The Unified Field Theory: A Biological Perspective

Peter Martinson and Sky Shields, two of the young scientists who are participating in the LaRouche Youth Movement Basement Project, were interviewed on the Oct. 3 edition of The LaRouche Show web radio, aired every Saturday. The program was hosted by Marcia Merry Baker (www.larouchepub.com/radio).

Marcia Merry Baker: Welcome everyone. Our topic today is, "The Unified Field Theory: A Biological Perspective." I'm very glad to have live, here in our studio with me, two guests from the Basement Project of the LaRouche Political Action Committee.

Many of you listening know that it was in July, I think, that Mr. LaRouche commissioned this "brain trust" (we'll call it that) for the LaRouche Political Action Committee called the Basement, to look at powered manned flight, and the advanced conceptualizations that're related to that, either in the past—Albert Einstein, Vernadsky, people in the more distant past—and so, let's begin there, if one of you would give an overview of how you were commissioned, or what's under way, or what's the point of all this, let's start.

Shields: Mr. LaRouche, today, just made the point, that he said: Look, our movement will be organizing and campaigning for this—we usually say, "Mars program," but what we mean is the industrialization of the Moon, the colonization of Mars, and the exploration of the Solar System beyond Mars, involving the searching for resources, the development of new technologies, everything associated with that. He told us, we are to mobilize like this, as though we're fighting World War III, because we are. Because this really is the fight right now for the future of human civilization.

A lot of people right now, are becoming very clear, that what's being pushed by Obama, his administration, and the behavioral economists in the administration, around their attempt at what they claim is health-care reform—that this is a Nazi policy. But the real depth of the criminality of this thing, what makes this thing so fascist, is really only clear, if you have a very clear idea of what the necessary development of the human species is in this time period: where the human species *should* be going, *could* be going, where it's been derailed from. In that context, you can really see, that the policy direction of this current Obama Administration really is the effective death of the human species for a couple of generations yet to come.

And so, LaRouche has been making very clear to people, which direction we're supposed to be moving. So, paint a picture for them in some detail, of what a Mars program is going to be, but that it is an economic process, where economics is the science of human development, and the study of the history of that scientific development of the human species.

So that's been the idea, that's what we've been working to pull together, as he was telling us, yesterday: Just go full-tilt; decide what's necessary, in terms of the increased energy production, increased energy

Peter Martinson (left) and Sky Shields discussed the breakthrough scientific work of the LaRouche "Basement Team," on The LaRouche Show Oct. 3. They are shown here, in an LPAC-TV videograb from the "Basement Roundtable," Sept. 25. It can be viewed at http://larouchepac.com/lpactv?nid=11956.

consumption, all these economic questions that are necessary to keep the human species alive; and then, to make very clear the fact none of this is possible, outside of a real manned Mars program.

Economics: From the Standpoint of Mars

Baker: Do you want to fill that in, concretely? If you look back, if you have a flashback, and look at when, in simple propulsion, scientists were dealing with so many pounds of thrust, or something like that, then in multi-tons, then hundreds of tons, but in order to do just the things you started out by saying, to get to the Moon, industrialize and settle it and then get beyond: Do you want to discuss energy or power in that sense?

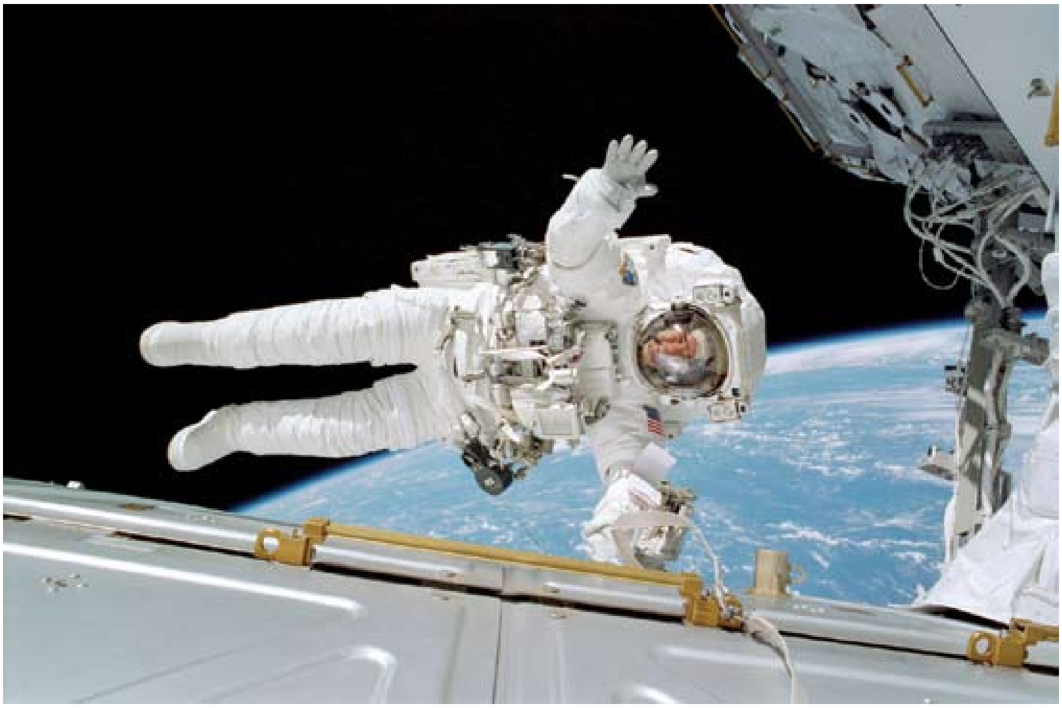
Martinson: Yes. You take, for example, the discussions right now around health care, that the Obama Administration is saying essentially, we are in this crisis period, we don't have enough money, this stimulus—we thought it would work, but it isn't quite working; we don't have enough money for the people, so we need to select people in the population to get rid of—we're spending too much on health care for these people. The debate in that context is totally insane. Mr. LaRouche has said, look at it from the standpoint of this Mars mission, and the economics of it becomes totally clear.

Because, how do you get people to Mars, in a condition where they can land on the surface of Mars, do productive work, and then get back to the Earth, and land on the Earth, and tell people about what they'd done? And inspire other people to go to Mars. Well, you have to get there in a way that the entire trip has to be supporting the biology of the people.

