AUSTRALIAN ALMANAC
Vol.5 No 31

What is the role of viruses?

Excerpt, LaRouche PAC New Paradigm for Mankind Weekly Report, 22 October, 2014

BEN DENISTON: What are the role of viruses as a broad phenomenon in the anti-entropic development of life on Earth, in the context of the galaxy? Which is a very large issue, but that's where mankind is today. Those are the questions posed to mankind today, by our own state, by our own questions.

And so, I know you guys have specific evidence that points in the direction of investigation to really fill in this question. What is the role of viruses then in these larger contexts?

LIONA FAN-CHIANG: I think, viruses really demonstrate a very good pedagogical, for specifically this idea the anti-entropic development of the universe, and also mankind's increasing control over this natural process of increasing the energy flux density of the universe. And, it's good for the context of human knowledge today.

Take a good example. Right now, for most people, viruses are the things that cause disease. And that's pretty much all it is. And you only get viruses when you have the flu, or you have a cold, or you have the Ebola virus, or West Nile virus. But actually, that's not the case at all. Which is then you'll see that they're actually very, very, very prevalent, and more prevalent than anything else. And because of this, you have to ask the question, what their role is in the biosphere and the in the noösphere.

Just to give you a couple of numbers to give you sense of the vastness of viruses and their role, take the oceans. The oceans are 70% of the Earth. 90% of the things that live in it are microorganisms. 20% of that gets killed off every day by viruses.

DENISTON: 20% of 90%...

FAN-CHIANG: And that includes half of all bacteria. So that's the overturn that's being created by viruses every day. Every single day. And the estimate is that in one liter of ocean water, you have 100 billion viruses. Those are really hard numbers to grasp.

DENISTON: Like the number of stars in the whole galaxy.

FAN-CHIANG: It's more than the number of stars.

DENISTON: Well, in one liter.

FAN-CHIANG: Right! That's the number in one liter. So, they outnumber every else 15 to 1. I think the estimate right now is 10^30th, or 10^31st power in number of viruses in total. That's more than the number of stars. To give you a sense of what that means, if you were weigh all of them, if you took all the viruses and collected them and dried them all out and weighed all of them, you'd get 75 blue whales.

DENISTON: There's a lot more blue whales in the ocean.

FAN-CHIANG: These are things that have 10 genes. Some have a lot. Some have more than a thousand genes. But most of these, the ones that we most know of, like cold, flu, these are things that have 10 genes. But yet, by number they weigh a lot. If you were to take them, and line them all up, strand end-to-end, the estimate is that they would reach beyond the first 60 galaxies.

It's almost unfathomable, but you start to get a sense that these are not a couple of things that are here and there. Then the question to ask is, if this is so prevalent in the oceans, which is 70% of the Earth, how is it that we aren't being infected all the time, every day, all the time, with all sorts of viruses? Even on land, there's a famous cave called the Crystal Cave in Chihuahua, in the deserts of Mexico. The Crystal Cave, which has been devoid of life as far as scientists can know...

DENISTON: Was it isolated from the surface?

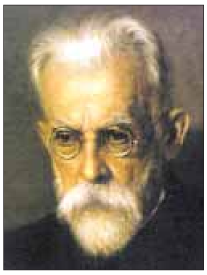
FAN-CHIANG: It was created by a volcano, which just happened to keep the temperature at a certain rate so that it could create these crystal walls, all over, these giant mountains of crystals.

DENISTON: And there wasn't an opening to the surface.

FAN-CHIANG: Isolated for the past several million years as far as they can tell. But yet, so they go in, it seems to be lifeless, as far as they can tell, and yet in each droplet of water that they can find, there are hundred million viruses. So just giving you a sense of it, it's on land. It's underground. It's in the oceans. And it's in us.

So, in the human body, you don't just have viruses when you have a cold. I'll give you a good example, just in your lungs on average, a human on average has 174 species of viruses, in your lungs, alone. Now, most of them, as you feel, aren't doing anything that is harmful, or that is disturbing your health. What if they do something good is another question entirely, and I'm not quite sure. I think most people think that they just aren't doing anything at all—that's a whole other question to ask.

