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# Basement Roundtable: The K-T Extinction

*A LaRouchePAC Basement Team group made up of Creighton Jones, Peter Martinson, Benjamin Deniston, and Sky Shields, held a roundtable discussion Aug. 19, on the increase in anti-entropy in the universe. They looked at the Cretaceous-Tertiary (K-T) Extinction about 65.5 million years ago, as a case study in the development of our planet. The video is at http://www.larouchepac.com/node/19129.*

**Creighton Jones:** Today, we are going to be discussing the simple matter of the fate or future of mankind. Sixty-five million years ago, the Earth witnessed the most recent of what is known as a mass-extinction event, or a mass kill. The victims then were the dinosaurs, which, up to that point, were the most dominant creatures that ever walked the Earth. The timing of that extinction coincides with a particular phase of what we have discussed as a 62-million-year cycle, as measured in marine biodiversity.

In other words, every 62 million years, it can be measured that the diversity of life goes through a rise and a fall, and that we know of, they have all coincided at a particular point in that 62-million-year cycle.

Now, not every 62-million-year cycle is punctuated by a mass-extinction, but of the five that were, there is a definite correlation between the timing in the cycle and the mass-extinction period.

A lot has been said about what could be the mechanism driving these mass-kills. And, there is a lot of debate about what that might be. The one thing we do know is this: that given the mass scale that we are looking at—62 million years, give or take a few million—it has to be something on the galactic scale; that only at that magnitude would you be capable of hypothesizing some process which would project itself on the level of 62 million years.

What we can also say for sure, is the thing that mediates this extinction process is what we have discussed as cosmic radiation. So, you've got a galactic process, mediated through cosmic radiation, which is driving a 62-million-year cycle of a rise and fall of biodiversity, punctuated at specific points by these mass-extinction events.

We currently are at that phase-point, which coincides with those other mass extinctions. In other words, right now, we are potentially facing another mass-extinction-type event on this planet. The question we have to look at today, is: Is this inevitable? Is our species the next one to go down? And, what can we do about it? How do we address this problem?

What we're going to do today, is to hone in specifically on the recent mass-extinction event, what is known as the K-T Extinction.

And so now, I would like to turn it over to Peter Martinson to discuss, in a bit more detail, what this K-T period was, and what we can draw from it as potential insight into how we must now act today.

## The Cretaceous-Tertiary Extinction

**Martinson:**. All right. First, if we look at just the sedimentary record of the rocks, which is the abiotic record of this, what you see is that, at the point that we're calling the K-T Extinction, there is a rapid change in the types of rock that you get at that point.

The boundary itself is called the red layer, which is like 2 mm—you see this all over the world, in cores all over the world—there's a little 2-mm-thick layer, which is red, and it's very rich in iridium, which is an element that is very rare on the Earth. But this layer is very, very rich in it. There is an increase of the amount of iridium leading up to it, but that layer itself is really rich in iridium.

Above it, is a 50-mm-thick layer of dark organic clay material. Underneath it, is a very rapidly changing series of layers which include calcium-rich layers of rock interspersed with thin layers of what are called microbreccia and mircospherule layers, which appear to be remnants of between one and four meteorite impacts, leading up to this period, going back at least 300,000 years before the actual iridium layer itself. There are actually no microbreccia or microspherules at that iridium layer. It's all beforehand.

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*The narrow band of iridium forms the boundary between the Cretaceous and Tertiary periods. This rock is from Wyoming, at the San Diego Natural History Museum.*

Now, there are various ways that we can measure what the temperature change was at this time. What we find is that leading up to this layer, there is a decline in temperature: It's getting colder, and colder, and colder leading up to that layer of iridium. But about 2 or 300,000 years before the layer, the temperature spikes, about 3 or 4° Celsius, and then collapses again. And then you go through the iridium layer.

Now, that's what the sediments show.

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*Creighton Jones: "You've got a galactic process, mediated through cosmic radiation, which is driving a 62-million-year cycle of a rise and fall of biodiversity, punctuated at specific points by these mass-extinction events."*

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*Peter Martinson: "The fossil record shows that there is a rapid transition at [the K-T boundary] but then, the sediment shows that there is a change in the geochemical activity, which points at some type of a cosmic change, like a change in the activity of the Sun. . . ."*

**Jones:** That iridium layer: that's what demarcates this K-T boundary point?

**Martinson:** That's the internationally accepted marker of the boundary.

Now the way the whole event was actually discovered was not by looking at the rock. It was discovered by accumulating fossils from all over the planet. And what became clear is that below this iridium layer, the types of fossil organisms that you find are of a completely different composition than the types that you find above this layer.

