-rich leaves · Nitrogen-driven, intense green	· Compact, mature · Rounded, structured leaves · Less nitrogen-driven, light green
QUALITY	· Watery taste · Nitrate: 2837 mg/l (very high) · Low vit. C · wilts fast	· Sweet taste · Nitrate: 687 mg/l (moderate) · Good vit. C · stays crisp

"Young and vulnerable" vs "Full ripe and strong" — Bloksma et al. 2007

And the differences were striking. So, they followed the lettuce until harvest time, and you see the harvest time on the top... the top row, the high-tech, was in about 5 weeks, and it took about double the time for the biodynamic one before it was mature for harvest.

And then they followed the developments. of the lettuce after the harvest time. The high-tech on the left side had a strong growth, primary metabolites, while the biodynamic one was more balanced growth, and showed a lot of secondary metabolites.

So, it took about 5 weeks to harvest the high-tech one, and about 10 weeks to harvest the biodynamic one. The crop, the high-tech, was loose, immature, elongated, water-rich leaves. Nitrogen-driven, intense green because of a lot of high concentration of chlorophyll. While the biodynamic was more compact crop, mature, rounded, structured leaves, less nitrogen-driven, light green. And the quality of the high-tech lettuce had a watery taste, a very high nitrate content, low vitamin C content, and it wilts fast. The biodynamic one in contrary had a sweet taste, a moderate nitrate content, and a good vitamin C level, and it stayed crisp over time. But the most interesting finding was this after-harvest effect. The high-tech crop just kept on growing. it just stayed in the vegetative phase. It did not start to shoot and form flowers and seeds, like a normal plant would do. The biodynamic one started to flower after harvest This was a really interesting finding.

To understand these findings Bloksma and colleagues focused on the two life processes of growth and ripening or differentiation. And there, you have the first relation with vitality. The life process of growth is production of mass expansion, primary metabolites, and basic metabolism. Actually, it's the high-tech lettuce you just saw. The properties of the crop are big mass, high yield. Large, dark green leaves, growth until harvest, this process favours fungal diseases. In our world we are aiming at high yields and big mass, we are counting quantity regardless of the quality. But with this also fungal diseases and weak quality is supported. And that is problematic, as I will show on later on. The properties of the product is firm, juicy, crunchy, high glucose, starch, nitrate, low dry matter.

The second life process is ripening or differentiation. The life process is refining, ordering, ripening of all the organs, forming of secondary metabolites. The formation of generative organs is strengthened, like the flowering and the seed formation like what could be observed in the biodynamic lettuce. The properties of the crop are differentiated refined forms, order, symmetry, the growth is completed. And there are many flower buds and seeds, a high dry matter content and secondary compounds. The researchers also introduced something different, a new aspect, the integration, or the interweaving of growth and differentiation. This has a relation to coherence, and could be regarded as vitality as the second meaning of vitality. The life process is maturing, the primary metabolites are transferred to secondary metabolites, self-regulation, so it's different than only differentiation. It's somewhere in between growth and differentiation.

It's, the crop becomes species-specific, ripe, it has a relatively good resistance to stress and disease, wound healing after damage, as seen in the cucumber experiments. The taste is optimum, nutrient composition is optimal, and in the crystallizations, we find coherence (see below).

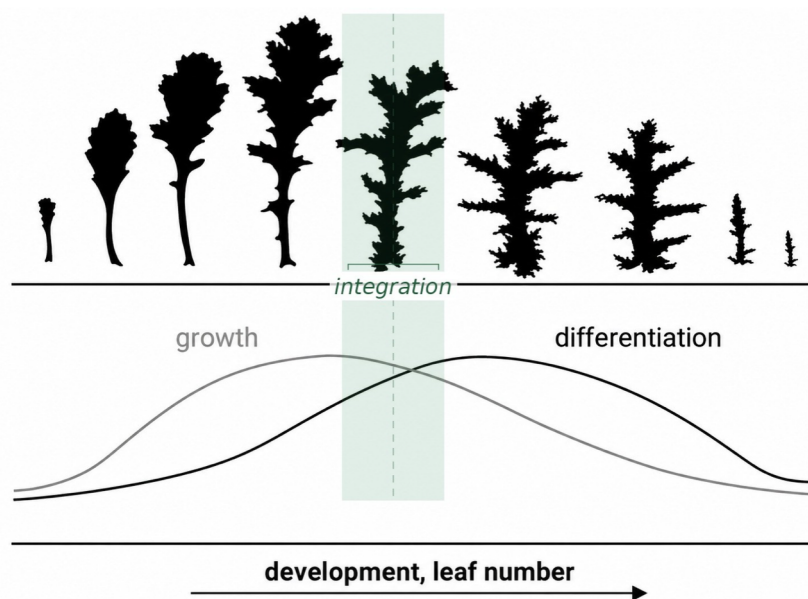
The Inner Quality Concept — Two meanings of 'vitality'