What they do do, though, is for example, there are viruses that specifically kill certain bacteria, and those kill vast numbers of bacteria in your body every day, without you noticing, without disturbing your health and so on. And



Ben Deniston: [Russian biogeochemist Vladimir Vernadsky] stated very clearly, there are two ways to approach these studies in general, which applies to viruses explicitly. He says, if you're studying living organisms, or viruses, or these different parts, components of the biosphere, you have two ways to look at it. You have a biological approach, which you can study the morphology, the structure, the physical appearance, the actions, the activities, the interactions of one particular organism or virus or species. ...

But Vernadsky says, ... that's not my approach ... if you're really going to understand the expression of life on Earth as a whole, you need to include and really subsume that by a second view, which Vernadsky discusses as looking at the organism, or part of the biosphere, not as what it is, but what it does. What is the *role* the organism plays in the biosphere as a whole? ...

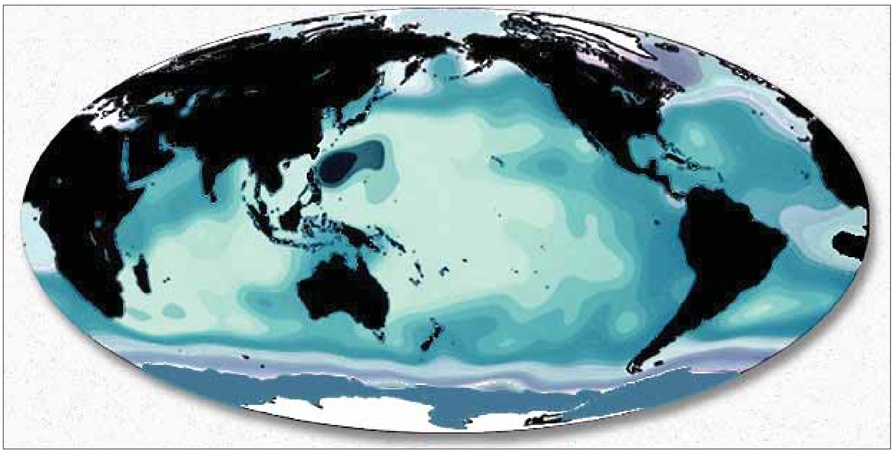
Vernadsky said, this process is governed by what, he calls, his second biogeochemical principle. His **first biogeochemical principle** is that life will always push to the maximum extent possible. It'll fill all potential spaces. It will be as active as it possibly can. It's like this pressure of life that will push as much as it can possibly to push against the abiotic conditions of the biosphere. So, at any given state, life on Earth will manifest itself to the greatest degree possible, that it's able to. ...

But then, he says, his **second biogeochemical principle**, is that over evolutionary time, the rate of activity of life, what we would call the energy flux density of biosphere, of life on Earth, increases. And that's the principle governing evolution. And he says, any species that comes about by evolution, must conform to a higher rate of energy flux density, a higher biogenic migration of atoms, as he discusses or it won't be able to survive in this higher system. That evolution itself, the development of life on Earth, is governed by a principle, a principle, he discusses in terms of directionality and irreversibility. That the system is always going in a certain direction, and you characterise that direction by higher biogenic migration of atoms, higher energy flux density. And that's the principle that governs the development of life on Earth as we understand it.

in fact, they're so integrated, that the viruses, they're basically little pockets of genes; genes are sort of bits of what you would know as DNA or RNA; and when they infect you, they can mix with your DNA, and your cells are the ones that actually produce more of the virus.

BEETS: Right. The virus itself doesn't have any metabolism, or any way of producing more of itself. It's got to find a living cell to go and infect with its genetic material and the get the cell to produce it.