When you go into space, the first thing you're presented with is microgravity, where you're floating, almost weightless, and we see, within two weeks, that the body undergoes degeneration, bone loss; the bones don't replace calcium; you have problems with your muscles shrinking and things like that. You start to mimic degenerative diseases on Earth. Some of the effects, we don't know why they're being caused. Some of them can be mitigated with exercise and things like that. But if people are in space for more than two weeks, then they have to rebuild their muscles and bones when they get back to the planet.

If they go to Mars on a 200-day voyage just to get there, in weightlessness, which is all of the current proposals, we're going to have lumps of jelly reaching Mars, that probably won't even be able to land on the planet, and do productive work, and certainly won't be able to come back here. So, Mr. LaRouche put a spotlight on the biological aspect, and the fact that the only way we can get people to Mars in condition where they can perform work, is if we develop nuclear fusion power, as simply the rocket propulsion for the ships that will be going there, because we have to accelerate the entire time, to create the conditions of artificial gravity. And the only way we can do that, with enough fuel and enough thrust, sustained for several days, is with nuclear fusion power.

Shields: It's not a coincidence that this is the kind of power source we need—if we were talking about some of the goals, like people talk about some of the goals down here on Earth that have to be met, say, the development of Africa as a continent. If you think about the per-capita energy consumption of an individual in a developed country like the United States, somewhere in Europe, for the people who have a decent standard of


NASA/MSFC

The first thing you have do deal with when you go into space is microgravity, where you are almost weightless, as can be seen in this photo of an astronaut who is working on the exterior of the International Space Station, April 2002.

living; and you think about what is required to expand that kind of standard of living into Africa, into Southeast Asia, into Central Europe, Central Asia, the only kind of energy production that's capable of doing that, is nuclear energy: first fission, then fusion.

So you see the kind of spinoff effects we're going to get from a project like this, in a space program are—keeping in mind the kind of spinoff effects we got around Apollo, during the early life of the space program—the spinoff effects you'll get right now, are exactly what we need to solve economic questions, and questions we're not going to solve in any other fashion. We're not going to solve it covering the Mojave Desert, or covering the Sahara, with solar panels.

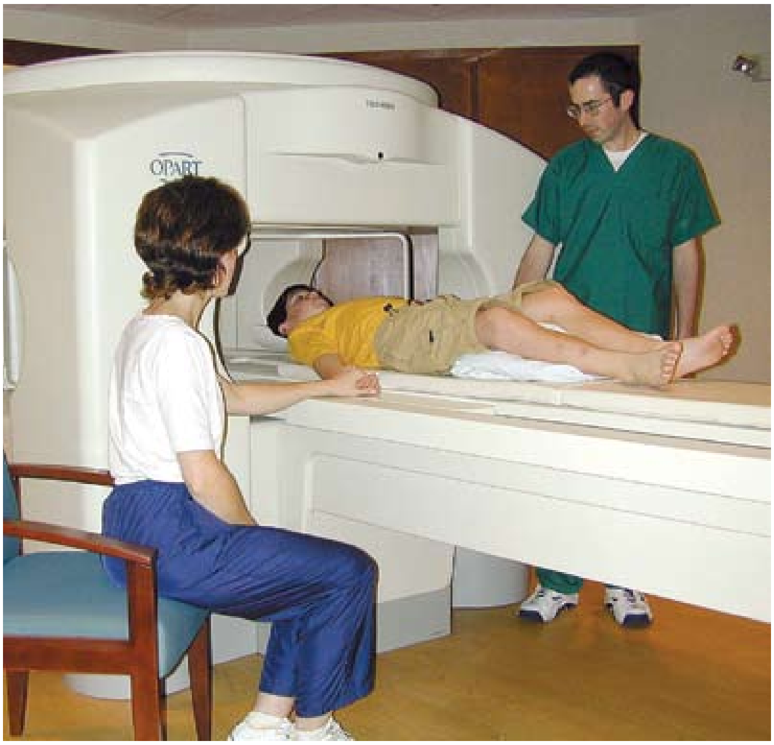
Fusion Power

Baker: Is there any update, or line of inquiry, on fusion energy—despite the dark age that's been prevailing for the last 40 years? Let's say that right out, that we even stopped fission power, and are barely getting back to that—but is there anything to be said about that? Or is it the continued lines of inquiry that were just dropped that have to be continued?

Martinson: Well, it's true that there's some research being done on fusion, but it's not a lot. We have a National Ignition Facility in California, which is going to be running its inertial confinement fusion experiment in the next couple of months. And that will be a big breakthrough, if it works. But that's just one step along the line of getting an actual fusion process that you can sustain for a period of time, upwards of a couple of days, at least. But then, especially to get to the point where you can actually produce power for countries and so forth.

But the mission in the United States, and around the world right now, is not one of a science-driver, which is part of the problem. Mr. LaRouche is always very clear that the core of any economics program is not how much money you're going to spend on this, where are you going to throw your money, how many speculators are you going to support in your economy? But how do you "amp up" scientific discovery, so that more and more of your population is involved in using their minds to discover how the universe functions? And right now, you don't see that in many science programs anywhere around the world! Fusion is just barely hanging on, from what I can tell, now.

Shields: That's the problem with this whole policy, this idea that you can just trickle out science, that it's possible to do these things in baby-steps. You know, you need an Apollo-style project, that's when you get densities of creativity, you get dialogues across areas of study, you get the kind of discussion and ferment that's required to make a fundamental discovery. Otherwise, you get little projects that don't go anywhere, and then



NASA/MSFC

The spinoff benefits from the Apollo space program, such as Magnetic Resonance Imaging, shown here, only hint at what is to come from future space exploration, which will provide exactly what is needed now, to solve the economic crisis.

some asshole bureaucrat decides he's going to cut the funding, because there hasn't been sufficient progress in it. And then you demoralize everybody and you don't get creativity, and you don't get the level of breakthrough that the human species needs in order to survive.

Martinson: This is the key to JFK—John F. Kennedy. Because, when he called for the Apollo program, there were already people talking about missions to Mars. There were discussions in 1960, for sending people to Mars.

