Leibniz, Creativity and The World Order

Jason Ross led the discussion with Megan Beets, Benjamin Deniston, and Liona Fan-Chiang on the October 21, 2015 New Paradigm for Mankind show at LaRouche PAC. What follows is an edited transcript.

Jason Ross: The importance of science and of understanding what science is for humanity, is really twofold. One is the importance of making more scientific discoveries, so that we can do more things: developing fusion power, health improvements—there are a lot of discoveries that need to be made, that we need to benefit from.

Gottfried Wilhelm Leibniz (1646-1716) considered the unification of efficient and final cause to be among his greatest achievements, of which he had many: in science, industry, statecraft, and theology. This painting was done by Johann Friedrich Wentzel, around 1700.

The other aspect, and the one that I really want to focus on, is how it provides us a better idea for what a basis should be for human relations. How should people relate to each other? How should cultures or nations relate to each other? On what basis can we come together and discuss, what is it that makes us human, a human world?

So the way to do that,—I'm going to use some insights from Gottfried Leibniz, who was really an amazing man, the founder of physical economy. He lived from 1646 to 1716. I'm going to use some insights from him to make some points about what it is to be human, by first setting up some of the problems about how science is presented today, both pop-science, and then also in academic science.

You could start with education where the discovery process of the past is left out. We get the final discoveries. Students are taught to take tests, rather than to discover new things, and there's little room in that for actual creativity, within the bounds of the official curriculum. You could look at popular representations of science, most of which should make you cringe. But even at their best, even when they don't make horrendous gaffes, they're not providing an insight into how these discoveries really got made. The same problem with education, it's too pat and often it's just misleading. And it certainly does *not* do a good job, or even try, at present, to distinguish what makes our ability to make these discoveries different from what could be done by a computer.

We hear touted all the time what computers are able to do now, and it is wonderful to have increasing automation in a variety of fields. A driver-less car? Sounds great; I'd love to have one. Are computers going to do everything that we can do? And what is it that makes discovery different from everything a computer can do? Who knows? That doesn't get touched on.

Instead, we have reductionism, whereby all concepts are considered as expressible in terms of components parts. I want to look at a couple of aspects of actual science practiced today in this respect, specifi-

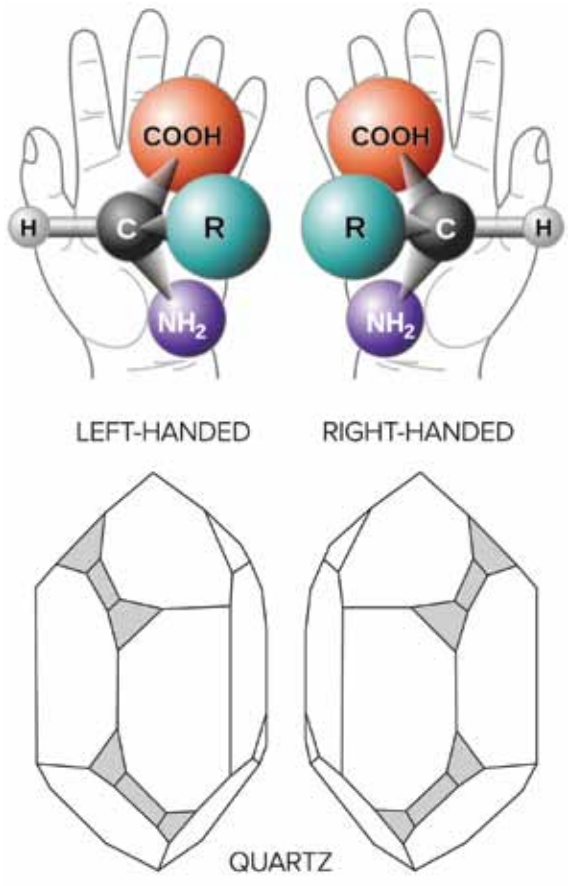
cally the fields of evolution and of neurobiology. On evolution, let's take, I don't mean to pick on him in particular, but as a good target, look at Dawkins, who's got some notoriety. He wrote the book, *The Selfish Gene*. He wrote the books about why he hates the concept of God. And he's a very strong defender today of what we would call the Darwinian view of evolution, which as explained, where it changes—mostly random changes in DNA, but also other changes, still without a purpose—end up causing changes in organisms from one generation to the next. Some of these changes confer a selective advantage, and those are the ones that end up having more offspring, or kill the other organisms, and do all the mating, or eat more food; those are the organisms that then end up creating the next generations preferentially. So natural selection, slight improvements locally, are what create the evolution that we see over the long scale of hundreds of millions of years in the succession of evolutionary stages.

So what do we make of that? Let's look at two aspects of it. One is the origin of life itself, and the other is, let's take it all the way forward, to the development, the emergence, of human consciousness as an active force on this planet. So as far as we know, there's a certain time before which we haven't found any evidence of life existing on the planet. People hypothesize that life was created on the planet. So people like [Russian biochemist] A.I. Oparin, an enemy of Vernadsky's, said that if you put some simulated lightning and some chemicals together and try to recreate the Hadean Age of the Earth, before there was life, if you just sort of bumble things around, eventually you'll create life, or at least some organic molecules. Now you can do that, and you might make some molecules.[1] No one's ever made life that way.

Take two issues that Vernadsky has with this approach: One, we've never known of just an organism; we've always known only a biosphere. So explaining the origin of life requires more than creating an amino acid or something. How does the biosphere get created? Is it from the beginning of one organism? Well, we haven't ever seen that. He points that out.

