

Brunelleschi-Cusa-Kepler: The Foundations of Modern Science

In a discussion with LaRouchePAC's Megan Beets and Jason Ross, during the March 19 Weekly Report/The New Paradigm for Mankind (www.larouchepac.com), Lyndon LaRouche was asked about his unique ability to forecast events, and how to help people understand this process. The following excerpt from that discussion serves to elaborate on a crucial point in LaRouche's above article.

Lyndon LaRouche: ...[L]et's take the thesis, which I have, on the succession of Brunelleschi, Cusa, and Kepler, because that's the key to understanding what the idiocy is, of most science today, Particularly talk science. And what we have, mostly, in the world today is not science, but talk science. They gossip about things. They don't really know anything, but they've learned how to gossip. So they're like the chickens, not quite as dumb as the chickens, but they behave like the chickens. They gather around, they share their opinions, "brahk, brahk, brahk, brahk..." and so forth. And they go at it!

And I'm not really ridiculing people: I'm saying they're stupid! They don't need to be stupid, but they decided to accept stupidity.

Okay, so let's look at these two cases: All right, what did [Filippo] Brunelleschi [1377-1446] prove? Brunelleschi proved the falseness of the straight line, of the existence of the straight line in the small. That was his great achievement. He extrapolated from

the understanding that you can not use arbitrary predetermined lines in any way, to determine how processes work.

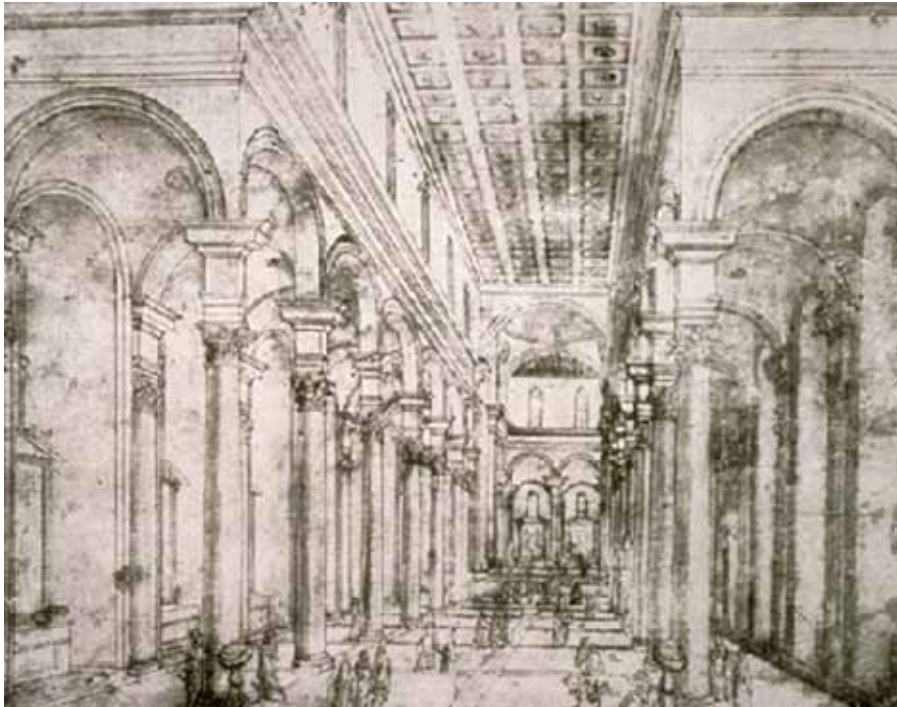
All right. Now, Brunelleschi intersects Cusa [1401-64] at a very specific point, which is shortly before the death of Brunelleschi. He made a fundamental difference. He went to the top. He took the whole, and examined the whole, and he examined it from a social standpoint of the whole. Now, that left us two things: Instead of saying you have a straight line and a dot—forget the dots and the straight lines, or the crooked lines, or specific, arbitrary lines; just forget them.

Let's look at this whole thing differently. Let's say we have three points of knowledge, which lead into this span of two centuries, within two centuries, which defines the foundation of all competent physical science. The first is Brunelleschi on construction, in which he



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"You're always working on what is called a discovery, a discovery of principle," LaRouche said. "And what the whole system, of real science is, is based on the notion of principles. We call these 'universal physical principles.' They are created by the human mind's recognition of how the universe is composed!" Here (l-r): Jason Ross, LaRouche, Megan Beets.