Baker: Right, and Wernher von Braun's book, there was a big impact.

Martinson: Mm-hmm, around 1950 he wrote this book, where he proposed a flotilla of ships going to Mars [*The Mars Project* (1953)]. But when John F. Kennedy proposed the project of going to the Moon, his point was, we're not going to go there because we're ready to go there; we're going to go there, because we're *not* ready to go there. He said, we have to go there, because it's very hard—it's not easy, but it's hard. Because we want to drive the population to make the discoveries that they think are impossible. And then from there, is where you get the real economic breakthroughs. And you know, we always use this figure that for every cent spent on the Apollo program, 10 cents were returned; but it's actually much more than that, because you actually had technological breakthroughs that you can't buy at Wal-Mart.

Vernadsky's Physical Space-Time

Baker: And the entire culture front, with all its problems at that time—you mentioned that there was also a series in the 1950s in a popular magazine, I think it was *Colliers*. You had the crazy sci-fi element, of just trying to minimize the excitement of the real science involved, in a cartoon style; but there was also the echelon of youth who looked at this as what would be normal in their future generation. And especially after Sputnik, of course, which was 1957.

With the kind of dark age in recent years, after manned space exploration was discontinued as a priority in the U.S., there are still areas of science, biological science, that you've been looking at, where there are clearly phenomena, things you have to think about, such as you mentioned, the gravitation conditions.

Shields: Yes. See, this is part of the reason, the necessity of getting out into space. I mean, there are lines of investigation that were dropped.

One thing that Peter, myself, and a team working with Rachel Douglas, who's been on the show here, and whom listeners are familiar with—we've been working on translating the works of the Russian/Ukrainian scientist Vladimir Vernadsky, on a number of different subjects. But, in particular, we've been digging up a whole area of his works that hasn't been translated into English—his hypothesis and experimental evidence, for a different state of physical space-time within a living organism.

And he makes it very clear, with several convincing arguments, that the ways both time and space are expressed in a living organism, are fundamentally different than the expression you get outside. And where you'd have to apply ideas that are taken from general relativity, and developed further, in order to even begin to discuss these things. That's been dropped. Biology's now largely reduced to chemistry, organic chemistry, except in cases where they have to stick in a few quantum or other phenomena. But there's this whole area of his work.

And so you say: How do you begin to investigate that? What sort of experiments do you do, to look at the space-time inside of a living organism? It's hard enough to find an experiment that doesn't stop your living organism from being a living organism, right? If you want to investigate the chemistry of a living organism, it's tricky to do it while it stays a living organism. So instead, you fall back on, "We'll just take an organic chemistry approach to it."

But, you look at the problem that Pete was just bringing up, you take a look at muscular atrophy in space, look at the loss of bone density, it's demonstrable. The initial idea was: Well, it makes sense. You're in micro-gravity, you're carrying less weight, you're doing less exercise, therefore your bone density will deteriorate. Because, we know, it had been discovered much earlier that your bone density increased because of load-bearing; obviously, most people are aware that your muscle mass increases with load-bearing. So obviously, people would say: Well, because of decreased load, you'd suffer a loss of bone density, you'd suffer a loss of muscle mass.

Even with rigorous exercise regimes given to astronauts on the space station, or other people who are in other zero-gravity situations, you cannot counteract the effects of zero gravity: There's more causing the loss of bone density, more causing the loss of muscle mass, than simply disuse. There's actually something about *being* in that state of zero gravity itself that causes these medical effects. So the question is: What is it?

Now, anybody who looks at some of Vernadsky's work on these questions of space-time, your first thought is, he's positing that there's a difference in the space-time within a living organism. Now, the only other place that space-time has been addressed that clearly in so experimental a way, is in Einstein's work in General Relativity. And what we saw there, is that, these different expressions of space-time are synonymous with gravitation. The effect of gravitation can at least be described, can be modeled, as a change, a curvature in your reference frame, the reference frame in which you're viewing physical space-time. Which expresses itself as a change in the curvature of space, and a change in the curvature of the rate of progression of time.

And this *is* gravitation, so now, you realize, that now, if certain properties of living matter are only explainable by the internal state of their physical space-time, then, suddenly taking a living organism into a different gravitational field, into a different—as Vernadsky calls it—"a different state of space," that suddenly, doing that, you realize, could have much more of an effect, and much more unusual effects than you would forecast otherwise. And we've seen only the beginning of that, just a glimpse of it, in what we've been able to do so far, because we've done so little real travel outside of Earth-like environment.

NASA

Under conditions of weightlessness in space, the human body begins to experience degeneration, such as bone loss, and to mimic degenerative diseases on Earth. So, to avoid having lumps of jelly reaching Mars, we need to develop nuclear fusion power, for rocket propulsion, to create the conditions of artificial gravity. Here, an astronaut runs on a treadmill on the Space Station, to attempt to minimize the effects of zero-gravity.

If we were to extend that kind of travel, if we were to really face some of these challenges that are involved in not just interplanetary travel, but then the colonization of planets, the mining of the Moon, the mining of Mars, the mining of the Asteroid Belt, the development of these areas, we would make fundamental discoveries in biology: You know, the still unanswered question of "what is life?" But then, fundamental discoveries in: What is space? What is matter? All these things that we sort of take for granted as existing in life, exactly the same way they exist outside of life, not because we've got any evidence that that's the case, but because it's just too difficult for us to do the experimental work otherwise, to find out whether or not it is the case!

Building a Gravitational Field

Baker: On the limited experimental reports that one has, are there interesting things posed by the studies of sending plant life, or other non-human life, that could be followed up?

Shields: Certainly. The obvious thing is that there's a whole class of things. You wouldn't want to do the first experiment with a human being. LaRouche has proposed, he said, look, you want to put together a small ship, stick some organic material on there, stick some other instruments, and you want to put in the conditions under which we plan to put human beings, and see what happens.

LaRouche has stressed that, in order to move human beings from point to point in the Solar System, you want to create an artificial gravity environment, you want something as close to an Earth-like environment as possible. There are proposals to do this using rotating ships, etc. The ideal way to get a gravitational field that's structured the way the Earth's gravitational field is structured, would be simply to have the ship travel on an accelerated pathway, from point A to point B, with an acceleration that roughly matches the force of Earth gravity.