The other aspect of it is something about life that distinguishes it from physical and chemical processes,

FIGURE 1



Chirality: Chiral molecules can exist in two forms, differentiated only by being mirror images of each other. Physical and chemical processes are, generally, indifferent to the two types of such stereoisomers, but they are treated totally differently by living processes.

something that had been discovered by Pasteur in [1848]: chirality.[2] Chirality means handedness. Some molecules can exist in two forms that are mirror images of each other, like your two hands. If you talked about which bones and tendons connect to each other, and you wrote it all down, you wouldn't know if you're describing your left hand or your right hand. But they're different. In life they're very different. We find proteins are of one handedness, and carbohydrates or sugars are of a different handedness. Different handednesses of the same molecule smell different to us and have differ-

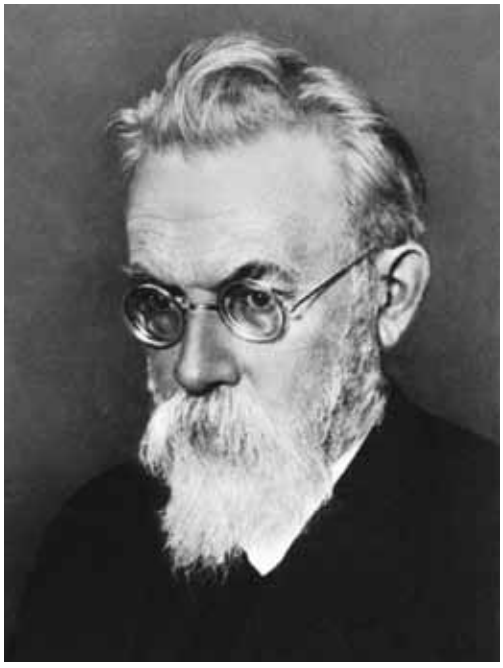
1. See Meghan Rouillard, "A.I. Oparin: Fraud, Fallacy, or Both?" in *150 Years of Vernadsky: The Biosphere,* published by 21st Century Science & Technology. Available at http://bit.ly/vernadsky-150 and http://21stcenturysciencetech.com/Articles_2013/Spring_2013/Oparin.pdf

2. See Vladimir Vernadsky "On the Condition of the Appearance of Life on Earth" in *150 Years of Vernadsky: The Biosphere,* published by *21st Century Science & Technology.* Available at http://bit.ly/vernadsky-150

ent effects on us as medicines.

So how could that ever get created? That's another question to look at. Where did the preference for one hand come from? That's another one, where there are physical or chemical hypotheses to explain it, but nothing that compelling yet. No specific idea why do we have the predominances that we do. Is it chance? Could it be different elsewhere? If there's life on Mars, is it shaped differently? That'd be great to know. Is there something intrinsic about the handedness of life? We just don't know right now.

But that's something that's inexplicable at present from chemical or physical factors. Living processes create one of the two hands, but not the other, or treat them differently, and no purely chemical process does that. And it takes very unusual physical processes to make a distinction.



V.I. Vernadsky (1863-1945), the Russian-Ukrainian genius whose great discoveries did not rely on the method of Newton or Laplace, as he remarks in his Study of Life and the New Physics. *This photo is from 1934.*

But let's ask, what else is there to this story of evolution? Vernadsky added more to the story. Vladimir Vernadsky was, if you've been watching our shows, the famous Russian-Ukrainian biogeochemist who did everything. He developed the concepts of the biosphere and the noösphere, where the noösphere is the shaping of the biosphere of the Earth and its surroundings by our minds, by noësis. Vernadsky said, well look, there's more to evolution than this. If we look at what evolution has done, we'll notice a couple of things. One is that the flow of biological compounds, energy, the chemical migrations associated with life. This increases over evolutionary time. Life is becoming more and more active. This *biogeochemical principle* of Vernadsky states that "the biogenic migration of chemical elements in the biosphere tends towards its most complete manifestation." Living matter takes full advantage of the opportunity for activity. The second principle states that "the evolution of species, leading to the creation of new stable, living forms, must move in the direction of an increasing of the biogenic migration of atoms into the biosphere." To Vernadsky, "it is impossible . . . to speak of evolutionary theories without taking into account the fundamental question of *the existence of a determined direction, invariable in the process of evolution, in the course of all geological epochs.*" A progression, a direction is seen over evolutionary time, and no theory that does not consider this can be considered complete.[3]

Among organisms, those that contribute towards this process are the ones that evolution has created and developed. They're the ones that exist in increasing numbers. So these biogeochemical principles of evolution that he noted, do those arise from a concept of natural selection itself? No. Unless you operate on faith. Let me read a short quote from Dawkins about his faith on this. He says, "The theory of evolution by cumulative natural selection is the only theory we know of that is in principle *capable* of explaining the existence of organized complexity. Even if the evidence did not favor it, it would *still* be the best theory available."[4]

So what do people do, when they take a reductionist approach? They say we've got a complex process. We have a faith, a certainty, that we could explain it based on the parts that make it up, once we discover what all those parts are, and how they interact. Eventually we'll get there. We're not there yet, but *have faith*. That's what Dawkins says. That's what Oparin says. Now we haven't done it. Right? We haven't explained all of evolution this way. We haven't created life from physical or chemical means. These are open questions.

So, evolution does occur. The Earth isn't only a few thousand years old, but there's more to it then. It's not explained by the Darwin approach, alone.[5]

3. Vernadsky, "The Evolution of Species and Living Matter," translated in *150 Years of Vernadsky: The Noösphere,* published by 21st Century Science Associates, 2014.

4. Richard Dawkins, *The Blind Watchmaker,* 1987.

5. And useful empirical generalizations about the process can be made, without relying on the reductionist approach, as remarked by Vernadsky in his *The Study of Life and the New Physics,* 21st Century Science Associates, 2015.

