Jason Ross

Developing Higher Platforms of Science and Technology: Key to Human Progress

This is the edited transcription of Mr. Ross's presentation to the Schiller Institute conference on September 5. He is a co-author of the Schiller Institute's 2017 Special Report, Extending the New Silk Road to West Asia and Africa: A Vision of an Economic Renaissance. *Subheads are the author's.*

Schiller Institute

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Throughout his career, Lyndon LaRouche was the American political figure most well-known for his advocacy of nuclear fusion, as the absolutely essential next step in human progress.

In the mid-1970s, LaRouche founded the Fusion Energy Foundation (FEF), dedicated to making nuclear fusion a reality. The FEF published a technical journal, the *International Journal of Fusion Energy;* a magazine, *Fusion;* and a number of books. Its members were involved in the legislative process and in the discussions with President Ronald Reagan about what Reagan proposed in a nationwide TV broadcast on March 23, 1983 under the name, "Strategic Defense Initiative," a proposal to work with the Soviet Union to develop new defensive technologies, including lasers for knocking out nuclear weapons and thus make the world safe from nuclear extinction.

LaRouche believed that it was only by superseding past science and technology that poverty could be entirely eliminated, the problem of resource depletion could be overcome, and humanity would be able to perform the next generation of experiments to discover the next generation of scientific principles. This is a process of unending growth of the human species that mirrors the developments we've seen both in the biosphere—with the increasing complexity and energy intensity of life—and in the universe as a whole, with the formation of complex celestial structures whose mysteries we have only begun to explore.

In this presentation, we will take up three topics:

1. The economic value of scientific progress,
2. The infrastructural, industrial, political, and cultural platform by which scientific progress changes our lives, and
3. How great visions for scientific and technological advance bring us to an understanding of the universality of the potential immortality of the individual human mind.

The Economic Value of Scientific Progress

Human economy exists because of that which distinguishes us absolutely from the animals: the ability of the individual human mind to develop a hypothesis, an idea, that embodies something perceived not by the senses, but which acts upon the perceived world—that is, universal physical principles.

These discoveries are like tools, but they aren't physical. An ape may use a stick to extract a meal of termites out of a mound in the earth, and a sea otter may use rocks to crack shellfish to consume, but only human beings use electromagnetism, navigation, geometry, poetry, fire, mathematics, and music.

Only our beautiful species, sharing a universality of the powers of our minds, unlike any animal, has built irrigation systems to improve access to food, trans-

formed other species through the selective breeding that has given us modern grains, fruits, vegetables, and even animals, liberated the power of coal to produce motion—with the steam engine—freeing people from drudgery and making it possible to produce goods for common people, created transportation networks to bring our societies closer together, and even left this planet to set foot on the Moon, which the animals can see, but not understand or visit. (Unless we bring pets!)

Scientific hypotheses, by which we reduce the imperfection of our understanding of the world around us, are the ultimate source of economic wealth, the means by which we improve the productivity of our labor, and the springboards to developing yet better hypotheses.

How are these discoveries made? And how certain can we be in our knowledge? Consider the problem of induction. If I observe something happen without fail 100 times, am I guaranteed that it will happen again the 101st time? Imagine a turkey being fattened up for Thanksgiving. Every day it is fed well and taken care of, each day providing more evidence to Mr. Turkey that life is good ... until Thanksgiving arrives! *Repeated experience is not the basis of knowledge.*

The escape from the problem of induction is the concept of the *crucial experiment,* in which someone uses his or her hypothesized *cause,* to create something that has *never* happened before. How many times do you need to observe an electric motor working to learn that there is a connection between electricity and magnetism? You don't need 100 experiments to convince yourself of the Pythagorean theorem if you've shown geometrically why it must *always* be true. How many hydrogen bombs needed to be exploded to validate the basic understanding that gave rise to them?

As Einstein reminded the world a little over a century ago, our knowledge is never perfect, but it is *perfectible.* The universe *rewards* our knowledge—less imperfect than it used to be—with improved power to reshape the physical world, to improve our livelihoods and discover yet more. Unlike the animals, our carrying capacity is neither limited nor pre-determined. Progress brings about higher levels of population and of *potential* population density for the human species.

This brings us to the second topic.

Platforms and Productivity

How does a discovery become effective in society? How does a thought manifest itself in improved living conditions?