FAN-CHIANG: Yeah, that's the funny thing, too. There's a huge debate, and Vernadsky mentions it, about whether viruses are actually alive or not, because of this. Viruses do nothing. In this Crystal Cave, they do nothing. They don't reproduce, as far as I know, until it is in a human body, or in an organism, which is then reproducing it.



The oceans are 70% of earth, and 90% of what lives in them are microorganisms. 20% of those microorganisms are killed off every day by viruses.

Because of this process though, because of continuous infection and so on, and because you have so many, and viruses can even infect the same cell and sort of mate in some way, and create other forms, mutate and so on, the human genome actually has, contains—8% of the human genome is viral, in origin. So, 8% of you, of every cell in your body, comes from a virus in some point in the past. And to give you a comparison, of all the genes that produce proteins in your body, all of the cells that produce proteins in your body consist of 1.2% of your genes. In other words, there are many more times the amount of genes that come from viruses than the ones that produce all your proteins.

I just want to go through all of that, to give people a sense that what we call viruses are an integral part of the biosphere, or probably what we call the abiotic as well, but they have very, very unique properties.

So let's look at that. As I said, they're incredibly integrated. You have to ask what their role is. Now, viruses mutate, and people know that; there are all sorts of scary movies about how they mutate. Actually, they actually mutate more than anything else, and because they mutate more than anything else, they are more diverse than anything else.

So what does that mean? You have a something, this category of thing, somewhere between life and nonliving, which is mutating all the time, as it infects anything else, which is bringing genes—so these are things that determine how life develops, between different species and animals, between different organisms, mutating again, and so on, and themselves evolving therefore by this process. What is that, how is that determining the evolutionary process of the whole, of the biosphere as a whole, as this process is occurring? One of the things is that, while most genes are transferred by birth, viruses give you a capability to do parallel transference of genes; so within a generation you can get a transference of genes.

So, yes, that does mean you can get transference of viruses that are deadly. But what does it mean for other properties? One property, for example, is photosynthesis. They find viruses with the encoding of photosynthesis. Now which one came first, that's a question to ask as well, but either way, that means that viruses are carrying the gene of photosynthesis, throughout the oceans, for example. And I think there's a famous case of the photosynthetic sea slug.

BEETS: Right: This is the sea slug which is able to ingest this algae and keep the chloroplasts and store them in its back, but unless it had a specific bit of DNA which is got from a virus, the slug, first of all, wouldn't do that, but wouldn't be able to use anything, any of the sugars or anything produced by the chlorophyll. So this really odd unique power of the sea slug comes from a virus.

FAN-CHIANG: Mm-hmm! Yeah! And that's photosynthesis—I mean, whichever one came first, photosynthesis is of course a *huge* part of the biosphere, in determining the properties of the biosphere. So how much of the role of that particular gene, or that virus carrying that gene plays out in the whole biosphere, should be considered. They've been able to trace all of these genes, for example, back to, as far as we know, there's a hypothesis that some strains of viruses go back before microorganisms, basically. I mean there's even hypotheses, for example, of viruses coming from comets, coming from other places outside of places that serve life as we know it.

So, again, I pose this question of what is their role? We know that evolution occurs, and that evolution increases energy-flux density at every state. We already know that occurs. If you took it from that standpoint, then, and play it down, then ask: Okay, but what role {have} viruses played? Instead of going the other way around, which is, okay, if you look at each mutation and say, how does this mutation feed into the biosphere and its evolution? Go the other way around: We know that that evolution occurs; so now ask, what is the role of viruses?

There's also a famous case, I think you might be able to...

BEETS: Yeah, I want to bring that up. There's in what you're saying, the fact that the evolution of the biosphere has been occurring over time in an upward direction, leading to organisms of higher and higher organization and higher energy densities. One famous case is the mammalian placenta. And so, studies were done of the human placenta, and they found that the protein that's responsible for the fact that the human fetus is able to create a special structure which fuses the placenta with the uterine wall, and allows the fetus to feed off of the mother, that protein which creates that structure actually comes from a bit of DNA which was put inside of us by a virus. And then, connected with that, there's also the protein which tells the mother's body not to attack the fetus as a foreign invader, that protein also comes from a bit of DNA which was put inside of us by a virus somewhere back in history.