Let's take a look at another phenomenon, that's a very shocking discontinuity over evolutionary time, and that's us, humankind. We're a shocking change over evolutionary time. And there have been some big shocks. If you were watching the planet, you'd say, OK, life is living in the crust. It's in deep-sea ocean vents munching on sulfur. There's a very limited amount of life that could exist on the planet. There's only so much energy bubbling out of the Earth, these chemicals.

The development of photosynthesis? Wow. That just completely transformed everything. Now the Sun is the source of energy for life, and not just what comes out of the crust. That's a huge change. That's amazing! Oxygen's being created now. Something poisonous. Life had to change to deal with oxygen, which can kill us, too, at high concentrations, at pressure.

Then you move along to get other shocking changes. You have the development of warm-blooded animals; well, first animals, vertebrates, nervous systems, warm-bloodedness, an increasing ability for organisms to create their own environments independent of their surroundings. And then with us, we have the ability to make decisions and act in a way that's independent of our surroundings. Animals are creatures of instinct, and of habit and training when we domesticate them.

Deniston: Hopefully, yes.

Ross: You never know. I think that some people ought to bring their pets when they visit their therapist. They might find some,—I've certainly known some pets who represented definite characteristics of their owners that you would have to be blind not to see. But anyway.

All right, so, we've got consciousness. How does this happen? Is this something that got built up in the pieces? These stupid science magazines every week, they'll talk about how we just discovered the evolutionary advantage of love. Or we just discovered why it's evolutionarily advantageous to have compassion. Because even if you are not related to the person you help, and your gene won't survive into the future, maybe your tribal group, in which you've got a larger correspondence of genes, and outside tribal groups will be benefitted by your altruism towards your, etc. That's called science? Trying to figure out some way of explaining everything this way?

But let's take the mind itself, consciousness. Now, without a doubt, the brain has an impact on our thoughts. There's no doubt about it. At least, definitely on the ability of thought to direct the body. Alzheimer's patients typically have characteristic structures in the brain that can be seen on scans. Neurosurgeons can identify that there are really things there. And take strokes, for example. Unfortunately, it's a science that really developed through studies of injuries and illnesses, and brain problems. We've been able to piece together, now more recently with MRIs, the different aspects of the different components of the brain, and relationships to various aspects of body, and also characteristics of the mind. Types of memory, certain kinds of feelings in some respects. So there's a connection there, obviously.

People use drugs recreationally. It's not because it makes their feet feel fantastic. I mean these things act on the brain. They create a certain kind of feeling and that's what people are doing it for. Or non-recreationally. So, let's think about this.

Where is the room for free will? It hardly seems like an illusion. Every day we make decisions. We're never surprised that our arms just start doing things that we don't want them to do; typically, for most people, that doesn't happen: When we want to walk, our legs do as we tell them. When we decide what we want to do with ourselves, the body follows. We can choose to think about something, and we can start thinking about it, although we might get distracted. But overall, we've got the ability to determine what we're going to do. Where does that come from, if the brain is biological and chemical?

If we've got that faith that Dawkins and Oparin have, and others, this faith that one day we'll figure it all out from those pieces, where are we in all those pieces? Where is the ability to do something of your choosing? If we are able to say, well, we know how synapses work, we know how neurotransmitters work, we know how a charge is conducted across the body of a nerve cell,—where is our ability to decide what we want to do? How can our thoughts impact something physical, within our bodies, that causes our bodies to do what we have chosen?

It obviously makes much more sense to start from free will, to say clearly this exists. We experience it every day. So a system of thought that wouldn't allow it, just can't be right. But that's not how it goes, if you follow through on the reductionist outlook. By explaining everything from its pieces, really, free will either has to vanish, or it has to be explained as an epiphenomenon, as an emergent property: By combining enough synapses, the synapses are you. Maybe free will is a

Author Jason Ross in the LaRouche PAC video Metaphor: an Intermezzo, where he explores LaRouche's concept from the standpoint of Kepler. In "The Strategic Situation Now," LaRouche wrote that "Metaphor does not relate to a particular, explicitly direct object, or set of several objects; it refers to an implied simultaneity among a very special quality of several, indirectly related objects."

little bit of an illusion, but you don't know that it isn't; or perhaps, when you put these things together, thought actually takes place, as a system of these neural structures.

Well, let's take this apart by looking at a very specific aspect of free will. Some aspects of our free will don't seem to differentiate us that much from the animals. You train mice, or they choose which button to push to get some food, or something like that. It seems like they're making decisions. That's not such a profound sense of our free will. What about the free will of doing something that has never been done before, in the specifically human sense of making a discovery? Let's look at that kind of free will, and see if it can be accommodated within an idea of the world that's based purely on those pieces acting in unison, or in concert.

We're going to get to one specific discovery, Leibniz's discovery of *vis viva* [living force], in a little bit. But I want to start with the most general notion of discovery using the concept from LaRouche of metaphor; he says this is the touchstone of understanding what discovery is—metaphor. The process whereby two or more different types of senses, or extended senses through not just using the senses of our body [using scientific instrumentation], where two or more senses are put together in a way that creates a concept that couldn't be derived from anything in the past. It's fundamentally opposed to mathematics, especially to logic. It's something that's specifically human. So, to give an example of it, and we come to this example a lot, because it is such a prime example; and it's the birth of modern science. It is,—you guessed it! Kepler.

Kepler's discovery of gravitation, of the Solar System as a system, this was an application of metaphor.[6] Before Kepler, astronomers had attempted to understand the motions of the planets as dots in the sky, the stars that moved from night to night, by combining motions of circles upon circles, upon circles, upon circles [epicycles]; depending on the astronomer, the number of circles might differ for was any given planet. And by putting all these circles together, you'd have a model for the motion of the planet. You would calculate where you'd expect to see it, and you'd look and you'd see, is Mars right next to the hip-bone of Leo, or whatever star, where you'd predicted it would be? And that was it. Circles were used because in the heavens, there could be nothing more perfect than the circle. The heavens are perfect, unlike the filthy Earth down here—that was Aristotle's view, which prevailed for quite a long time.