	Life processes	Properties of crop	Properties of product
GROWTH <i>Vitality (meaning 1)</i>	· Production of mass · Expansion · Primary metabolites · Basic metabolism	· Big mass, high yield · Large dark-green leaves · Grows until harvest · Many fungal diseases	· Firm, juicy, crunchy · High glucose/starch/nitrate · Low dry matter, short storable
DIFFERENTIATION	· Refining, ordering · Ripening of all organs · Secondary metabolites · Induction of gen. organs	· Differentiated refined forms · Order, symmetry · Growth completed (final bud) · Many flower buds & seeds	· High dry matter · Phenols, vitamins, aromas · Structure in crystallisation
INTEGRATION <i>Coherence, vitality (meaning 2)</i>	· Maturing · Primary → secondary metabolites · Self-regulation	· Species-specific, ripe · Resistance to stress & disease · Wound healing after damage	· Optimum taste · Optimal nutrient composition · Coherence in crystallisation

Bloksma, Northolt, Huber et al. 2007 — Inner Quality Concept

These are aspects we find in pretty much every crop. So here we have a leaf series (see below). I think most of you are familiar with leaf series. Of a one-year plant you cut off all the leaves, put them in an order from the first appearing leaf to the last appearing leaf, and you see a growth phenomenon. So, first we see an expansion, which relates to the growth phase with little differentiation, and then the differentiation starts and the differentiation curve slowly starts to increase. You see, the leaves become smaller, more differentiated, and finally become completely shrunk. And integration is this interweaving, like I just mentioned, between growth and differentiation.

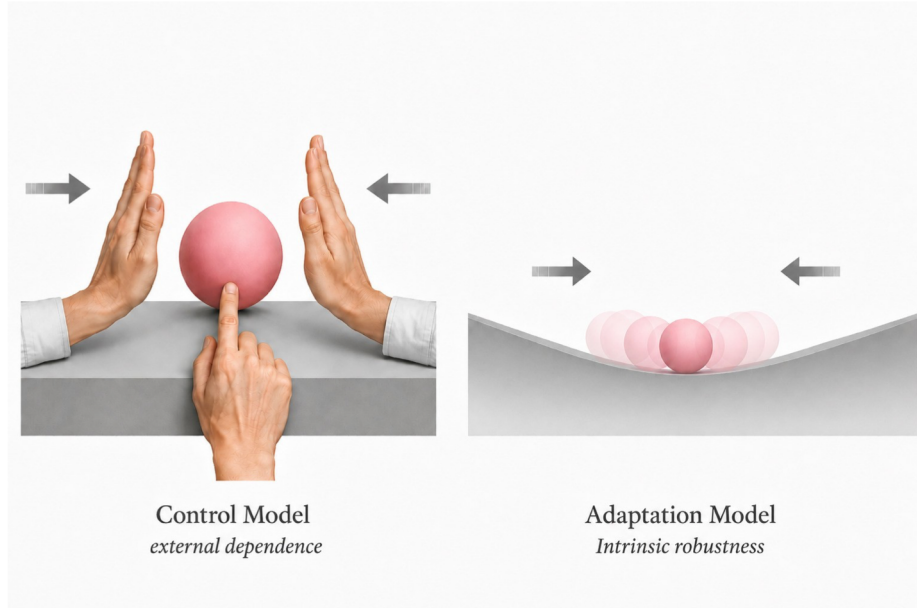
Growth, Differentiation, Integration in Plants



We just saw that optimal quality emerges from this interweaving. And the question is, do our agricultural systems provide the circumstances for this integration, between growth and differentiation, to occur.

I think the best way to look at this is in a system design philosophy. We call it the ball and bowl model which is developed in the Louis Bolk Institute as well.

Control vs Adaptation Model



The surface, which is in the control model (left), a flat surface, or a curved bowl in the adaption model (right), represents the agricultural system. And the ball is the plant or the livestock we're trying to grow. And to understand vitality in living systems, we also have to regard the stability of this living system as a whole. So, on the control side, you have stability, but it's a static stability. The ball, the plant, the organism of the farm is not allowed to move along. This is actually the system we have named conventional agriculture. It has proven its value, high yields, food security, but it is structurally fragile, this system. If you remove the intervention, the hands, in this model, the system fails. The flat surface only holds the ball while the hands are there. It's figuratively speaking, of course.