Leading up to—before you had the dinosaurs, all the giant reptiles, the marine reptiles, like the plesiosaurs, ichthyosaurs, etc., we had the pterosaurs—these giant bat-like things—some of the largest organisms ever were these flying creatures. You also had more-or-less large-shelled cephalopods, like the chambered nautilus, which is the only living remnant of these things.

You also had very tiny organisms, like planktonic foraminifera, and other types of microorganisms that we don't actually have today. We have different types of these organisms today. You also have a different type of flora, different types of plants, predominantly gymnosperms.

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*The Deccan Traps, large igneous formations east of Mumbai, India, formed about 65 million years ago, at the end of the Cretaceous period.*

Now, above this iridium layer, you have no evidence at all of any of these giant reptiles. The dinosaurs are gone; the giant marine reptiles are gone; the terrosaurs, gone; the cephalopods, gone; the planktonic foraminifera apparently suffered the worst extinction; microorganisms—we lost something like 98-99% of these organisms at this point.

Above the layer, after a period of resurgence, it's a completely new environment: We have mammals, which exploded to large sizes, but also large diversity. Angiosperms, which were coming into existence earlier, blossom. Insects blossom.

So, we have, essentially, two things: The fossil record shows that there is a rapid transition at this point, but then, the sediment shows that there is a change in the geochemical activity, which points at some type of a cosmic change, like a change in the activity of the Sun, or a change in the composition of the so-called inner-planetary medium.

**Jones:** So, you don't buy the idea that it was a simple, random meteor strike.

**Martinson:** There's no evidence that there was a meteor that struck the Earth at exactly the K-T; but there *is* evidence that there were an increasing number of impacts around the world leading up to it, including an increase, and then a spike in the iridium, which is extraterrestrial.

**Jones:** There's a lot of evidence volcanic activity also around that period. . .

**Martinson:** Right at about the 65-million-year point, you had the explosion of the Deccan Traps, large igneous provinces, tons of vulcanism right around the west coast of modern-day India, which looks like it lasted for at least several hundred thousand years, and pumped out hundreds of thousands of square kilometers of lava under the surface of the Earth, with the associated chemicals pumped into the atmosphere—sulphur and things like that.

**Jones:** That's something that we've discussed elsewhere, that there's accumulating evidence that volcanic activity itself can actually be driven by increases in cosmic radiation penetration into the Earth. So you have a lot of different types of evidence that sort of correlate this period to some change in the cosmic environment, increases in cosmic radiation, perhaps changes in the magnetic environment. It does seem clear that this was something which is galactic in scale, something which is a function of cosmic processes, and not just some sort of random impact from the gods, or something like that.

**Martinson:** Yes, asteroid impacts do not just cause the radiation of mammals.

## The Biosphere: Rapid Change

**Jones:** Ben, maybe you can get into this also. It was a pretty selective extinction process, right? If it were just a simple mass strike, then you would expect that anything that was alive would be wiped out within some radius of the impact, but it was pretty selective. You can take that up, and discuss also some of the difference in the qualitative and characteristic differences of the Biosphere, before, and then after, this K-T period.

**Ben Deniston:** That's actually come with a lot of the mass-extinctions: It's very selective. You have certain organisms that are completely wiped out—even some that are very similar in what they eat, how they interact with the Biosphere; and some seemingly won't even be touched by these mass extinctions.

But, you put it all together—this is big. I think maybe a clear example is the Trassic-Jurasic mass extinction, where you had these dinosaurs and dinosaur-like reptiles, which were very, very similar, in terms of what they ate, how they interacted with the environment, their size—all these things. This was before the dinosaurs got really large. And for whatever reason, the dinosaurs were completely wiped out, but these other guys weren't even touched. The dinosaurs had been the dominant forms of life, and the dinosaurs took off.

If you put all this together, it's a very non-kinetic process. And you can't attribute it just to an asteroid coming in, slamming the Earth, and then mayhem, or whatever way they paint this image.

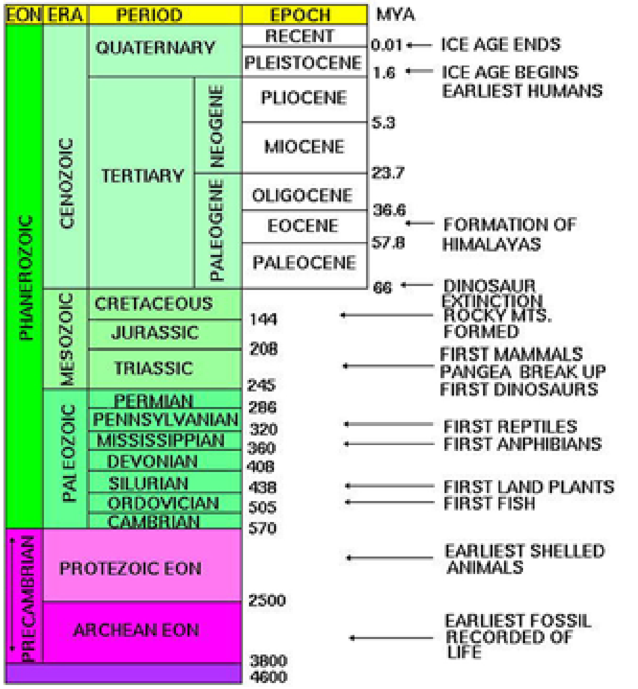
If you describe that kinetic idea, and you just start to look, without any of these false kinetic, really, Second Law of Thermodynamics-type assumptions about the way that the universe works—if you just scrap all that, and take an honest look at the fossil record—it takes somebody with some real brainwashing not to see what the actual process is, just looking at the nature of the fossil record itself.