Kepler proved that this mathematical approach couldn't succeed. To make a long story short, he outdid them in what they were trying to do. He made the perfect circle model, or the perfect circle-circle-circle model. He did it, he made a model for Mars with it, it seemed really great; but there was an irreducible, unavoidable, unremovable error of 8 minutes of arc. A minute is 1/60th of a degree. A fraction of a degree of error as to where Mars would be. There's no way to remove it. There was no way of putting those circles together to do any better than a minimum error of eight minutes.

So Kepler says what? This proves to you guys that your approach is wrong. You're trying to just match what we see. You're not asking why they're moving. You've just got these circles. But why are the planets moving? Why are they moving that way? Why are they at those distances? Are you trying to answer any of that? No, you're not. He showed that their approach would never work. He also says, you could always add more

6. See "Metaphor: an Intermezzo" by Jason Ross, at https://youtu.be/aUQUbEoyVoQ

circles, and keep reducing the error. So he said, even if your model matches what you observe, that is *not* proof that you're right. The error might just be too small to observe at this point. If you added a hundred circles, you could match things *really* well. Does that mean that that's how the planets really move? Of course not.

So what Kepler did instead, was to create something totally different. He had a physical principle of gravitation, that the Sun caused the planets to move. It wasn't just sitting in the central seat watching them as a bystander. He had a physical hypothesis. Not only was it not based on mathematics, it couldn't even be expressed in mathematics. The Kepler problem: If you try to express Kepler's principle as to where will a planet be on a certain day, you can't even solve the math for it exactly.[7] So his approach was non-mathematical. It was anti-mathematical: It was physical. It was metaphorical. Even though today we wouldn't accept his physical hypotheses, the specific ones that he was playing with—and he wasn't quite certain about them—we'd definitely see this as a foundation of modern science, where curve fitting is gone, and the discovery of principles corresponding to thoughts in the mind becomes a standard for understanding the world around us.

And it's no surprise that sometimes people today are astonished, that believing, religious people in the past were able to discover great things, as though Kepler's belief in God should have disqualified him from figuring anything out, because God is a terrible delusion that just enslaves and kills people. Some of this atheism stuff gets pretty intense, but it's quite the contrary for Kepler. He viewed human beings as made in the image of God. He said that there's a correspondence between the way our minds work and the way the Universe is composed, such that we'll actually be able to understand it, such that we can ask why. Right? It's possible to ask, *why* is it acting that way, instead of some other way?

And that's not true in every cultural tradition—the idea that that's even a legitimate question. That's certainly not a universal thing. Some cultures would say: You can't know; maybe you could model it, but why it's happening? Who knows? Only God knows that. We don't know that. So keep the importance of Kepler's outlook in mind.

7. The "Kepler Problem" relates to an unsolvable expression for the position of a planet at a given time. Attempts to resolve it led to Leibniz's development of the infinitesimal calculus, and Gauss's work on elliptical functions.

The 1900 Assault on the Mind

Now let's ask, could a computer have done what Kepler did? Let's ask in a general way, can a computer make a discovery? This requires looking at what happened in 1900 briefly, something we've discussed on these shows a few times. As a bare summary of it, and this goes earlier, but just from 1900: In 1900 at a conference of mathematicians, David Hilbert laid out the problem: Is it possible for us to explain all of mathematics, starting with arithmetic, with logic? And maybe we could explain physics, or chemistry, that way too. Let's find out. Is mathematics just a branch of logic?

Now what does logic mean? Logic is a technique for arriving at conclusions from assumptions that you believe are true. What are all the legitimate conclusions you can reach from the assumptions? So logic is about rules for deriving new theorems, as the terminology goes, from your past ones. Start with your axioms. Start with assumptions. Start with your beliefs. What follows from them, using your rules? That's logic. Now things that follow logically, are included [implicitly] in what you already know. Have discoveries, great discoveries, been embedded in what was already thought in the past? It wouldn't be much of a discovery, if you could derive it from what was already known in the past. Discoveries don't happen that way.

Moving forward a bit, we come to Bertrand Russell, who really hated humanity. LaRouche has called him the most evil man of the Twentieth Century, and he's got some tough competition—you might look at some other evil men in the Twentieth Century. So that is quite a statement, to say that Russell is the most evil of them.[8] But he had a *very* all-encompassing goal, and he worked in many fields! He worked in politics. He wanted to nuke the Soviet Union, when we had the bomb and the USSR didn't. He wanted to destroy science.[9] He worked *very hard* on the math project to try to do what Hilbert said, to try to turn all of arithmetic into logic. He invented some new tricks that he pulled from his sleeve to make his system secure from several paradoxes that he knew about. So he went out of his way to make sure that none of these paradoxes could hurt him, that he could

8. Lyndon LaRouche, "How Bertrand Russell Became an Evil Man," *Fidelio,* Fall 1994. http://www.schillerinstitute.org/fid_91-96/943a_russell_lhl.html

9. See Jason Ross, "Bertrand Russell, in 1895, Pre-Ordains that the Quantum and Relativity Will Never Be Discovered," at http://larouchepac.nationbuilder.com/riemann_vs_russell

make math logical—until Kurt Gödel proved he was wrong.[10]

Kurt Gödel proved that Russell's dream was impossible. Now, really, Gödel had already known it was impossible, but he proved it. He proved that what Hilbert and Russell were trying to do was a dead end, that there were important concepts, or thoughts, that would not be derivable from the past. This is basically what Gödel showed; that, in other words, there is always more to know, that can't be derived from what happened in the past; even just in arithmetic he showed this was true. There are new important things that you couldn't have gotten from the past, that you can't have a system of logic that's both comprehensive, embracing all possible true things, and free of contradictions. Not possible. And it can't prove of itself, that it knows everything.