And in the adaptation model the whole system secures stability of the organism. So, it's not a static stability, like in the control model. It still allows the ball to move, but the whole system is ordered in such a way that stability will be sustained anyway.

The difference between these two models, you could frame it as robustness.

On the left side, robustness appears only within its very narrow limits. Versus the more intrinsic robustness in the adaptation model. And of course, you can understand the control model stands more, but not exclusively, for conventional agriculture, and an adaptation model more, but not exclusively for organic, mainly biodynamic agriculture, where you regard the whole agricultural system, not only the plants and the nutrients in the soil.

To investigate if this model applies to living organisms, my colleagues at the Louis Bolk Institute, Huber et al, did a very interesting chicken experiment.

It was to determine whether organic food resp. biodynamic food was healthier. And it turned out to be a pretty hard challenge. Two generations of chickens were grown. One group was fed only with biodynamic, and the other group was only fed with conventional feed. Surprisingly, or even disappointing was, that both groups were healthy. If organic feed is healthier, couldn't be answered in this way. The conventional feed resulted in a faster growth of the chickens. But the most interesting finding was this intrinsic robustness, when the chickens were given an immune challenge. They were made ill, slightly ill. Both groups lost weight considerably, but the biodynamic fed chickens had a stronger immune response to this immune challenge, and a quicker and better recovery. And I think this is a very interesting finding. It shows that more growth does not necessarily relate to intrinsic robustness. So, it's not just a theoretical distinction between the two models.

Organic feed: does it make a difference?

2 generations of chickens · organic vs conventional feed

- Both groups were healthy
- Conventional feed produced faster growth
- After immune challenge, organic: stronger response & better recovery

More growth ≠ intrinsic robustness

Huber et al. 2010 · British Journal of Nutrition 103(5): 663-676



The next question is if this intrinsic robustness can be transferred to human beings. And in relation to this Ehrenfried Pfeiffer, the father of the crystallization method, had a very interesting talk with Rudolf Steiner back in 1924.

He asked: "How is it that, in spite of your great and numerous instructions, the spiritual impulse, especially the inner work, becomes so little effective in the individual human being, and that those concerned, in spite of their efforts, can show so little manifestation of spiritual experience? Above all, how is it that, in spite of theoretical insight, the will to act, to successfully carry out the spiritual impulses, is so weak?"

And Rudolf Steiner answered:

"This is a nutritional problem. The way nutrition is structured today, it no longer gives people the strength to make the spiritual manifest in the physical. The bridge from thinking to willing and acting can no longer be built. The food no longer contain the forces that they should give to human beings."

This conversation took place just before the agricultural course as the inauguration of biodynamic agriculture worldwide took place.

To test this, researchers performed the „monastery study“ (Huber et al. 2003, Forschungsring). It was just a small-scale study. But it had some very interesting findings, and the main question was, does food quality affect body, soul, and spirit? So, at least the soul and spirit part is what Pfeiffer and Steiner were talking about.

The monastery study had the advantage that the nuns lived together, you can all feed them at the same time, in the same way, you have a very consistent situation.

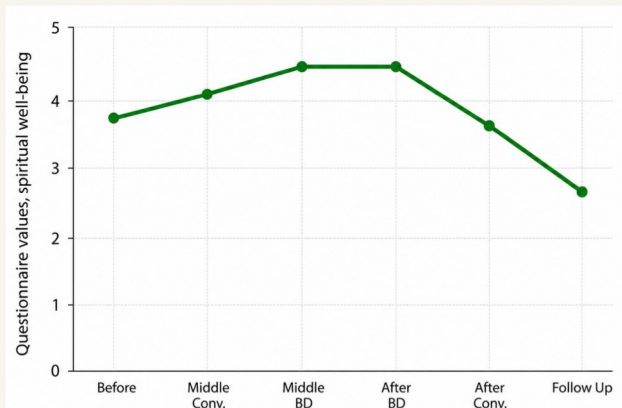
The results were really striking. Different blood and health parameters were analysed. And a questionnaire was filled in about the spiritual well-being. An increase in the spiritual well-being could be observed by the nuns.