Brunelleschi's invention of linear perspective made possible the portrayal of a three-dimensional universe on a two-dimensional surface; he then superceded that discovery, with his development of a general theory of curvature. Shown (above left), Brunelleschi's perspective design for the interior of Santo Spirito church (Florence, 1440s), and a photo of the church interior, below. Brunelleschi's portrait (detail) by Masaccio (1420s).



goes outside construction and says, there's a principle of nature: Forget all these drawings, forget all these measurements, let's look for *principle*. And he went into the principle of the small. He said "small is wrong." He did, through a number of experiments with light and everything similar to that, and they came to the point of curvature: There is no such thing as straight line, there is only curvature. There are no points, there is only curvature.

So he developed a general theory of curvature, and he tried to measure it: curvature, as a standard of measurement. What did he come up with? Well! He came

up with a whole new architecture, but more: He took the simple thing of a simple, hanging chain [catenary—ed.], the hanging-chain model. Just a fine-grained chain, very fine grain, which would get very close to what you're looking for. He said, these are the natural relations of our experience in nature, the hanging chain, which has nothing to do with any curve that the previous so-called authorities had ever discovered.

So, he went through this, and through his work on light, vision, and so forth; he went through the whole process. He went through acoustics, went through every dimension he could possibly look at, and came out with solutions. But this was only looking at it from the standpoint of the criticism of the small, the denial of straight lines. And the fact that these unstraight

lines, need not be chaotic unstraight lines, they're not arbitrary ones.

So therefore, he had the general idea of a new conception of curvature as a principle of action! Not just as curvature, but a *principle of action*. Because that's what you do with a hanging-chain bridge; you're just taking this hanging-chain bridge, and people used to walk across these things. So it's a process, it's not a thing.

A Universal System

Well, now you go to the other end: Cusa. And Cusa is in the large. And you compare this to what was done by Max Planck as against Einstein: Planck went to the very small, Einstein went to the very large—and we have not fulfilled Einstein's design yet! We only have an approximation; people are looking for it.

Okay, now, you have two cases in the Renaissance; and you have the other now, in the 1890s. This now embraces the entirety of all modern science, essentially! We have some things that have happened since then, but this defines something which is a universal system spanning these centuries.

Now, take another step. Well, then, we haven't solved the problem, but then came [Johannes] Kepler [1571-1630] as a follower, implicitly of Brunelleschi, and specifically of Cusa—very explicit about it. He solved the problem. So a third, a solution! But Kepler's solution, depended upon both the implications of what Brunelleschi had done, which enabled Cusa to make his decision. But solution was not yet reached. The solution was done, by Kepler.

So all competent modern science, depends upon the reference to Kepler, in terms of Brunelleschi and Cusa. Anyone who eliminates any one of these three—Brunelleschi, Cusa, or Kepler—all as one group, is an incompetent in science, intrinsically.

Now take the next step, and now you take [Bernhard] Riemann, in the middle. Riemann was the person who, following Gauss, but independently of Gauss, but also part of Gauss, made the great criticism of getting freed of the system of mathematical physics, which existed before. Gauss made the great accomplishment of freeing mathematics and science, from the previous system, entirely. But he didn't solve the problem. He defined the problem without solving it.

Now, you come with what Riemann did: Riemann went the next step, and he did it—essentially it was his thesis; it was published as his habilitation dissertation.

That thesis opened up the whole question, clearly where Gauss had left it. And there were a lot of other people who did work in the same direction, but Riemann was the one who succeeded.

Now, you come along, you come to another point; you come to the 1890s. Now you come to our new leaders, Planck and Einstein. Now, what's the solution? Well, it hasn't been defined yet.

That's my project.

Vernadsky and the Principle of Life

Jason Ross: And the other thing we get, after Planck and Einstein, is the potential to take their work from another perspective, based on the insights of Vernadsky.

LaRouche: Now, this is really the key answer, but it's not a completed answer. It's not a completed answer in the sense that Kepler did, earlier.

Now, what he did, Vernadsky attacked—essentially, he attacked everything the British system produced, by saying that the whole system is based on the principle of life. And his question was, how do we put this into the form of the question of the principle of *human life*, as opposed to life in general? That question has not been settled, and that's what fascinates me, because that's the key to what the principle of mankind is.