LaRouche discussed the relationship between discoveries, infrastructure, and production in his 2005 paper, "Science, the Power to Prosper":

> All discovered, valid notions of any universal physical principle, implicitly define a field, a *field* which is the functional notion of the extension of the efficacy of that principle throughout the universe as a whole. It is the action expressed by the impact of the potential expressed by a field upon the setting in which production occurs, which is the focus of our concern in this report as a whole.
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> For example, the application of Dirichlet's Principle to any field of action, elevates the experimental viewpoint from a collection of calculations to a single act of conceptual thought, a conception which, like Kepler's notion of universal gravitation, efficiently subsumes, implicitly, all of the relevant, detailed calculations. It is impossible to develop any competent insight into the way a modern economy functions, physically, except by employing the way of looking at a field in the way Riemann's treatment of what he terms Dirichlet's Principle applies.
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> The understanding of this point which I am developing here, enables us to understand *why the transfer of the production of a product, even when the same technology of design and production is employed, from a developed economy, to a less developed economy, has usually resulted, during the recent quarter century, in a net collapse of the level of the rate of generation of per-capita productivity in the world as a whole!* The transfer of production from a nation with advanced development of its infrastructure, to a nation of relatively poor people with a poor development of general infrastructure, tends to produce a collapse of the physical economy of the planet as a whole. The role of the field represented by basic economic infrastructure, has been ignored, with what tend to become ultimately fatal economic results for all concerned.
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> By choosing a field of application which itself represents a zone of lower potential, the effective productivity of labor, per capita and per square kilometer, is relatively reduced.

Let's use the introduction of electricity into the rural

areas of the United States as a case study, to look at how an improved infrastructure platform transforms society and productivity.

The Rural Electrification Administration (REA), created by an Executive Order by Franklin Roosevelt in 1935 and funded through the Rural Electrification Act of 1936, was created at a time when electricity was becoming widespread in American cities, but still nearly 90% of American farms lacked access to electricity. The costs to string wires to those farms was considered prohibitive, in light of the small electrical use per household, as forecast by the electric companies. Using their understanding of the past, they didn't think it was worth the money to bring power to America's farms.

The REA made loans to farmer cooperatives, to build their own power lines and even to purchase appliances and equipment.

The results were stunning.

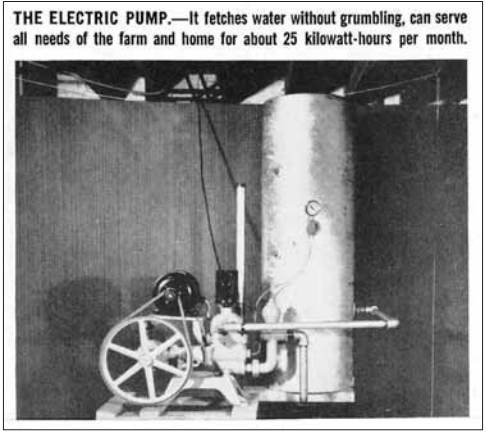
The electricity was not simply *inserted* into an otherwise unchanged geometry, used only to power the radios, washing machines, and lightbulbs of city dwellers. Rather, it had the effect of transforming the productive potential of the farms.

For example: Refrigeration reduced disease from food poisoning and ensured that more of the agricultural produce could be consumed rather than being wasted. Lighting in chicken coops increased egg production significantly, particularly in the colder, darker winter months. The chickens weren't re-engineered, but their environment—the *field* in which they lived—was changed. Electric pumping saved dozens of hours per family per year, compared to a back-breaking labor of using a hand-operated water pump.

The project was a success. By 1951, the proportion had been reversed: instead of 90% of American farms lacking electricity, now 90% were on the grid.

THE ELECTRIC MILK COOLER.—Milk keeps sweet in a modern regulated dairy cooler; 1 kilowatt-hour will cool 10 gallons of milk a day.

THE ELECTRIC BROODER.—For as little as ½ of 1 kilowatt-hour per chick, a whole brood can be raised under a modern brooder.



THE ELECTRIC PUMP.—It fetches water without grumbling, can serve all needs of the farm and home for about 25 kilowatt-hours per month.

This was an incredible shift in potential productivity, when a more advanced platform of infrastructure exists to support it, and it can be carried out again, in many ways.

Consider what nuclear fusion will mean for the world. It's not just cheaper electrical power, or doing what we already do more easily or more cheaply—think about the *new* things we can do:

• A fusion torch can vaporize and dissociate waste, separating it into its constituent atoms. That's recycling!

• Currently, essentially *all* production of new (non-recycled) metal from rocky ores requires the mining of coal, not only for its energy content, but for its chemical activity in the carbon, drawing out the oxygen. This antique method can be superseded with the energies fusion can bring.

• Space travel will no longer be limited to the energy density of chemical fuels, which are not susceptible of much improvement beyond their current levels. Rather than spending nine months going to Mars, we can go there in just a couple of weeks, by leaving the engine on as we're on our way, rather than just using it at the beginning and coasting to that destination, which is what we do now. Even with this coasting, most of the mass of a rocket going to the Moon is fuel. It's enormous. See **Figure 1**. In one sense, chemical fuel is just barely able to bring us to other celestial bodies. We need something better.