Now, he was making the point, that we assume that we know what the effects of that would be; we really don't know what the effects of that are. I mean, you are sort of getting into a kind of a special relativistic engineering, there. In my mind, you can see the image of, you're building into interplanetary space, you're building a gravitational field, in effect, along the path of your travel. What does that do to the contents of your traveling ship? What does that do to space-time? You really are creating a new set of curved reference frames there.

What are you really doing? We haven't tested that sort of acceleration, we haven't. You're not talking about necessarily high velocities, but you are talking about sculpting space-time. We should do that—that is likely something you might want to try first with a—

Martinson: A dog.

Shields: Yeah, a small dog, some plant life, before you try it with your neighbor. [laughter]

Do Plants Talk to Each Other?

Baker: Speaking of back here on Earth: Are there certain kinds of things that may be open for pursuit, or have been pursued, phenomena that lie outside apparent explanation? For example, 30-some years ago, there were studies, published by the Fusion Energy Foundation, or *21st Century Science & Technology* later, about plants that were simply adjacent, that had no apparent means of communication, but influenced how each of them grew. There was a researcher in Europe, named [Fritz] Popp, who studied this, and there are many others; and there are other effects like this. I presume this is coherent with the general opening up of the questions, relevant for conceptualization for a space program.

Martinson: As I understand, Gurwitsch did several experiments like this, where he was placing plants next to each other, and showing different types of growth, some type of communication between them. And he showed that there was actually some type of radiation being passed between them. And there have been a lot of experiments after that, to show that there are some type of electromagnetic phenomena associated with life, that cause growth, cause different things.

And one phenomenon that was proven a while back, in the 1950s and '60s, is that certain types of viruses are activated and deactivated by specific wavelengths of light. A virus can infect a cell, and it'll lie dormant in a cell for generations of that cell, until it's nailed by some type of ultraviolet light at a specific wavelength; then, it will start reproducing itself.

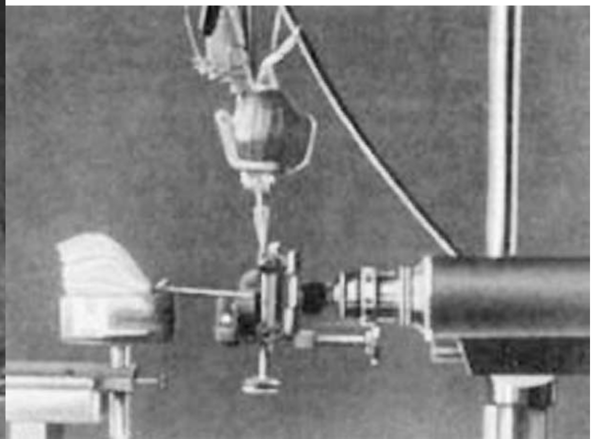
So, it's clear that there is a very close relationship between electromagnetic radiation and life. One of the deeper questions is: Is life responding to some type of higher, unified field? In the same way that there's a very intimate connection between life and gravity, there's an intimate connection between life and electromagnetism which is much less understood. Are we responding, are these living creatures and so forth, responding to some type of higher unified field? Mr. LaRouche has posed that type of question.

Sky probably has more to say on this.

Shields: It's a funny thing, because this is a puzzle that is posed. Again, back to gravitational phenomena, we do have these gravitational phenomena, that are de-

Alexander Gurwitsch (1874-1954)

FIGURE 1
Gurwitsch's Famous Onion Experiment



Source: A.G. Gurwitsch, Das Problem der Zellteilung (The Problem of Cell Division), 1926.

The roots of two onions are positioned perpendicularly so that the tip of one root points to one side of the other root. Gurwitsch found that there was a significant increase in cell divisions on this side, compared to the opposite, "unirradiated" side. The effect disappeared when a thin piece of window glass was placed between the two roots, and reappeared when the ordinary glass (which is opaque for ultraviolet light) was replaced with quartz glass, which is transparent for ultraviolet light.

scribed. The way you see physical space-time expressed, in the face of these gravitational phenomena, is described in Einstein's *General Relativity*.

But now, on some of the causal side of it, you realize: Okay, these are always connected with the existence of matter. The existence of these gravitational fields is something that happens, in the presence, in the immediate environment of matter, of material that has mass. At the same time, all matter produces electromagnetic effects: All matter has charge, all matter is capable of producing electromagnetic radiation, except for the most-likely-mythical "dark matter." But there's one thing, that I think would sort of argue for its nonexistence, is the fact that it doesn't—

Martinson: —interact with anything! [laughs]

Shields: Yeah!

Martinson: Your imaginary friend *only* has a gravitational effect.

The Nature of Matter

Shields: Yes. But all known matter, all matter that's known to exist, has these things—you might want to call three things, but maybe more—Pete had mentioned earlier that Riemann classes amongst these things, heat—but you've got heat, light, electricity, the generation of magnetic field, gravitation, all these things come in a package together with matter. Which tells you that all of those are one, or there's one thing that you're looking at there. Now, the attempt to unify all those into one phenomenon, as theory, has really so far eluded some of the greatest minds, greatest thinkers.

One thing LaRouche has stressed is, that a real unified theory is not just attempting to unify all these things in the abiotic. You're talking about, what else is a property of all matter? One property of all matter is that it's capable, all matter is capable of being incorporated into a living process; it may not be in a living process, but it has the potential to be used in a living process, as part of what Vernadsky called the "biogenic migration of atoms"—that you've got a steady flow of all matter through living processes, sort of in one, and out the other—in such a way that the living organism itself, is not "faithful" to any particular matter. It's an organizing principle that exists outside of the matter of which it's composed. People compared it more to sort of a vortex than a structure; in the same way as a whirlpool of water is composed of water, you say, but it's not composed of any *particular* matter. There's water passing in, water passing out; the structure itself is almost—you want to say "meta-structure."

So, what it means, then, if you want to look for the properties of matter, you're leaving out quite a bit, if you're leaving out the fact that matter, may, and most likely does, have a very unique state within a living organism, that's very distinct from its state outside a living organism, not to mention, what role does cognition play in that? Because ultimately, this is sort of the most sublime role matter can play, is it can take part in our activities; and then again, the more practical consider-

EIRNS

In recent discussions with the Basement Team, LaRouche (shown here, with some of its members), proposed that by achieving constant-accelerated, 1g travel, man will be able, for the first time, to shape his own gravitational field.

ation, that we wouldn't even be talking about it, if we weren't here! Nobody would care it existed if we weren't here, if you didn't have cognition.