Monastery kitchen study — participant responses

“I FELT MORE ALERT,
MUCH BETTER THAN BEFORE.” (Sister A)

“I REALIZED THAT I HAD
HARDLY ANY HEADACHES.” (Sister B)

Follow-up interviews conducted one year after study completion



* Drop at follow-up reflects return to conventional food, loss of attention, and changed taste preferences

In the middle of the biodynamic phase (BD) and after there was the highest value of spiritual well-being. Which went down after conventional and dropped completely, lower than before, during the follow-up. The drop of the biodynamic after follow up probably reflects the return to conventional food, which is pretty sad. I think most of the food they had before the study began, was deep frozen food. And the loss of attention, of course. Life went back to this, and that was a big drawback for them. But the interesting thing is this peak of spiritual well-being during middle BD and after BD, or biodynamic nutrition. And a few quotes, and these follow-up interviews on the left side were conducted one year after study completion, so the memories were still vivid. One of them was I felt more alert, much better than before. Another one was „I realized that I had hardly any headaches.“ And I thought this was really interesting. It's just a first step towards, well, proving, no, showing that, this inner robustness that the agricultural system can deliver from the plants to the plate. So, in the animal, in the chicken we see it, in the plant we see it, but also, to some degree, in the human being. And I think this is really thrilling.

How can we research this?

And for this, and I wouldn't be myself if I didn't want to talk about the crystallization method. I think the crystallization method is one of the outstanding methods. And Ehrenfried Pfeiffer, a student of Rudolf Steiner I just mentioned as the father of this crystallization method. He asked Steiner how he could research the etheric, the living entity of the world of plants, animals, and human beings. And Steiner advised him to perform a crystallization procedure.

And the procedure is like this, we make crystallization plates, so it looks like a Petri dish. And we fill it with a solution of copper chloride, which is a salt, with some kind of organic additive. And here you see the filled petri dishes, and what you notice, it's only a very thin layer of this copper chloride solution. Now, we put this petri dish in a crystallization chamber under standardized conditions, temperature, and relative humidity. The crystals form and give a specific pattern.

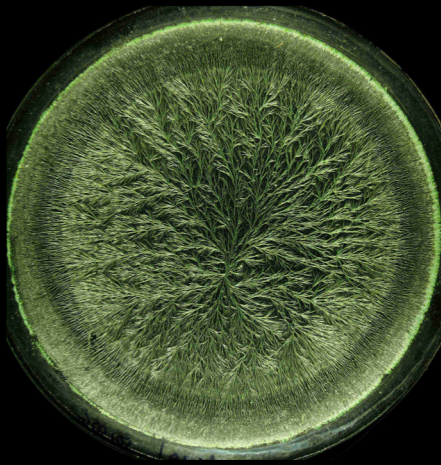
Here we have a crystallization of cucumber juice.



It's a crystal with a clear centre, branches extending from the centre to the periphery. What I think is so exciting about this method, and that's what has kept me going already for 26 years, it's just not building a crystal. The copperchloride forms the crystal. And the way the needles are structured into a meaningful whole due to the additive, like here cucumber juice. So, this cucumber, I think it was a biodynamic cucumber, was able to highly organize the copper chloride crystallization needles. That's why I call it a formative method. I don't know any other method that does anything like this. The methods we usually have are analytical methods. We reduce something, break it down to single components, and we can say something about the vitamin C level. But here we have the inner robustness of the sample.

Here are a couple of examples.

Crystallisation: A Formative Method



Aged carrot juice

diffuse branching · loss of structure · absent focal point

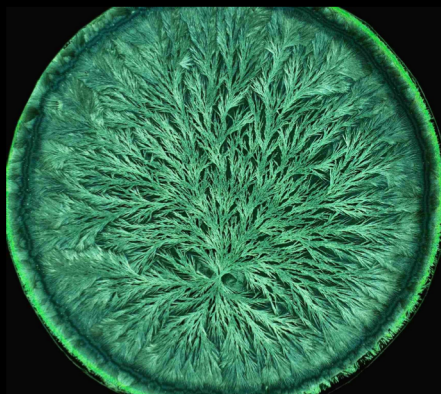


Fresh carrot juice

differentiated · hierarchically structured · clear focal point

On the right side, we have fresh carrot juice, which is able to structure the copper chloride. And when we age this carrot juice in the fridge just for about 4 days, we get the left picture. This is highly reproducible, no problem. And you see that it's a very weakly organized picture on the left side. So, it's very difficult to see the crystallization centre. And when you look at the crystallization centre on the right side, you see these branches extending to the periphery, more or less, but these branches are completely absent on the left side. Also, if you regard the centre as the centre of the crystallization as a conductor and these branches as in an orchestra, you see there's an orchestra playing on the right side. Versus on the left side the orchestra is just making a mess, a chaos. And it's fascinating that degradation in the sample is reflected so stunningly.