Library of Congress (14)

Bertrand Russell (1872-1970), the disgusting racist who later in life proposed threatening the Soviet Union with nuclear attack in order to achieve a last world peace of one world government, got his intellectual start by trying to forbid the practice of creativity.

So, really, that should have been the end of it; that should have been the end of the idea of artificial intelligence, which should never have gotten off the ground. That really should have been the end of it. It wasn't. What instead happened was that people then said, well, the mind is also subject to this. Yes, maybe we are able to do new things. Maybe we do have free will. Consciousness is an emergent process out of these synapses and neurons, and whatever a computer can do, that's what we're able to do. But nothing else, nothing more. To admit that there is something more the mind could do, would mean that that the build-up of the mind from its components, was wrong. And that they couldn't accept. Because on faith, we're building everything from the pieces.

Let me review what we've talked about so far, and then bring in our friend Leibniz. We've touched on the topic of evolution, of the faith that's expressed by those who say that there is nothing different beyond the pieces, changing, and developing, and combining to represent something higher. We discussed free will, and the impossibility of a purely physical mind, if free will exists. By physical, I mean obeying laws of physics that could be determined from physical processes, and not looking at cognitive ones—not that our *brains* aren't physical. Obviously they're physical; they're not *not* physical.

And then we looked at free will with the specific application of discovery—that application of free will. Is it possible to explain from components, the creation of a discovery of thought, that revolutionizes the vocabulary by which thoughts are considered, and which doesn't follow from the past? And the answer, as proved very completely by Gödel is: No, that's not possible.

Now I want to bring in Leibniz, and see what this man from several centuries ago (again he lived 1646 to 1716), can he add to this discussion. He was a polymath. He did everything. He was involved in science, industry, had his own projects for mining and power transmission, physical power transmission, statecraft, efforts to reunite the churches, and outreach to China, with the idea of embracing the Eurasian continent with the best ideas in the cultures of Europe and China. He said that China and Europe were *not* mutually exclusive concepts, that there was a cultural tradition in China that wasn't totally different from Europe's, which is the approach that some missionaries, or people pushing them, wanted to have. That China is can't be civilized, they're just barbarians, they shouldn't really be treated as human,—Leibniz did not agree with that.

As a young man, he realized that he disagreed with Aristotle, who said that the mind was really a blank slate, on which the pen of experience would write, and that's what fills out our minds.

Leibniz said, no way. There are concepts that are born in the mind, that are not generated from inductive experience from the senses. Induction is the idea that

10. See Jason Ross, "The Failures (and Evil) of Logic: A Particularly Evil Aspect of Bertrand Russell," *EIR* April 4, 2014. Available at: http://www.larouchepub.com/eiw/public/2014/eirv41n14-20140404/56-59_4114.pdf

we observe things of a certain type (of course, even considering things of a certain type is an act of the mind), but we observe these things and we figure out what's common to these observations; we use induction to create a general concept of the observations.

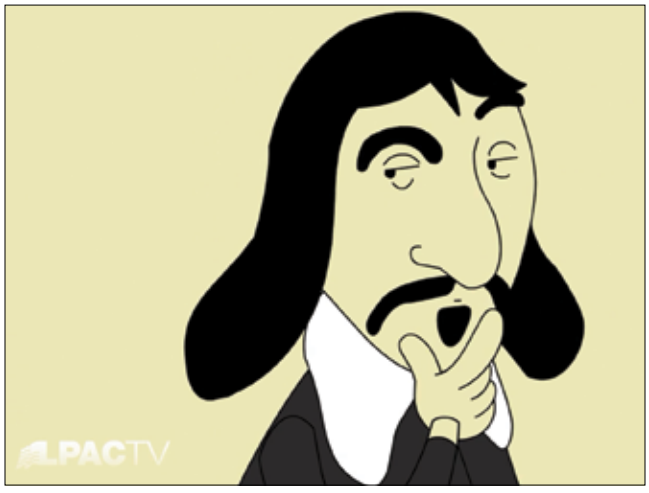
Leibniz said, that's not all there is. Yes, we use our senses, sure, but that doesn't explain everything. There are concepts that just come from the mind itself, that have a valid power in science, in understanding the world around us. He said that this shows, again, that the Creator of the Universe is reflected in the mind of the individual, that human beings are made in the image of God.

At this point, I wanted to talk about one of Leibniz's specific discoveries, that of *vis viva.* I realize that our time is not going to allow it, but it's in the video description. I'll just say something short about it now, and you can watch the full video later.[11] Leibniz, in looking at how motion occurred, at dynamics, moving bodies, and then their power, and looking at mechanics—this is an important field of science—he said that there was something very wrong with Descartes' and Newton's views of this. Descartes said that matter is extension and it's motion. What is stuff? It takes up space, and it moves, in an absolute space. What Leibniz showed, was that the power of a moving body wasn't in anything that you could observe about it; it wasn't its speed. But that you actually had to take its speed squared, and that that represented its power. Now, in summary form, that sounds kind of mathematical, I admit. So I urge people to watch the video, to get the full story behind this.

There's something there besides the motion; there is a power to act that's in matter—there's something real beyond what the senses might induce. And here, I think, is a key concept for us today. Leibniz looked at two different kinds of cause in nature. And, he said—this is using older language—there are efficient causes, moment-to-moment causes; and there are final causes, which is a cause arising from an intention, a goal. If you see your friend in the store holding a jug of milk, and you say, how did you get here? What's going on? The efficient cause would be that his legs moved him into the store, and then his arms picked the milk from the shelves. The final cause would be that your friend wanted to buy some milk, because he has some cookies, or whatever.