So, the question is, you have to look at these questions of life, of cognition, in order to figure out, to even answer, I'd say, even the most basic questions about what matter is. Some of the most basic questions of supposedly abiotic physics, aren't really going to be answered in that domain. They'll be answered in some complex domains. And that we're going to encounter, that we see, from the paths Vernadsky lays open to us—we see it in Aleksander Gurwitsch's work on the metagenic radiation; we actually see it in the research of a number of American and other scientists, especially embryologists, around the turn of this last century. Around the 1920s, 1930s, there was an incredible amount of research work done, very interesting, very non-reductionist, on the electromagnetic properties of living matter, the response of living matter to different types of radiation, and the responses of living matter to changes in gravitational field, to the extent those could be experimented with on Earth.

The other ones are obviously easier: It's easier on Earth to generate radiation, to generate an electromagnetic field. We don't have a means, yet, to switch and sculpt a gravitational field at will, to check its effects on living matter. That's something we're only going to get—we currently only have access to, as part of the space program, as part of interplanetary travel.

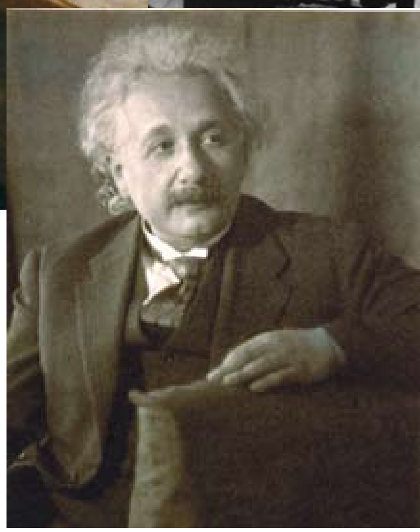
Mr. LaRouche's proposal to have this constant-accelerated, 1g travel, it's going to be the first time we've ever really shaped our own gravitational field. This will be our first experimental project with structuring something like that, that's entirely distinct from Earth's gravitational field.

Left/Right Handedness

Baker: On that level of phenomena, this question comes up about handedness, the right-hand/left-hand, the apparent elements that are exactly the same in certain ways, but they're different depending on whether they're in living matter, or—could you say more about that?

Martinson: So, yes, the handedness comes up. Vernadsky actually does this application of looking at non-life and life, back in the 1920s and '30s, and through the rest of his life, where he was looking at what are the distinctions between life and non-life? And he gets particularly excited when Einstein comes onto the scene with relativity, and especially the concept that space and time are not distinct quantities, but they're intertwined into one principle. And so, Vernadsky picks it apart; he says, Okay, well, we can see in non-living and living, two distinct classes of space. In the non-living, you have various types of symmetries, where you can rotate something around an axis a certain amount, and it'll look the same; like a cube, you can rotate it 90° and it'll look exactly the same. Or, you can rotate it 180°, and it will look exactly the same.

In life, you see something, you see a different expression, where Vernadsky always references this experiment of Louis Pasteur, who worked with various molecules that come up in fermentation of wine and beer, where, when you pass light through this material, before it's acted on by the yeast, nothing happens to the light. But if you pass light through this material after it's been acted on through the fermentation process, the light will actually be rotated: the plane of polarization,



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The great Ukrainian-Russian scientist V.I. Vernadsky (top, right) responded to Albert Einstein's discovery of relativity, by investigating properties of space-time as expressed in living processes; Vernadsky also referenced the work of Louis Pasteur (top, left), who was examining "handedness" in molecules, in the fermentation of wine and beer.

as it's called, will be rotated counter-clockwise a bit.

And Pasteur said, what happened is, the light selected out the left-handed version of molecule that was in the solution; that was as if you're looking at both of your hands; it's a molecule that has the same chemical properties, but can be formed in two mirror images. And Pasteur said, the yeast will select out and use one of those configurations, but the other one it will discard, which it left in the solution. And then Pasteur showed that this is across a whole domain of living processes, a selection of left-handed isomers, they call them; if it has a choice, it will select one of the hands of the isomers. And the isomers have different processes with light. Chemically, they're identical, but in terms of living processes—you have, I think orange and grapefruit, I think are two different isomers.

Shields: I'm not sure—maybe orange and lemon.

Martinson: Maybe orange and lemon. Or, peppermint and spearmint: They taste a bit different, but they're chemically exactly the same.

So, Vernadsky showed that, in life, you have a definite selection of a direction, but in non-life, you don't have a selection of direction. In the abiotic, direction is arbitrary.

Vernadsky looked at, since you have a physical space-time, and time and space are one physical process: Do you have handedness, or something like handedness, in time, also? In chemical processes, non-living processes, you really don't—all the processes are pretty much reversible, like chemical reactions are reversible. But in life, you have one direction, and Vernadsky points at the evolutionary process, that you never have backwards motion in the development of species, you always have forward development. So, in life you have various aspects in time and space, that are different than you find in non-life.

Space Is Not a Box

Baker: Meaning, you can't go back and forth between states, you're going in one direction.

Martinson: In life, yes.

Shields: The point he makes is that, if you scrap this idea that there's such a thing as absolute space or absolute time—most people's idea of space and time, is that, "Space is the box in which things happen, and time is sort of the slot along which those boxes are sequenced"—and he says, well, forget about that, that's an abstraction, it's an imaginary thing. There has never been observed, and will never be observed, some thing called "space," in the absence of matter. What you call "space," is—he gives the example of what he calls "the space of a crystal," in an earlier translation we worked on, called "The States of Physical Space," which was published in *21st Century Science & Technology* magazine—he says, the space of a crystal *is* the crystal. You say, "The space occupied by the crystal." But what that is, *is* the crystal; that is the definition of the space there. And, in general, that's what you have. You do see the beginnings of this as an idea, around general relativity, that there's not some independent thing called "space." That the phenomena which are ongoing, are what space and time are. Your time is, you're looking at types and quality of change.