**Jones:** You definitely have plenty of brainwashing.

**Deniston:** Yes, that's the thing. And it's not really in the evidence; it's in the fact that you've got the imposition of this Second Law of Thermodynamics running the universe, the idea that you only get changes like that

FIGURE 1

**The Progression of Geological Time**

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from some big kinetic interaction, that cause is only a step-wise process, where the previous state, whatever its nature, is what determines the next state.

It's fun. We've been taking the Biosphere as a whole system, pre-K-T and post-K-T, and you just line them up and compare them: What do you see? I think the premise is, you want to start from the standpoint of Vladimir Vernadsky's work, who we've all been studying a lot, and we have presented a fair amount of material on this website.

He first put forward this very clear concept of the Biosphere system, as he defines it—frankly, different from the way it's discussed today generally. He recognized the fact that you had this system, this envelope around the Earth, including the atmosphere, the oceans, the soils, that is very much, relative to a non-living process, in constant disequilibrium. And he makes the point in some of his work that if life just stopped acting, the whole Biosphere would become very, very different.

And maybe one of the most clear examples is free oxygen. It's a very reactive substance. The only reason it's continually found in a free form in the atmosphere, is because life is continually taking it in, changing the

*Left: a fossil pterodactyl, at the Carnegie Museum of Natural History, Pennsylvania. They were flying reptiles that existed from the late Triassic to the end of the Cretaceous Period (220 to 65.5 million years ago). Below: Artist's rendition of a plesiosaur, one of the giant marine reptiles that preceded the dinosaurs.*

molecular composition, freeing up oxygen, and releasing it.

## Biogenic Migration of Atoms

**Jones:** Right. So the Biosphere is actively maintained by life.

**Deniston:** Yes, exactly. Across the board. Vernadsky makes the point, that if you compare it to anything on a geological time scale, it's incredibly fast. If you could watch the Earth from the standpoint of geological time, maybe watch the Earth and watch Mars, the Earth is "crazy active," whole regions spinning with activity.

And Vernadsky discusses the concept of the biogenic migration of atoms, how organisms are constantly taking in material, changing its form, releasing it—so that, the whole atmosphere is that; the oceans are that; the soils are that. It's all a constant flux of material, that, if you look at it on a geological time scale, is very, very rapid. But, it's a qualitative process.

Living organisms are constantly doing this: They're respirating, they're eating; they're constantly taking in material, changing its form, releasing it; using it to sustain themselves, and also creating an environment that sustains all life.

**Jones:** So, what were some of the key qualitative characteristics of the Biosphere, prior to the K-T?

**Deniston:** I think the clearest thing, which is obvious, across the board, from the start, is just a lower level of energy density. And then you have all this talk about a universe governed by a movement toward equilibrium, minimizing energy usage—that's ridiculous! You just look at life: The absolute clearest thing is that the Biosphere, pre-K-T, is less energetic. The organisms are less energetic.