11. See Jason Ross, *Dynamics and Vis Viva: an Introduction* at http://archive.larouchepac.com/visviva

FIGURE 2



René Descartes (1596-1650) would have been perplexed by a world that actually behaved according to his laws of motion. Leibniz demonstrated that understanding the power of motion is impossible if you are guided by your senses. This depiction from the video Dynamics and Vis Viva: an Introduction at http://archive.larouchepac.com/visviva.

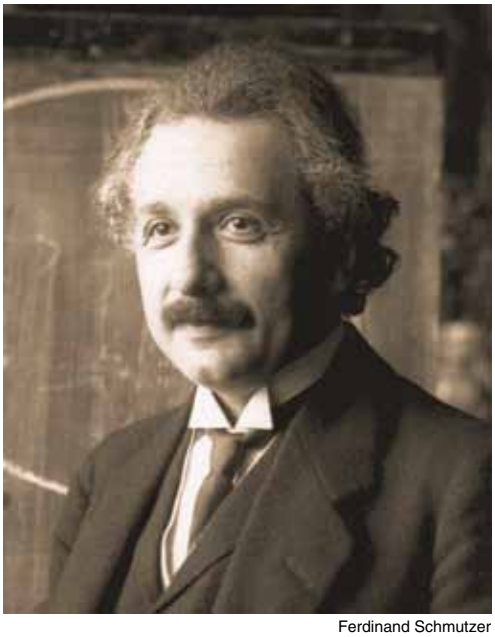
Leibniz said that these aren't exclusive. He said, there's a "kingdom of power," as he called it, by which processes are understood in terms of the moment-to-moment operations, the efficient causes, and that can explain a lot. But there's also a "kingdom of wisdom," which explained, why the efficient causes are as they are. Why are the laws of nature the way they are, instead of another way? Efficient causes can't tell you. But, he said, the "kingdom of wisdom" explains why the efficient causes are the way they are, and very importantly, this kingdom's basis lay in beauty, goodness, or fitness—not just power.

So reductionism, starting from the bottom and growing up—that can never tell us why nature is the way it is, instead of a different way, or why our minds are able to understand it at all. That's almost miraculous, that we can actually understand how nature works. Did it have to be that way? And if it did have to be that way, what was the cause? What kind of cause would that be? *What kind of cause would that be?*

Some people today say, well, if there are a lot of universes, in some of them life couldn't exist, and we're not in one of those, because it's survivor bias, statistically we're in the one that we're in, and there are a lot of other ones out there, somewhere. Not much of an understanding. If you don't conceive,—if you throw away the mind as a cause, you're left with explanations

like that.

Let me give one last example of Leibniz's thought, about space and time, and then come back to the beginning. Leibniz corresponded with Samuel Clarke, who was an associate of Newton's. Clarke was a translator of the most popular book on physics, written by a follower of Descartes, Jacques Rohault. In this correspondence, a debate quickly emerged between different concepts of God. Clarke said: God's omnipotent. He can do anything He wants. Leibniz answered, things aren't good because God did them. God did them because they're good. Clarke responded, that means God can't do whatever He wants. He has to be good? Well, what's the point of being God, if you have to be good? Sort of like a would-be dictator. You can see how Clarke's and Newton's view of civil authority reflects their views in this religious idea.



Ferdinand Schmutzer

Albert Einstein (1879-1955) during a Vienna lecture in 1921. Einstein's work subsumed space and time, already shown to be relative by Leibniz, into a single physical space-time concept, and, by uniting energy and mass in $E=mc^2$, had the effect of transforming the meanings of space, time, energy, and matter, in the course of a single decade.

Leibniz said, look, all the qualities that allow of an infinite perfection, all of those are in God. Omnipotence, yes. Also, omniscience. God has to know everything, and be as wise as possible. There's no contradiction in infinite wisdom. So God couldn't do anything without a good reason. Otherwise He wouldn't be infinitely wise. You're only focussing on the power, Clarke, but God is also infinitely wise. That's got to show up.

Clarke said, no way. I'll give you proof. So in the tradition of Descartes and Newton, Clarke said that there's an absolute space and time, like a big shoe-box that surrounds everything. When God decided to create everything, He put it over here in the shoe-box. He could have put everything over there. We wouldn't know the difference. We'd only know how far away the things are that are near us, which would be the same if we're all over here, or all over there; makes no difference. That proves it. God did something without a good reason. That shows how powerful He is.

Leibniz said, the problem is that you assume that space and time existed on their own before God, and that assumption required that He make a choice in putting the Universe together, that didn't have a good reason for being that way. Therefore, the problem is that you believe in absolute space and time. They don't exist.

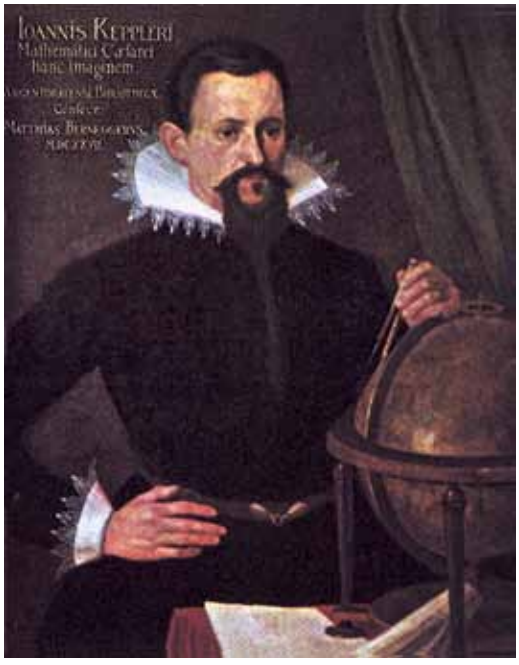
That's pretty phenomenal, because this was in the early 1700s, and here is Leibniz using a final cause proof to come to a conclusion about something very physical, space and time. And he was right! There is no absolute space. There is no absolute time. Laws of motion shouldn't differ if you're moving while you're watching motion. This is a principle for Leibniz, and it's a principle for Einstein. Einstein's theory of relativity, built on what Leibniz had done, took that relativity of motion of Leibniz, the non-existence of absolute space, and created something that did away with space and time as separate things altogether—a space-time. Einstein's $E=mc^2$ eliminated the distinction between mass and energy. Now after Einstein, think about it. Space, time, mass, energy, none of these mean what they meant before. Over the period of two decades, these basic terms had their meanings transformed.[12] So that kind of a change, that change in the language, means that you're definitely going to be saying things now, that you couldn't have said before. Right? It's a discovery. It's not expressible in what came before. It doesn't derive from what came before. It's fundamentally new; couldn't be done by a computer, couldn't be done by Bertrand Russell.