So therefore, you have this history, where you find this triadic element, which is what you require as a minimum in logic and mathematics. If you don't have a threefold manifold, you don't have an empirical basis for the mind to work on. But they have to be principles, they can not be theorems....

Vernadsky was crucial, and does represent a point of reference for the future of humanity now. And he does open the gates to begin to understand man in a better degree, which was what his intention was. I mean, after all, he lived out a pretty full life, under tough conditions! So he did a pretty good job of it all.

But this leads to something more: It leads to the fact, first of all, the result of this process is, that the educational process, properly conducted, means that you have immortality of all the people who have participated in the process. That if they follow the track of the process, then they each have made a contribution which is permanent, and so therefore, the human personality, unlike in the animal personality, is potentially immortal. Because, the ability of human beings, to take the

product of what their mind has generated, to transmit that as a foundation point, or launching point for future generations.

And everyone who is a true scientist, in principle, thinks that way. You always think about what foundation you're creating for the next, coming generations. You're always working on what is called a discovery, a discovery of principle. And what the whole system of real science is; it's based on the notion of principles. We call these "universal *physical* principles." They are created by the human mind's recognition of how the universe is composed! In which there are no dots or straight lines ever found.

And that's where most of the idiots are. They all are looking for mathematical points of deduction or construction. With no idea of creating *new ideas*, which had never been known to mankind before, or have been lost, and had to be recovered. And that's what you do, in repairing society: You try to get people to rediscover what their ancestors had lost; you try to intersect them with that experience, and have them move from that standpoint. And then, tell them: Don't worry about it, you can now reexamine yourself, on the basis of what you're going to, through this experience. And that's what you really do, when you educate a child into adulthood in science, is you give them an idea, at any one or two points in their life, and one of these or several of these points will define their development.

And what will happen is, that there's one development which is crucial, there has to be a second development which is crucial, and preferably a third. And if they go through an experience where they've had this kind discovery of universal principles, within their own mental processes, they now will tend to have a secure identity, as a potential scientific thinker.

The Immortality of the Human Mind

And everything really has to be based on these kinds of conceptions. And if you take these two—I mean, there are earlier ones. Obviously, Plato poses that same kind of question. How did he think it out? But the essential thing is, the human mind, in this respect, is immortal. The creative intellect, that perpetuates and advances the development of the human mind as a universal principle of mind, exists in cooperation with the existence of the human brain, but is outside and beyond the human brain. Once it's created, the

human brain that created it, is no longer needed. Except that the memory of that brain's action is very valuable to people to try to understand what they've discovered.

Therefore, that gives them an edge, of saying, well, we discovered this, we discovered this, we discovered this. So now we can take the history as we know it, and we take this, and we say, wait a minute—this is the way the evolution of our mind is working, especially, and we call that principle. And when people come to a universal physical principle, a universal physical principle, as defined by a mathematical physics, properly, is always of that nature. We call it a principle.

And take the case of Brunelleschi: a principle! Cusa: a principle! Kepler: a principle! These are not mathematical entities.

The same thing is true with Planck, with Einstein, and with the concept of life, which is brought to a certain maturity by the work of Vernadsky. These are all matters of principle.

And if you know this kind of thing—and only if you do!—if you don't think this way, you can't know the future. Because you haven't got the experience to be able to judge what the future is going to be, because when you *know* the future, and discover it in this way, then you *know* it. Because you have a knowledge of what knowledge was up to that time. You may have some blanks, but you know what knowledge is, and you know what the *future* is! Because you know where you're going, and you know where you *don't know* where you're going, too. Which is also, equally important.

So therefore, the human beings go through this kind of tri-point relationship. You have to have the contradictions, which gives you dimensionality to your knowledge; and what the tri-point means—it's dimensionality. You have one point, you have another point, and a third one; and this characteristic gives you direction. The order of the points, and the points are not just arbitrary, they're ordered: so, ordered points, in a series on a question, on things which correspond to universal principles, these are the way in which you know the future. You don't know it perfectly, but you know the future as you are capable of knowing it.

That's all I can do, either. I don't think anybody can do it any better than that. That's the way the human mind works, successfully.