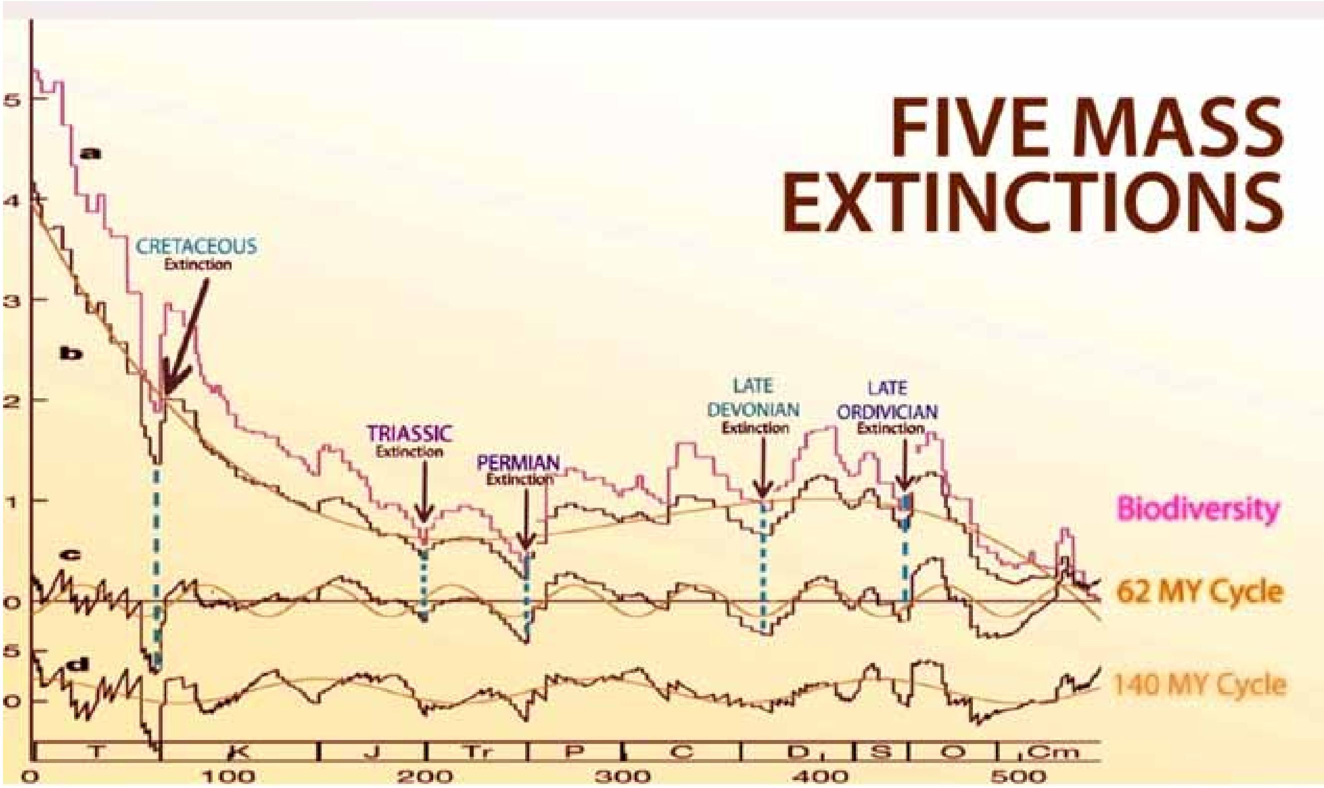
You could look at questions like the metabolism of organisms, or you could look at it from the standpoint of Vernadsky's work, which, I think, makes a little bit of a better picture. If you look at the organism as a singularity in the Biosphere, where it's constantly taking in and putting out material, you could think of the different organisms having a different rate of doing that, a different rate of activity of transforming the environment.

So, life generally, in the organisms, after the K-T extinction, was much, much quicker in this process. They required more intake to sustain themselves. To be a little more specific, if you compare the metabolic requirements of a reptile, or the best estimates we have for the dinosaurs—there's some debate, we don't know exactly what their metabolism was, but the evidence shows it was somewhere between what we see in reptiles today, and what we see in mammals today. Not the level of mammals, but not as low as reptiles.

But, you compare mammals to anything before the K-T: They have a much higher metabolic requirement. They require more food, more oxygen, just to maintain themselves as living organisms.

So they probably could not have been maintained in the K-T system—

FIGURE 2

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**Jones:** Mammals couldn't have—

**Deniston:** Very likely not. There were some mammals, some beginning forms, but the type of mammalian-dominated Biosphere, mammalian- and bird-dominated Biosphere we see today? There's probably no way it could have been supported by the nature of the pre-K-T, Mesozoic Era.

**Jones:** What makes you say that?

**Deniston:** One, the energy requirements. They just require much more energy to sustain themselves.

**Jones:** We've talked about the dominant kinds of food sources that were available then; they seem to be of a much lower density, in terms of energy content or usable energy content, in that prior period.

**Deniston:** Exactly.

**Jones:** Like you're saying with the reptiles, and then also the dinosaurs having what we think was a much lower metabolic rate, in terms of the amount that they had to consume just to maintain their daily functioning, and their characteristic behavior, was much less. And the food available to them—as Peter brought up—the gymnosperms as more the dominant form of plant life, which is a much less energy-dense sort of food, which was fine for less energetic creatures, but then, as we go through this boundary shift at the K-T, as the dinosaurs are gone and the mammals are emerging. They have, as you've pointed out, a much higher metabolic rate; they do a lot more; they maintain a constant internal temperature; they can exist in much more varied types of climates, from the North Pole to the Equator. Their general range of action on a daily basis is much greater. So, yes, there does seem to be a much greater energy throughput of life after the K-T, than what you had beforehand.