You make an error—take two processes that are both changing; they're completely independent. Or, one good example, I think, is, take particle motion and wave motion. The motion of a boat along the surface of water is one thing; the motion of a wave in that exact same water, is really something quite different. Nothing actually displaces any significant distance in the direction of the wave, in the case of wave motion. Your motion, of the type that's comparable to the boat's motion, is actually moving at right angles to the boat, but you see this wave propagate in the same direction as the boat.

Now, those two things are *very different phenomena*. You project them, though, onto the same thing, they've both been projected onto your visual field. In your mind, you project them onto this absolute space, and so you treat the two as though they're comparable, but they're not.

And Vernadsky says the same thing, in general, about time: That time within different processes, is distinct. The naturalist, the physical scientist, as he defines it, is someone who treats it entirely experimentally, completely apart from the abstractions of absolute space and absolute time. And if you do that, you start to see all these things, handedness, or chirality, as an expression of the space of a living organism. And he treats that, along with the five-fold symmetries that you find in living organisms, as being the outward expression of the internal state of the space within that organism. These things, in normal space, in abiotic chemistry, are identical: There's no distinction between these two hands, but whatever the space is inside of a living organism, these things can be a world of difference, in some cases between life and death for a living organism. That tells you, that what space is in there is different, and the fact that you see these different qualities of change is how you define time; that's how you say what time is inside of a living organism.

And there are all these very peculiar things, like Pete's mentioning the negentropic development: the fact that life is always sort of moving toward more and more complexity, in the course of its lifetime, over the course of several generations. But then you get strange things, the kind of modular character of it: Like, the fact that you've got the life of an organism, that you've got the development of organisms from generation to generation, is almost this cycle thing—birth to death, birth to death. You've got a structure to the type of change that you've got there. And he says, you can see that structure in the change, as being a projection of the state of time within the organism.

And so, it suddenly gives you a whole class of things, now, experiments you can do on chirality. What is chirality? What could it tell you? What could we do with it? Suddenly, if you've got scientists who are interested, engaged in that, suddenly there's a whole class of things they could investigate that weren't open to them before.

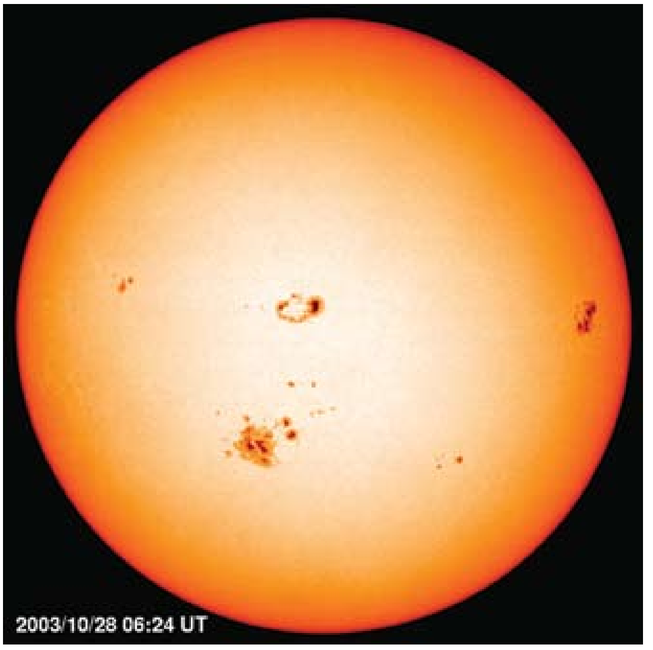
As it stands right now, the only people I could find, who are very interested in this question of chirality, are, not surprisingly, a number of people around the space program—NASA has an astrobiology institute. I think one of the major problems, is they have a real tendency toward reductionism, when dealing with a phenomenon that is so amazingly complex, and non-reductionist. But what's helpful is watching the amount of trouble they run into, trying to account for this—

Internal Clocks

Baker: When they can raise a phenomenon, you mean?

Shields: Yes, and try to figure out, in particular, why this one-handedness inside of life? Why does it matter? In the lab, it doesn't matter. For the chemical character of these things, it doesn't matter. For certain physical properties, it does, in particular, its interaction with light; the one thing we know, they have the two hands of the same molecule.

Again, for our listeners, we're talking about, for these two different-handed states of the same molecule, you're talking about the exact same molecule, exact same chemical composition, exact same behavior under



SOHO (ESA & NASA)

With high Solar activity, cosmic rays are blocked from reaching Earth; but, with the recent low Solar activity, cosmic rays will hit the Earth, producing cloudy Summers, such as this past one; this Winter is set to be very, very cold, a very serious Winter. Left: The Sun today (Oct. 9, 2009), with no Sunspot activity; right: the Sun on Oct. 28, 2003 shows significant sunspot activity.

every possible chemical process you would use to try and determine its identity; but now, completely distinct, in the way they behave in life, and distinct in their interaction with light.

Now, again, you can see this gets right back to what we were discussing before with Gurwitsch and these other ideas, because light is an electromagnetic phenomenon. Suddenly, you see that; you get a vague idea that it requires being subject to more experiment. But you see, again, that suddenly life and electromagnetism have this very close relationship, very important functional relationship, that's not accidental.

One point that's interesting, and maybe Pete will go more into, is you've got a real close connection between the electromagnetic phenomena, and other radiative phenomena, from outside the planet, from the Sun, and from other bodies, and larger-scale processes on Earth, like evolution. Not to mention smaller-scale things, like organisms' "internal clocks." But definitely long-term processes, you've got a real clear correlation there.

Martinson: It's funny, right now, people probably know that we're at this minimum in Solar activity, where we just had two sunspots appear for a month, and then they disappeared. We're at the longest Solar activity minimum for a century—this is the lowest activity we've seen. And it's been shown by certain people, like Svensmark, for example, in Europe, that cosmic rays tend to create cloud phenomena on the Earth, but only when you have less activity in the Sun. So that the Sun, when it's very active, it's actually buffeting out these cosmic rays, which don't come from inside of our Solar System. It looks like they come from somewhere else in the galaxy. When you have high Solar activity, cosmic rays don't have an easy time getting to the Earth. But when you have low Solar activity, cosmic rays will hit the Earth, and, you'll have things like very cloudy Summers; if you remember, this whole Summer's been very cloudy, and this Winter is set to be very, very cold, a very serious Winter.