I want to wrap up then, going back to my opening concept about the importance of science for the fruits of science—we need fusion power, for example—and for its benefits in understanding humanity in relations among people. We're all human beings. What does that mean? We're all human beings. We've got a shared inheritance of brilliant acts of discovery, of creation—scientific, cultural, musical, political, economic. If we understand that heritage, where it really came from, what it really is, if we hold onto that, and embrace that as our

12. Vernadsky, *The Study of Life and the New Physics.*

humanity, that we recognize to be the basis of our joint humanity, that's a real basis for relations among people and among national cultures.

As Lyndon and Helga LaRouche have said repeatedly and recently, a unipolar world can't exist, but neither can a multipolar world, simply. Right? A new paradigm of human relations has to be forged, based on that ability that's unique to us, not shared with any other form of life, or computers, to create a future that never could have existed yesterday. And on that basis, on the uniqueness of our minds, as being in coherence with the Universe as a whole, we can set a very firm foundation for what relations among nations, and among people, should be.



Frankfurt University's Pictures of Famous Physicists

Johannes Kepler (1571-1630) demonstrated the efficient power of metaphor with his discovery of the Solar System.

That's what I wanted to say.

Liona Fan-Chiang: Well, that sets a very high standard.

Ross: [laughs] Yes!

Fan-Chiang: But the other thing is that it sets a higher standard that evolves, so you have a definition of what governs relations among nations, among human beings, and that definition is going to continue to change, based on a basic characteristic of humans, which is discovery.

Vernadsky has a discussion that says, life exists, cognition exists; and it is what you said, but sort of the inverted way, which is, these things exist, and so you can't say that they are not of this Universe. And so, if you are going to say that you have Universal laws, then you must encompass the laws that govern life and cognition. And it's funny, because you said, the mind can't be totally encompassed by laws of physics, at least as it's taught today. But, it really is that the laws of physics just don't encompass the Universe, at this point.

Deniston: I think metaphor is really a good reference point for getting at the importance of these concepts. And Kepler *is* a good example of this: You take his *Harmony of the World,* you take Book 4, what he discusses there, his explicit attack on Aristotle, like you were saying, this blank slate idea, that knowledge is just what's presented to the senses and then recorded by the senses and imprinted on you; that's what knowledge is, that's the basis of human action in the Universe. Then you reference Kepler's discovery: It was not just something you got from the senses. It was not something that you took in and observed, but required this action of the mind, this creation of a metaphor. He was great, because he takes *you* through it, too. He writes his whole book recognizing, "well, if readers are going to get this, I'm going to have to take them through how my mind went through the process of figuring it out."

If you went to school and you got Kepler's three laws, his three formulas, you got cheated. You should ask for a refund. It's a lot more fun to read his book and figure out how he thought about what he did; and how he just completely, pedagogically takes the reader, in that day and age, through the way he thought through a process by which he can come to the ironies, the conflicts, which had forced him to come to a new conception. But then, when I was looking at this from the standpoint of Mr. LaRouche's work, I always think it has an extra dimension to it too. Because Mr. LaRouche defines a metric for human progress, human economic advance—the ability of mankind to exist as a greater and greater force in the Universe. And what enables us to do this? It's this unique capability, which you only find in this quality of metaphor. It's this unique capability, demonstrated by Kepler, of the mind generating a new discovery; we see no evidence of animals expressing this capability. And it's that quality of process that is, as far as we can see, the substance of what allows mankind to fundamentally change the way he exists in the Universe; and to exist in the Universe in a completely new way, really, as a function of something the mind generated. Not as of something you observed, not as something Aristotle wrote on his blank slate, but it was something that the mind did, that changed how mankind exists in the Universe.

As you were saying, what does that tell us about Einstein? Einstein said at one point, that the most incomprehensible thing about the Universe is that it is comprehensible, that it's this quality that the mind has uniquely, that allows us to advance, that allows us to make scientific progress. That tells us about the Universe. That comes back on what we can say about what we know the Universe is; that it's that quality of generation of something that the mind can generate uniquely, through this type of process of metaphor, that you're referencing, that's what allows us to exist in a completely new way.

Some of these pop-science people promoting reductionist views—at this point, [they are] people who have just been brought up in this, and they don't really understand the fight anymore. But this is really evil. It's an attempt to kill the actual creative spark that makes mankind unique. This is not just a difference in opinion. This is a direct attack on the idea that mankind has this unique creative principle.

Ross: Yeah, you end up looking at people in terms of their patterns of behavior, instead of their thoughts, for example.