**Deniston:** Exactly. And if you take the baseline of what it takes to support all that, it all starts with photosynthetic activity, both in the oceans and on land. That's where you have the creation of new organic matter, actually living matter that can be eaten by the organisms and becomes the basis for the vast majority of the food chains that we know of, with certain exceptions.

And so if you take the question of the extinction selectivity—what goes extinct, what doesn't—you see also, building up to the K-T, and around the time of the K-T and following, a very, very clear shift in the photosynthetic activity on the planet.

You mentioned that the gymnosperms were the dominant plants on the land in the Mesozoic Era and the time of the dinosaurs. Can you imagine trying to sustain yourself by chewing on pine needles or something?

**Sky Shields:** There are some human beings who've tried that. I think they live in Seattle and other places.

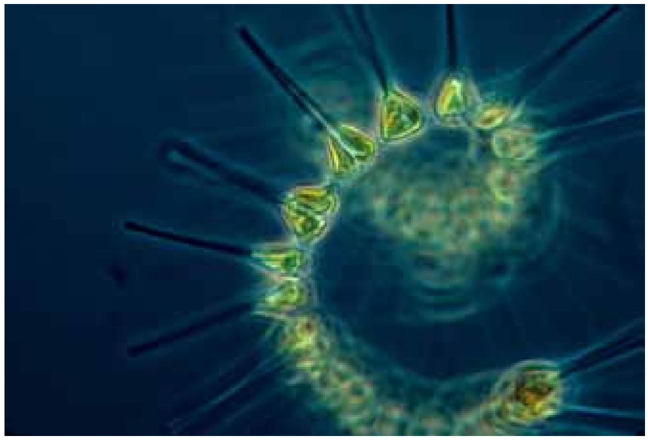
**Deniston:** Yes, it's unfortunate.

They have just a higher content of indigestible resins, and different things. And then with the angiosperms, you have flowering plants, you have fruits, you have nuts. Even the leaves are generally more nutritious. A little bit later, you have the development of grasses, which are crucial to the development of mammalian grazing systems.

But, it's no coincidence at all that it lines up on this K-T shift. That's incredibly significant in itself, if you just compare the development of the shift in plant life, from gymnosperms to angiosperms, and the collapse of the dinosaurs, and the rise of mammals. That's interesting enough. But then you take it to the oceans, and you see the exact same thing. The vast majority of the photosynthetic activity in the oceans is actually done by single-celled organisms, called phytoplankton, photosynthetic plankton, that just float in the water. And you see the exact same characteristic shift. You had two specific types of phytoplankton that dominated the ocean, in addition to the cyanobacteria, which is like a constant workhorse in the Biosphere.

But you had these two other types of phytoplankton that were the dominant forms in the dinosaur era. They begin a decline—they're building in biodiversity and general activity up to the K-T, but they take a dramatic hit at the K-T. Peter mentioned one of these forms that took one of the biggest hits, in terms of how many types of species went extinct, at this shift. But prior to the K-T, you had the buildup of this other form of photosynthetic plankton, called the diatoms, and they exploded after the K-T, very similarly to what occurred with the mammals and the angiosperms.

And the diatoms, this other form of photosynthetic plankton, now completely dominate the oceans. And they're just again a more advanced form. Per diatom species, they can support more invertebrates and different forms of life that feed on them. They can store nutrients better. And overall, studies have shown that the general energy consumption of life in the oceans has increased with the diatoms. So they created a higher basis for more developed food webs, more advanced forms of life to live off them.



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*A phytoplanckton, a single-celled photosynthetic organism. A vast number of these creatures float along in the oceans.*

So if you take systems of life, pre-K-T and post-K-T, across the board you see the same characteristics occur. The gymnosperms are building; they begin a decline. The angiosperms take off. The K-T separates it.

You see it with the phytoplankton in the oceans. You see it with certain types of fish: You see the fish that characterize the Mesozoic Era. You look at the collapse at the K-T, and most of the kinds of fish you find today—your salmon, your trout, goldfish—they all took off right at the exact same time. And the mammals, the birds. So we see very clearly as a whole, ignoring all these insane assumptions about how the universe operates, the whole thing is characterized by an increase in energy requirements, increase in energy density, increase in activity, increase in changing the environment, changing the actual Biosphere at a faster rate.

## The Directionality of Time

**Jones:** It does seem, as you're saying, absurd and really a piece of brainwashing, to say that the extinction events are simply some sort of train wreck, a random event where you have whatever existed before, then you have a train wreck, and then things just progress as they had before. There's clearly a shift, a definitive shift in the process, and that seems to be what characterizes all of the so-called mass-extinction events. They demarcate a point of transition.

Now the thing that bothers a lot of people is that this tends to imply that there is a definite directionality to the development of life, a directionality to the development of the cosmos, and our universe, which obviously raises a lot of questions about the nature of time, space, space-time, etc.