Now, that's already pretty astounding—

FAN-CHIANG: And pretty important!

BEETS: Yeah. But, the even more astounding thing is that studies were done finding this is true of humans. Other studies were done, finding this is also true of mice; other studies were done, that it was also true of rabbits. Now, the most interesting thing is that the viruses that are responsible for this power in humans, in mice, and in rabbits, are three different viral infections. So you're not talking about something where, way back in mammalian history, one mammal got this infection and then it branched out to rabbit, mice and human species; no, you have three different, parallel infections of viruses, which all gave this same sort of power to mammals in a top-down, coordinated fashion.

And I think that really does raise the question of, again, what do viruses do from this standpoint? And you start to get a picture of them as something almost like a communication mechanism. You know, the biosphere as a whole is developing in a certain direction, and you have in this example, three different viruses which in roughly simultaneous terms, were able to communicate a certain necessary mutation to three different mammalian species.

FAN-CHIANG: Yeah, that completely goes against the idea of just random mutation and what the "survival of the strongest," that these three would evolve in this way, would mutate exactly such that they would create a placenta. Or the ability for babies to feed off a placenta, is that what it is?

BEETS: Yeah.

FAN-CHIANG: That's amazing.

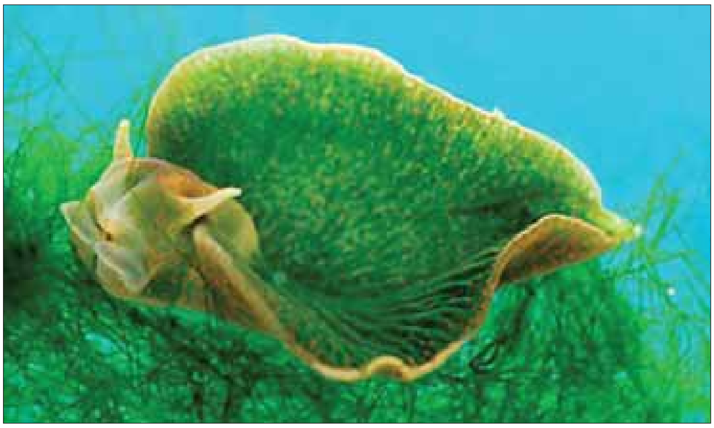
DENISTON: Well, I also think that we pointed to the role, that 20% of all the microscopic life in the ocean is killed by viruses daily. I mean, from Vernadsky's standpoint, that's a massive effect on what he would call the biogeochemical cycles. So that's already a huge impact in determining the whole material-energetic exchange in character in the biosphere. And we have this picture, while a lot of it's not fully known, this idea that they obviously play a critical role in the biosphere, in its current state, in these cycles that sustain life, living organism, living matter in the biosphere; you might be freaking some people out about going back into the oceans with these figures, I mean—some of this has been done more recently with bacteria as well. They did a first census of the human body and figured out how many different types of bacteria are just all over the body: You have particular types of bacteria in your gut, particular types of bacteria on your skin, certain parts of your skin that seem to play an active role as part of the human body.

So certain bacteria we know are bad, and that's what most people think of. We're just now beginning to realize that other forms of bacteria, in fact, lots of them, seem to play a functional role, are necessary, and it's very, very likely and plausible that viruses are similar. There hasn't been a full study of viruses, in the body, or the role of viruses in the living organism, yet. There's been a few, we indicated this thing with the lungs, that we have a significant amount just in your lungs, but these are really open questions, what role do they play as an active party of the whole process?

FAN-CHIANG: Yeah, I think they've done a study of the—they've characterized them all, but now the question is, what role do they play?

DENISTON: Right. And this indication that they actually play an active role in the evolutionary process. So this certain puts, as we opened with, the starting conditions for the larger question, which is, if we're going to understand disease, as mankind, it's kind of like, Prince Philip wants us to be subject to the laws of nature: He says, mankind is animal, if we get too numerous, we should just cull the human species, kill off, like any other animal species. And it's very explicitly this British oligarchical view of mankind that's just a beast, an animal to be treated like an animal.