Deniston: Right. The behaviorist school. And you've mentioned how long Aristotle's ideas stuck around, just imprisoning people for centuries in this crazy concept of the mind, and science didn't advance. Mankind didn't advance for centuries, until you had the Renaissance. You just wasted generations upon generations, when people were denied the ability to make some kind of creative contribution to the progress of society, because you had this crazy reductionist dogma imposed on the population. The Twentieth Century has been the beginning of the new phase of that same type of thing.

Fan-Chiang: It wasn't an accident also that Russell attacked metaphor, explicitly, trying to say that valid language, especially a valid language in scientific writing, has to be direct; it has to be exact. It has to be without ambiguity.

Ross: In that it's really not ever going to be new! [laughter]

Fan-Chiang: *And* that it won't be new, and therefore, that it won't be science.

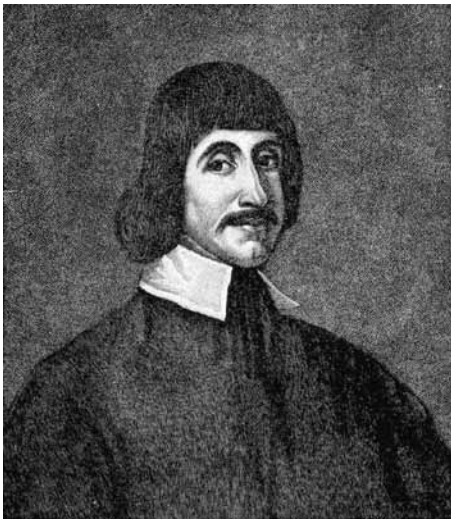
Ross: Yeah. When you said that it's an evolving basis for relations; or think about morality; sometimes, a question people might ask themselves or ask a friend, is whether morality is absolute or is it relative? People, I think, look at that as a question in a wrong way. Absolute sounds like, is it already completed and written down? In other words, is it done? That's sort of implied in the absolute. The relative meaning, morality's relative, whatever, there's no actual universality to it. Yes, there's an absolute standard of morality, but it's not one that we know yet, and never will completely have known, that the basis for the substance of morality is one that we have to keep discovering, that we do more work on, as we learn more about what it is to be human. So, you think, what's the basis? Why shouldn't I treat people wrong? The Golden Rule, well, because I wouldn't like that to happen to me? Well, that's a good start. Treat people like you'd like to be treated. Well, you should, that's presuming you don't want to mistreat yourself. [laughter]

Deniston: Excluding Dawkins.

Ross: Well, yeah. But why does every human being on this planet deserve respect? Or what's the basis of their dignity? Do we all look the same, in the sense that we walk on two feet, and we don't have a whole lot of hair, and you can tell that we are all human beings? The fact that we're all one species, and that we can all reproduce with each other, and that's what makes us all human, by the definition of an animal species? We can reproduce and have fertile offspring? No! That's not why people are deserving of dignity and respect and a love for and urge to develop them. It's because of this ability that every person on this planet has, the ability in their lifetime to contribute something of enduring value. But how many people in history have done that, or have been in a position to do that? We're really in a position now to end, to really wipe out oligarchism. Things are really coming to a head right now, with the complete collapse of the financial system totally, the incredible opportunity represented by the BRICS. And then the scandal, after scandal, after scandal and attack, after attack, that's all coming down on Obama right now, except at that Democratic debate. But in the real world, he's being slammed from every possible direction. It's a real opportunity to say, "Hey, this has got to go, and instead, here's a real basis for relations among nations."

We have got to develop the world, because people deserve human rights, and you can enumerate them. People have a right to shelter? Yes. People should be able to eat enough? Yes, of course. People should have clean water? Yes, we can all agree on that. Electricity? Yes. Why? What's the basis? And then what's that highest right, to know that when you die, you're not dead? In a real way, to be able to know "I did something; I was able in my life to do something that's going to have

Tsar Peter the Great of Russia (1672-1725)



John Winthrop, Jr. (1606-1676), Governor of Connecticut

Leibniz's scientific and political influence spanned the globe, playing a role in shaping the ideas of great reformers in Russia, the U.S., and China. He advised Peter the Great on establishing the Russian Academy of Sciences; corresponded with John Winthrop, Jr., among other Americans; and provided advice to missionaries going to China, as part of an overall program advocating cultural exchange.

Leibniz's Novissima Sinica (News from China), published in 1697.

meaning beyond it." That's the really human thing that we have to give people. It requires all those other rights,—we need those other prerequisites. We should develop all of them. But we've got to keep in mind where it's really come to head. For example, among the UN Development Goals, which say: We're going to reduce poverty, we're going to get rid of this disease. We got rid of smallpox. It should be, *immortality, in the real sense*. That would be a fantastic UN Development Goal.

Deniston: Yes, right. I think that's a demand we're at right now. We have to realize, our existence as mankind, is what makes us a species, what makes us unique on this planet.

Ross: We need meaning. We need to give meaning.

Megan Beets: You mentioned that it's just been a very small percentage of all humans who have ever existed, who have acted in this way. I think it's worth letting your imagination work, to envision what it might be like if the majority of humanity acted in the footsteps of genius. What would that mean? What would that do to the physical Universe? How rapidly would that start to transform the physical Universe in a certain unified direction? And it's really an incredible prospect, which is very much at our fingertips right now.

Ross: Yeah. If it was normal for children to think, "Oh, there goes little Einstein and little Marie Curie," and that that was typical, as opposed to unusual, or shocking—imagine.

Beet: Right. And, of course, you'll always have great geniuses who trailblaze and drive that next revolution. But if the majority of the population could be brought to the standard, where they're living a life which has an impact after them, because they've actually changed the meaning of humanity in some way. . . .

Ross: And with that kind of culture, you could never have had Obama. Or Bush, or the list goes on.

Fan-Chiang: Not as President!

Deniston: I think that probably defines an appropriate challenge for people to think about.

Ross: And to respond to.