Sky, maybe you could go into some of the work you've been doing on what this tells us about this paradox of time, this directionality of time.

**Shields:** It's sort of funny. Ben presented a pretty clear picture that what happens across the K-T, and what happens in evolution in general, is the evolution of systems. You've got a whole process that's involved. The way Vernadsky looks at it, is, he describes this biogenic migration of atoms: that you can't treat any organism as a distinct thing. And it's true, you actually can't.

Any organism is a flow of material going into it, but it's not a flow of material going into an *object*, and then out of an object. You have the old saying, "You are what you eat." There's a flow of material going into and becoming the object, and then what you're excreting is largely material that was once the object itself. We've used to good effect, although it's limited, the idea of having a whirlpool in water: You can't take a whirlpool out of water, and have it actually be anything any longer. You're not going catch it and take it somewhere.


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*Sky Shields: "The idea of creativity requires a different structure of time than what's presented. . . . [In paleontology,] you're digging in the ground. You've got this mass of material that is related to each other, in really bizarre, jumbled sort of ways. And then, you're artificially placing it all out on some line, as though this were a progression in some artificial thing called time. The notion of a timeline in itself is rather criminal."*

**Jones:** You try, but it doesn't work.

**Shields:** Over and over again. It's a little Kafkaesque. It'll wreak hell!

If that's what you're looking at, then what you want to say, taking the whirlpool image, is that what you treat an evolution process as, is not some single thing evolving. You can't take that whirlpool out and then see, did it struggle, did it survive under these new conditions? Instead you picture this entire flow of material, the whole biogenetic migration of atoms, all these things moving back and forth, forming what we call the different cycles: the carbon cycle, the nitrogen cycle, the water cycle, whatever is cycling; and then, as that whole process sort of twists itself, you see it unwinding certain knots, and then rewinding other knots. Certain little whirlpools, eddies, are taken apart, and vanish, disperse, while other ones recondense, based on the new flows.

That's the disappearance and re-emergence of species. And really, when you realize the interconnectedness of the whole thing, you realize it has to be that way. And then you don't have all these Chaos Theory problems, of trying to figure out how to add the whole thing up in the large.

But then, if you can view the thing that way, you see something funny. A similar thing, if you treat that across space, you see a similar kind of cohesion across time. Which is that all these innovations you're describing—take the development of mammals—that is not what is presented. It's not as though this was something that developed by chance, and then, post some disaster, like the K-T, these things were able to suddenly thrive. You get multiple attempts to create mammals early on, in the fossil record. And that's a lot, that's not just some furry thing, it's not just some simple innovation that it looks like from the outside. There's a whole transformation internally to do this, to develop the ability to do a number of things, not just the birth of live young, the development of milk secretion, the very specific transformations in the skeletal structures we've looked at, taking what were once jaw structures in earlier creatures, and using those to form the whole mammalian inner ear, which is an amazingly complex thing.

**Deniston:** That this happened as a random mutation by chance, repeatedly, over and over again?

**Shields:** Again and again.

**Deniston:** In the same general time period.

**Shields:** In creatures that aren't related at all. It's not as though these are familial traits. It's as though something in the system is demanding these things to emerge.

**Jones:** It's not just some point mutation in a gene somewhere. A reptile's gene just mutated; now its bones, which were once the jaw bone, are becoming the inner ear, or something.

**Shields:** Right. Yet you realize you can't really explain it that way, unless, as you mentioned before, you're just some lunatic ideologue. The lunatic ideologues will do this, and they'll fight tooth and nail, and they'll add whatever they need to add to their system, to try and make it work. It always sort of works—well, in theory, you could imagine it could work. But instead, you get a real sense of the directionality. You get a whole process that's evolving, that's moving.

Yet *that* brings up very funny questions about time. Because if you've got the idea of directionality, as an intention, not as some kind of domino effect from the bottom up, but as though there's some future state which is defining what happens in the past, and allows you to get around an obstacle, you're constantly redefining what you're going to do on the basis of achieving a rough end goal.

But that kind of willful character, that's something that doesn't agree with the concept of time that's laid out by Newton, and then was developed in more detail by LaPlace. You just can't have a time that's actually composed of fixed moments, where you can say that, okay, there is a *now*, and there's a certain state of things *now*, and there'll be a certain state of things in the future. Because if you can ever say that there's a state of things *now,* then your future state is already determined, and that's what Laplace concludes. Under those systems, you don't have free will; you don't have the ability for any kind of willful, directed action.

This is where you get the argument: Well, of course, it seems like you're doing this, but really it's just an accident of your perception, that you think you've got the ability to willfully choose something.