And if we let that mode of operation, as under Obama run our society, we're going to be subject to the laws of the animal world, which—you know, we kind of have a choice: We can choose to evolve biologically, through viral infections and biological mutations, which I would rather not do, because it takes a long time. You don't get human creativity from that process. Or we can actually be human and evolve noetically and creatively, which means understanding and controlling these processes.



The photosynthetic sea slug, which carries out photosynthesis, is understood to have received the capability from genes bequeathed to it by a virus.

That is not just a question that could be taken up. That's an obligation for mankind right now: If we're going to understand disease, viruses, human health, we actually have to have an understanding of this whole picture, ultimately. What are the principles governing the anti-entropic development of life as a whole on Earth, in connection with the cosmos. What role do viruses play as part of that process, and how do we use that knowledge to better the conditions and improve the biosphere as a whole, to improve the noösphere as a whole, to increase the energy-flux density of the system as a whole?

That's the challenge that mankind faces right now, in order to really tackle disease, because it's not just about killing these things off, 'cause they're everywhere! And they're part of the biosphere. So we have to understand, what are as Vernadsky would look at them, and how do we guide that process and direct that process and those processes towards increasing the energy-flux density of the system, and improving the system as a whole?

FAN-CHIANG: There's already been a few cases of people using viruses for our good. And they are examples of expressions of the noösphere, acting. Or changing the properties and changing the role of, for example, viruses. You know we've been able to manipulate genes and create it with incredible precision. And there's an ongoing study to treat cancer with viruses; and some people may or may not know that, one, a lot of cancers are created by viruses; and like people have seen, maybe 10, 20 years ago, there was a special on the "Tree Man," the man who grew like a tree.

DENISTON: With growths coming out of his skin....

FAN-CHIANG: All over, right. That same virus also causes cervical cancer, which is much, much more common, and I think it's the third killer after lung disease and breast cancer. But you can also use viruses to treat cancer. What they did was incredible, I think: They took a virus, took out its capability to tell the cell to reproduce the virus. But when the virus gets to the cancer cells it has this mission component, so then it starts to reproduce, infects the tumor cells, and disrupts them. But that's high precision...

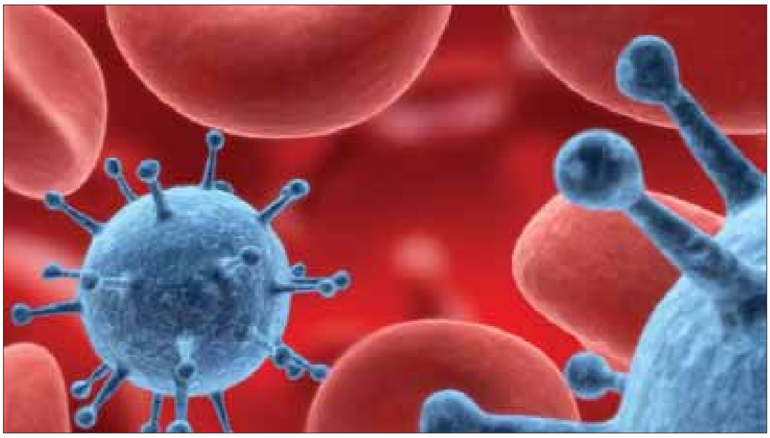
DENISTON: It particularly targets the tumor cells.

FAN-CHIANG: It particularly targets them. It's similar to the bacteriophages, which is a particular targetting. You send in a virus which particularly targets certain bacteria that you want to get right of.

BEETS: And that's increasingly important, because now we are really reaching the point where the antibiotic-resistant bacteria are beginning to become prevalent, and you're facing a point in man's medical capability, where antibiotics just might not be affective at all any more. But then, you have this possibility—okay, well, take viruses, take the capability of viruses that can be tuned to very specific bacteria to fight bacteria that way.