Crystallisation: A Formative Method



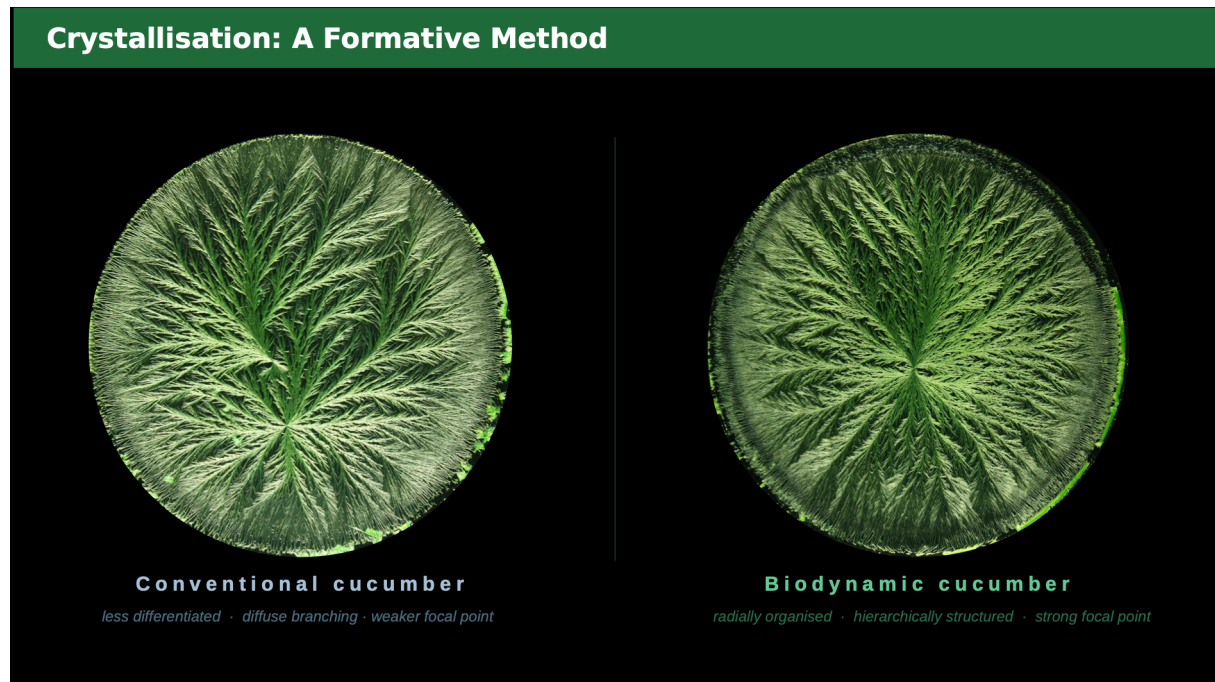
Conventional wheat



Biodynamic wheat

Courtesy Dr. Jürgen Fritz

Here (above) we have biodynamic wheat compared to conventional wheat. Both were cultivated on a standardized trial in Switzerland (DOK trial) and the grains aged a couple of days, courtesy of Jürgen Fritz, my colleague. Again, in the biodynamic wheat you see clear branches forming from the centre, with a lot of tension going towards the periphery, and it almost seems like if the glass plate would have been larger, it would have extended even further. On the contrary, the conventional wheat is just falling apart, the branches do not really reach the periphery. This we call the Flechtwerk. Here in the conventional sample, it is like a ponytail of a woman that just starts falling apart after sleeping on it one or two nights. That's what occurs more on the left side.



The last example is cucumber. Conventional cucumber on the left side, and biodynamic cucumber on the right side. So, you see this powerful tension in the branches on the biodynamic cucumber, reaching to the periphery, one clear centre. And on the left side, it's doing pretty well. It forms branches, you see a second centre, which is not a big problem, but it's also a little bit forming holes, not showing the same intensity on the left side as on the right side. And, of course, I must add, to interpret these pictures, we make reference series of degradation, so allowing samples to break down and see how they are able to shape the copper chloride at the same concentrations as the fresh juice.

I think what I just told you is catching up with what a lot of you already know and experience in daily life. And the question now is, how can we make this distinction? Between the parts and the whole, and what the whole really means, and how can we make this effective in our culture and talk about it. I think this is really the most important question. And like I started off with this cucumber slice healing experiment which was developed to make it absolutely clear what the difference is between vitality or inner robustness, in this cucumber slice healing ability.

So I hope this Dynamic Nutrition Network can contribute to a broader understanding of the whole in the world.

Thank you for your attention.