But the idea of creativity requires a different structure of time than what's presented. So you realize that we're sort of shooting ourselves in the foot, because, what are you doing with paleontology? You're digging in the ground. You've got this mass of material that is related to each other, in really bizarre, jumbled sort of ways. And then, you're artificially placing it all out on some line, as though this were a progression in some artificial thing called time. The notion of a timeline in itself is rather criminal.

**Jones:** Say you were around during the pre-K-T period, and you knew pretty much everything about what existed then. You knew all the animals, all of what they eat, all the different relationships. There's nothing from all you could know in that present, that would give you any idea of what the future would be, or could be. Because it's not just a sort of linear unfolding, where this sort of turns into this, into this, into this. But it's always, as you said, you go through this boundary shift: The future is fundamentally different, qualitatively, than anything that preceded it, such that nothing in the preceding period could give you an idea of exactly what would be next. It's only the future that's determining what it's going to be, which then gives you a very different sort of flow, of which direction is time actually flowing here.

**Shields:** Yes, and this is where we start to realize that we're hung up; we get hung up, because we're getting a limited palette as far as language is concerned, to describe these things.

## A Musical Example

And an example: I think there are plenty of other cases where sense perception trips you up, and you end up projecting something that's rather complex, onto to


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*A multi-dimensional expression of time, said Shields, is something you find "frequently expressed in the experience of time that the human individual has, when experiencing, performing, or composing Classical artistic composition. . . ." Shown: The Schiller Institute performs Beethoven's "Choral Fantasy," Rüsselsheim, Germany, July 2, 2011.*

something that's simple. One example we use is the question of pitch in music. And this is maybe not familiar to everybody, but it's familiar to certain people, people who try to sing, in particular, singing in such a way that requires you to actually hit correct pitches, not some weird auto-tuned, electronic thing; but you actually have to do something like trained *bel canto* operatic singing.

You realize that often you'll encounter a situation where it seems as though you're either flat or sharp, but you'll just change what's called the color of your voice—you simply change whether you're making your voice sound darker, or brighter, something that has nothing to do with the pitch itself, and then what you'll hear as a result, is as though your pitch corrected itself.

So you realize that if you were to sort of draw out the spectrum of things you call pitch, you'd end up with one linear spectrum, but then, around that, you realize you've actually got something that's got more than one, that's got multiple degrees of freedom, because this thing you're calling color is also a degree of freedom. Context, you realize, matters. What voice you're singing against will affect what your pitch sounds like, whether your pitch sounds flat or sharp.

So, suddenly you've got this multi-dimensional manifold, but you're projecting it on this linear thing called pitch; and all your language then is limited to higher, lower, sharp, flat, etc., right? Same thing happens with color. We're talking about color and brightness. You know that, in general, greens will look brighter to you than blues. You'll never get a really bright blue. That has nothing to do with how bright the color actually is; it has to do with how you see the colors green and blue. The reason highlighters are the color they are, is that color will always look brighter to you, the green-yellow highlighter. Those who try to use a blue highlighter find that it's often problematic.

The thing called brightness—you're inclined to put it on a linear spectrum, because you actually experience it as something linear, as something with only a forward or backward. But the actual space that's been mapped linearly, is much more expanded than that. But sense perception won't let you say anything else, besides brighter. . . . You have to create instrumentation beyond that.

We have the exact same problem with time, because in talking about it, we're limited in only being able to say we've got forward, backward, faster, slower, before, after—all the terminology that we have to discuss time, is dependent on this linear notion; but in order to have the kind of causality we're talking about, we've got to have something much more complex. The effect of that complexity is—oh, it looks like it's flowing backward, flowing forward, etc., and you try to come up with paradoxes to break the terminology, but really you've just got something that in, its ontological character, is entirely different.

And you find it frequently expressed in the experience of time that the human individual has, when experiencing, performing, or composing Classical artistic

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*Ben Deniston: "So if you take systems of life, pre-K-T and post-K-T, across the board you see the same characteristics occur . . . an increase in energy requirements, increase in energy density, increase in activity, increase in changing the environment, changing the actual Biosphere at a faster rate."*

composition that uses the thing called time substantially, like in poetry or in music.

**Jones:** That's interesting, because it does, in a certain way, get us back to our fundamental problem, which is that, if we do look at a seemingly linear progression of events—say over the last 540-some million years—what we see is that you've had these periodic extinction events in time, sort of moving forward. We've discussed that those aren't simply events, but they are transformation points. Seemingly, from what evidence we've gathered up to this point, we're now entering, or approaching, or in the throes of, what should be another point in time, so to speak, like we've seen with the mass extinctions. This idea that these extinctions come seemingly as part of a cyclical process, around the certain period of the 62-million-year cycle we've discussed.

Now the question is, does that mean, from a very linear or simple time, we're seemingly the dominant species now? People will love to make that point, particularly the greenies, from a very negative standpoint. Does that then mean that we are fated to go through an extinction phase? Is that something we can just linearly project?