Svensmark correlates low Solar activity with the onset of ice ages. And if you look, there has been some work, correlating beginnings of ice ages, ends of ice ages, beginning of glacial cycles, and things like that, with explosions of evolutionary development of creatures on the planet, like mass extinctions, for example. Now, a lot of these guys try to explain mass extinctions by—you know, "These animals get super cold because it's an ice age, we've really got to watch out for the changing climate, because we're going to freeze to death."

Baker: Plant growth changes—

Martinson: Plant growth changes. But what you see, is actually, the timings are not quite correlated. But what it does bring to question is: Do you have evolutionary changes in life correlated to changes of cosmic rays, or other types of radiation hitting the Earth? Because we were just discussing, Sky and I, for the last couple of days, the fact that the human genome has been decoded—we know what the whole human genome is—and they found whole swaths of the human genome are made up of virus DNA. So, whole sections are actually coded viruses, that are just lying dormant in our own DNA.

Now we know that viruses are activated and deactivated, and so forth, with radiation, so it's a potential that, since viruses can transfer DNA from one species to another—and we've seen this in bacteria—viruses give you new DNA.

It's a potential that evolution is correlated in some way between radiation coming from outside of our [Solar System], from the galaxy, and viruses transmitting DNA material: Maybe there's some kind of interaction.

Shields: The point you made once, that made a good impact on me, was the high selectivity of these mass extinction events. You mentioned frogs, like the frogs survived some of these!

Martinson: Supposedly the dinosaurs were wiped out by an asteroid that hit the Earth and covered the Sun and all this. But some of the wimpiest creatures survived the asteroid hit—like frogs: You know, frogs are very sensitive to what happens in their environment. If you have the Sun blotted out, and it's wreaking havoc on these giant creatures, frogs are going to get wiped out, too; but they weren't.

Shields: So, it seems there's some kind of process that's got this high selectivity, that's able to very carefully, eliminate certain species, certain whole families. But then, very carefully, come up with these, frankly, very, very intricate evolutionary changes, and creating these very intricate types of interrelations.

It's funny hearing people trying to explain some of these things, by just, like what they call the "selective pressures": They're tripping to try and explain these things by just an animal adapting to its environment.

A 'Chicken-and-Egg' Problem

Baker: Environmental stress, or something.

Shields: Yes, exactly. But then, you realize, in almost all of these cases, you get a much more authentic chicken-and-egg problem, than even the chicken and the egg, where you say, "Which one of these animals evolved first? And how did it survive for the millions of years it took the other one to evolve?"

Martinson: Like certain birds, that are just exactly designed for the flower they go to, or the bug that's perfectly designed for the flower.

EIRNS/Bonnie James

Certain birds, or insects, like this butterfly, are exactly designed for the flowers they light on: The bug won't survive without eating the food of the plant, and the plant won't survive without the bug aiding in its reproduction.

Shields: Mm-hmm! Where the bug won't survive without eating the food being produced, and the plant won't survive without the bug aiding in its reproduction. So you realize that there's something here, that's much more—and this gets into the whole endless, mindless creationism versus mindless evolution debate. Where both sides of the thing are mindless. Really, you've got a much more intricate, dynamic process there, that's going to require introduction of whole new scientific concepts to be able to describe and discuss, to see what evolution is, to understand the level of detail and complexity that's involved in it.

Martinson: You know, we were discussing a while back, the issue of when embryology—people have been looking at embryos for a long time, but at a certain point, it became experimental embryology, where you can change the embryo, you can pluck pieces off the embryo, take part of another embryo, and put it on another one to see what happens.

When we go into things like space flight, like when we start traveling to other planets, the question is going to come up: Well, can we take another planet like Mars and transform it into an Earth-like habitat? Can we terraform it? And I think that's the point where we're going to be running into questions of experimental evolution: What types of problems are we going to run into, when we're trying to generate a Biosphere, on another planet? Like, for example, when we leave the Earth, we're going to be leaving our magnetic field—the Earth has a pretty hefty magnetic field. Mars doesn't have a magnetic field—it used to have one, but it doesn't any more. So, are we going to run into problems, are we going to have to create certain type of electromagnetic environments, for creatures?

Shields: That's a real question. Most discussions of terraforming now, operate on the basis of what I like to call the "mold hypothesis": that life is just this mold that grew on Earth, the rock, as it hurtled through interplanetary space. And that's the description, "Oh, life is so hearty, it figures out how to survive in these harsh, harsh environments!" Which is, really like a "mold"—it grew there and somehow it survived, despite the fact that there's intense radiation; somehow it grew, despite the fact that there's incredible temperatures by these geothermal vents. And if you start from the standpoint that, maybe life was developed there, *by* those conditions, that there's something about the electromagnetic state of our Solar System, of our Sun; you look at how much effort has gone into this interaction between our Sun, radiation from outside the Solar System—I mean, it's very complex, if you look at this: The Sun acts, not just as a simple moderator, to stop radiation from coming to the Earth, or to let it through. Much of the radiation that hits the Earth that comes from outside the Solar System, is accelerated *into* the Earth by the Sun's electromagnetic field; the Sun directs it *at* the Earth. The Sun is playing a *very* active sculpting role—

Terraforming Mars

Martinson: Perhaps even a creative role.

Shields: Yes, exactly! Exactly.