FAN-CHIANG: Yeah, so in the medical field, they've already done some research, but on a galactic scale, that's the question we're posing now.

BEETS: Mm-hmm. All this does really point to this distinction that Mr. LaRouche is making. He's saying, animal systems and human systems are distinct. So we discussed the role of viruses in animal systems; they seem to have been playing a crucial role, somehow, in this mechanism of upshifting the biosphere over time. Then you look at the human system, and you see two cases we're brought up here, so far. One, when the human system begins to degrade back into the direction of a biological system, with the withdrawal of economic capability: We see that in West Africa, we see that when you have the withdrawing of the noösphere, viruses are able to begin killing off large portions of the human population.



Ongoing studies show that viruses can be used to target cancer cells.

But then, on the other hand, you see the activity that's being indicated of the potential of viruses within the noösphere. This could be a completely new technology for mankind to use this so-called communication mechanism, to alter the biosphere in a way in which it would {never} be capable of doing itself! I mean, you imagine, what you're describing we do by actually engineering these viruses, taking these viruses and altering them—understanding what they do inside the body, altering them to do something, and target extremely specific cells and kill them. And that's uniquely human, that's really incredible.

And it really does speak to the fact that, with that capability and with what hopefully will become an increasing understanding of the relationship of viruses to these galactic cycles—I mean, you are opening up an entirely new domain of power, within mankind.

I mean, just quickly, one thing we didn't mention here so far, is that there have been studies done that show that viruses actually do respond to changes in UV radiation. So two things: One, studies have shown that UV radiation can trigger some viruses to go from a dormant state to an active state, from a state where they're just sitting inside of your cells, seeming just doing nothing, to a state where they're actively replicating and killing cells. Then, the other thing is there are studies which have shown relationships between these seasonal pandemics, like influenza, and solar cycles, or different astronomical cycles of the Earth's position with respect to the Sun, where you have an activation and then a shutting off of these seasonal pandemics, seemingly correlating with the Earth's position relative to the people.

FAN-CHIANG: Right, because they don't run out of people.

BEETS: Right, it's not that the flu runs out of people to infect and so it goes away. It's that all of a sudden, it seems to sort of stop in your area for the year.

DENISTON: Yes, it's a whole area of study that just needs a major international scientific crash program, to look at these electromagnetic, field, cosmic radiative properties, and associated properties of living matter and life phenomena. There's probably all kinds of areas that need to be opened up and pursued, to really figure out these larger questions of how does a biosphere operate as a whole, how do living organism operate in the context of the biosphere? And not just the material side of it, but also these cosmic radiation side of it, these radiative effects.

You know, I think what Mr. LaRouche was putting on the table last night, is, this is the creative challenge to mankind. I mean, if we're not constantly coming to these new questions that didn't exist for society before, and making a new effort, with a new creative effort of our scientific layers, to tackle these completely new questions, then we're not acting like mankind, we're not actually being mankind. Any time we stop doing completely new things, things that were not existent in the previous state, then we stop being mankind. And I think that's a challenging concept for a lot of people today, is just the fact, you don't even know, necessarily, what the next few challenges down the line are going to be, but you know they're going to be there, and you know we have to respond in a create way that only mankind has the capability to actualize and wield and apply.

I know Mr. LaRouche continues to come back to this question, as kind of essence of the whole fight that we're facing today, which is the failure of society, especially now mostly in the trans-Atlantic region, to organize itself, and recognize this creative nature of the human species, and to marshal its efforts to understand and develop these creative potentials of society. Not, like Mr. LaRouche was saying last night, not biological, not animal capabilities, but it's uniquely creative capabilities which you {only} find in the human mind, which are the source of our ability to address any of these issues, but it's really what makes mankind, mankind. If we ever stop progressing, and stop moving into these new domains and tackling these completely new challenges, which we might not even realize existed a couple generations ago, then society is not just stagnating, it's heading towards collapse and failures.