Or, is there something just in the fact that we're having this kind of discussion, that says that there's something very different about man, or potentially something very different about man, that you don't find in these other forms of life, which have risen and fallen. And I think getting at that is very much connected with getting at this whole notion of a deeper, higher understanding of what we've come to call *time*.

**Deniston:** What's primary is the process of development, not the way you interpret it in terms of the space and the time in which your sense perceptions are reading it. There's a very clear nature to the process of the development of life, and you see, I think, with these mass extinctions, the organisms that don't make it, are the organisms that can't sustain themselves in this more energy-dense, more energy-intensive system. The only thing that stands out is—and you have to be a brainwashed ideologue not to see it—is that the clearest thing is that the organisms that advance and develop, are more energy-dense organisms. That might be a little loose use of the term, but Lyndon LaRouche has used the term "energy flux-density" as applied to human economic processes, and I think it has a corollary here—I don't know if you want to use the same terms exactly—but you have an increase in the energy density of the organisms, as you keep going through these upshifts of the system. You have an increase in the energy density in activity in the whole biospheric system.

So, with these mass extinctions, you see the organisms like the dinosaurs, etc., that maybe contribute to changing the Biosphere in a way that the Biosphere can now sustain a more advanced form of life, but they can't themselves change their activity in order to live in that more energy-dense system.

**Jones:** At a certain point, the dinosaurs actually did represent an upshift, a development. They were of a higher order than what had preceded them. But seemingly, they kind of then fixed themselves to a particular point in time. They were super-adapted to that particular point in time. Which seems to be also what we're being told to do! If you would look at what the green movement's saying, or what the current Obama policy is saying, it's that you've got to reach a point of sustainability; you've got to adapt to our current state of existence, that we have to sort of fix ourselves to this current point in time. But evidence shows that every time that's ever occurred in the history of life, whoever has fixed themselves to that point in time, has gone extinct, has been eliminated.

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*Jones concluded that man has demonstrated a potential to bound the entire process of the development of the Biosphere, to take that process off the Earth, to colonize other parts of our galaxy.*

## The Expansion of the Noösphere

**Martinson:** One thing that's interesting about that: We had this geologist in the United States, back in the 1800s, named James Dwight Dana, and he noted that the whole group of mammals reached their peak of domination on the planet several hundred thousand years ago, and now they're going through their decline. So, if you look right now, everybody's freaking out that we're wiping out all these species and everything like that, but Dana noted that it's actually headed toward the extinction point anyhow for the mammals. But, he noted, man has not reached the peak yet; man is still increasing.

So if you look at the planet now—and Vernadsky actually comes into this too—if you look at the planet now, Vernadsky said, you're looking at the transformation of the planet into the Noösphere, you're transitioning out of a pure Biosphere into a state of the Noösphere, where the activity of man, the willful, creative activity of man, is expressing itself by changing the entire biogenic migrations of atoms. And you see this—you just look at what type of new species are coming out right now. For the most part, they are species that are under the domination of man, like all the flocks of domesticated animals and the plants that we're using right now. You can almost say they're the most impressive of their type that's ever existed, because we're crafting them to be the most useful for us.

So we're looking at the creation of a whole new system that unfortunately could come to a grinding, screeching, very ugly halt in the next couple of years. But if we can overcome the hump right now, we would look at the Noösphere actually spreading out into space, and we would see that there would be a transformation of the whole Biosphere into the Noösphere, like that.

**Jones:** So, we see a real potential for man to take over the Biosphere, that we may not necessarily be subservient to the Biosphere itself or subservient to this sort of process of development, the rise and fall of species. That we've demonstrated a potential to overcome that, to actually be the singular expression which bounds that entire process of the development of the Biosphere, and to take it beyond, as you're saying, take it off of the Earth, colonize other parts of the galaxy. That's if man acts as man is uniquely designed to act, so to speak.

But we don't always act that way. Clearly, we're being directed to act counter to that. And I think that's what poses the gravest danger right now. Although we are maybe facing one of these inflection points in the transition of the Biosphere, relative to galactic and other cosmic factors, we are not necessarily fated to succumb to whatever cataclysmic type of change might come out of that. In fact, we can now act as the living, active agent of transformation; that we now become the embodiment of the principle of evolutionary transformation and upshift.

And I think maybe that's something we should pick up at another time. I think it would be worthwhile to plan another roundtable. We'd take up more explicitly the characteristics of the Noösphere, the characteristics of economics; get a little more specificly into LaRouche's policies. So, the question is now on the table: I think we have a clear idea of what the problem is; what some of the characteristics of this galactic, Biospheric process are; the question is firmly on the table. Are we next, or do we have a future that we can determine?

So thank you for joining us, and we'll see you again soon.