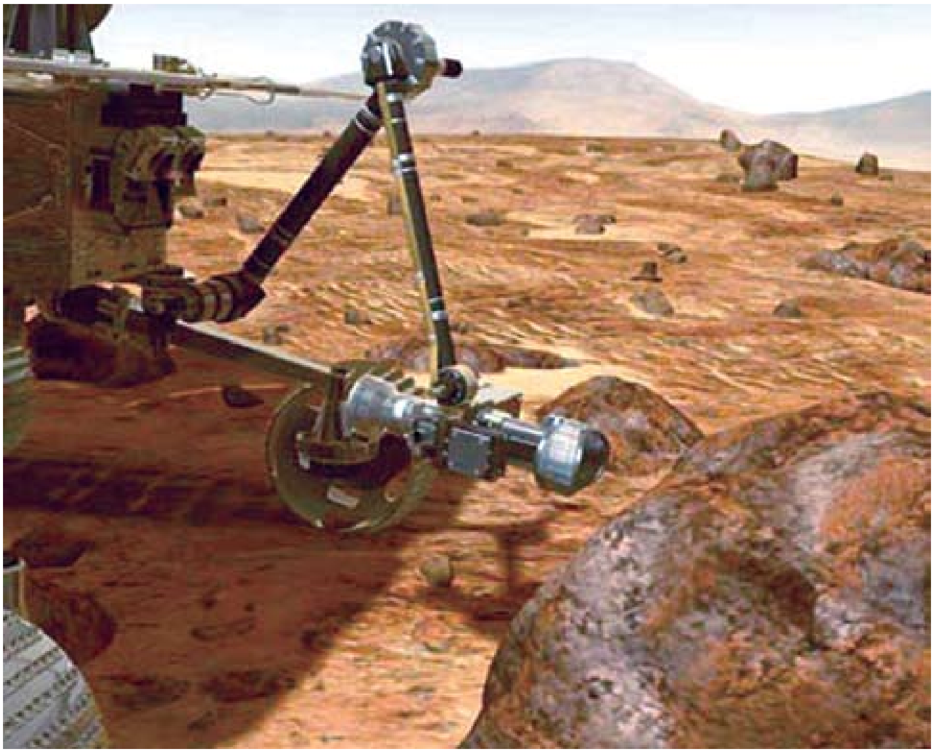
So, if that's the case, then, what do we need to recreate, if we want to recreate life on some planet like Mars. When you start talking about terraforming—really, honestly talking about it—you're discussing more than just dropping some anaerobic bacteria onto the surface of Mars or something. There's a lot that goes into that, and if we can answer some of those questions, we'll figure out some fundamental questions about life on Earth—fundamental, practical ones! I mean, if you can figure out the possible role that viruses will play in evolution, the possible role that they play in their response to larger-scale phenomena—I mean, you get all these seasonal viruses and other things, that seem to be very clearly correlated to astronomical and other phenomena—if you can figure out what governs their electromagnetic behavior, you could a) stop them from killing us, in the cases that they do; but b) maybe figure out a way to use them as something much more beneficial than they have been up until now.

But all this stuff sort of points at the necessary of having a real frontier approach to physical science and economics. If you don't have that, if you don't have this sort of long-term view that LaRouche is calling for, of a Mars project, but really, a Solar System-and-beyond colonization project—if that's not your view, I can guarantee you, not only will many of these questions never be answered, but they're going to kill us, and they're going to kill us in the short term. The human species' nature, is exploration and expansion, with the expansion of what Vernadsky called "the Noösphere." He had these two concepts of the Biosphere and the Noösphere, and their nature is to expand and to develop. And right now, we're up to the plate: It's our responsibility to figure out how to move the human species, with us, the Biosphere, off of Earth, into the rest of interplanetary space, colonize the Solar System, and if we don't do that, we're going to die—we'll have proven ourselves unfit for survival.

Martinson: I'll say, just on that, Mr. LaRouche has produced several papers, recently, a trilogy, where he's highlighted this concept of the Type B personality over the Type A personality, where the Type A is the regular person in the population—

Baker: "I know what I see"—

Martinson: "I know what I see." You know—"I like Obama," or "I don't like Obama." "I don't like Obama's wife." Right? Just very sense-oriented. Versus the Type B personality, who is creative, who believes that there are principles in the universe, which are reflected to your senses, but which are not directly—you're not actually seeing the principles, you're seeing


NASA/JPL-Caltech

Can we take another planet, like Mars, and transform it into an Earth-like habitat? Can we terraform it? What types of problems are we going to run into, when we're trying to generate a Biosphere, on another planet? This artist's conception of the Mars Rover, shows a robotic arm with an abrasion tool to grind away the rock's surface, allowing scientific instruments to analyze the rock's interior.

the results—they're the creative, scientific thinkers.

Now, some people have said, "Mr. LaRouche, you keep saying we're in the greatest economic crisis in history, we're about to go into an international holocaust, where we could lose most of the world's language-cultures—we could lose French, for example—why are you concentrating on Type A versus Type B people? Why aren't you just talking about economic policies the whole time?"

Well, the point is, Mr. LaRouche's concept of economics really does—it's physical. The idea that man survives on his creativity, and on his ability to make scientific discoveries, is a physical concept, which is what we've been getting at this whole time: that human survival right now, does depend on the types of scientific expansion and development, that something like a real space exploration program entails.

Shields: If people want to see what the reality of the thing is, when you cut that off, then, what're you stuck with? You're stuck with the discussion that we began the show with, which is, "Well, we're not going to expand, we're not looking for new resources, there's no scientific development, therefore, we don't have enough to go around—so, who do we kill?"

Baker: Yes, "Let's accommodate to this insanity, that the Earth's resources are fixed, space is fixed, time is fixed, Newton said so." If you want to be academic, right?

Shields: Yeah, right! So, now let's kill grandma, right, that's *Newsweek*'s argument for it. And it's a lack of vision. And, it *is* fascist, and that's the core of it! This is what you're really talking about when you're talking about a fascist policy. I mean, it *really is* a policy that redirects mankind from that destiny, that says, "We're going to stop this creative development of the human species and we're going to try and figure out how to sustain, we're going to push for sustainable development." This is why the green ideology, the environmentalist ideology, is inherently fascist. There's no way it can express itself that's not fascist, because its existence is in order to prevent this sort of development, prevent the actual progress and expansion of the human species. Its stated mission is that.

Martinson: Green jobs are for dead people, actually.

Baker: That's right. And you know them, by who supports them—that's not the topic today, but we'll keep that in mind!

And just to underscore again, Pete just mentioned the trilogy of papers Lyn has written on the science of the physical economy. And he's working on another one, which I'll just alert people to, in order to subscribe to EIR Online, give heavily to LaRouche Political Action Committee, and watch for "The LaRouche Plan: Rescuing the World's Economy," which is underway [see this week's *Feature*].

And this is definitely just the beginning, and I thank Sky Shields and Peter Martinson, and ask you to listen to The LaRouche Show weekly.