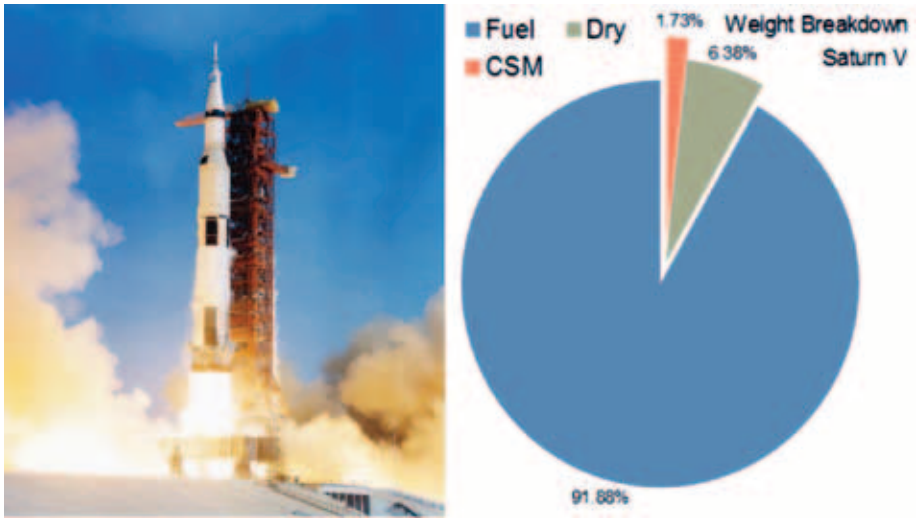
• Water shortages are becoming an increasing issue around the world, where groundwater supplies are being drawn down faster than they are replenished. But there's plenty of water in the oceans. Nuclear fusion will make it economical to desalinate ocean and other brackish water on a broad scale for agricultural use, far surpassing the small projects that exist today, primarily geared toward urban use.

• Energy-intense manufacturing processes, using large electrical currents or high-powered lasers, will usher in a new generation of production techniques.

In short, fusion power, as a platform, will enable tremendous improvements in the productive powers of labor. We should look for such progress that can create a 10-fold improvement, rather than small marginal gains.

Here is Lyndon LaRouche, writing on this topic in 2010, "What Your Accountant Never Understood: The Secret Economy":

FIGURE 1



NASA

The Saturn V rocket. (The weight of the command and service module is designated CSM.)

> We should then recognize that the development of basic economic infrastructure had always been a needed creation of what is required as a "habitable" development of a "synthetic," rather than a presumably "natural" environment for the enhancement, or even the possibility of human life and practice at some time in the existence of our human species.... Man as a creator in the likeness of the great Creator, is expressed by humanity's creation of the "artificial environments" we sometimes call "infrastructure," on which both the progress, and even the merely continued existence of civilized society depends.

In addition to the new platforms possible with fusion power, the current COVID-19 pandemic should remind us of the importance of making breakthroughs in biology.

What is the effect of living in a society committed to progress, in which every decade brings a better life than the past? Clearly, a great deal of happiness at being able to live more easily, but also a cultural connection to the beautiful potential of the human species itself, the third and final topic of this talk.

Immortality

Lyndon LaRouche wrote in 2004,

> The conspicuous shortfall of otherwise talented leaders among us, is that we have become a nation which, for all its current rant about religion, has no actual conception of a real form of immortality. In this mass-entertainment-soaked, "Where's my money" citizenry of today, there are few Jeanne d'Arcs, Abraham Lincolns, or Rev. Martin Luther Kings among us, who are prepared to put all that which is mortal in them, as a talent on the altar of service to the foreseeable good of the future of mankind....
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> —Lyndon LaRouche, "Re-Animating the World's Economy" (2004)

A great leader, such as those mentioned in this quotation, acts in the present to change the future, of course, but also the past. The contributions of those who achieved victory in the American Revolution over the world's foremost source of evil—the British Empire—took on renewed meaning through Abraham Lincoln's success in defending the Union and in Dr. King's achievements in leading the country into greater coherence with the ideas of equality and the pursuit of happiness that motivated the nation's initial creation.

In these days, when identity politics is reaching a fever pitch, and people are drawn apart under a microscopic intersectionalism of heredity, religion, geographic background, sexual orientation, and what is called race, it is more important than ever to bring to people the challenge of acting on our *universality.*

The discoveries of a great thinker remain valid *even after they die.* Louis Pasteur is dead, but his discoveries live on, and continue to safeguard our health. Marie Curie is no more, but her breakthroughs continue to an-

imate our pursuit of the truth. Albert Einstein has passed away, but his epic reconceptualization of space, time, energy, and matter offers ever new puzzles to tease our imagination into discovering more about the universe. Dr. King was assassinated, but his devotion to his enlightened understanding of the human condition continues to inspire.

A functional immortality isn't about dying and martyrdom. Being willing to die to defend—or burn down—a dentist's office, a sandwich shop, or furniture store misses the point.

Will we wipe out poverty on this entire planet? Will we develop defenses against comets and coronaviruses? Will we create for our children and grandchildren a future in which they will have the opportunity to address their minds to new scientific inquiries and a culture that fosters that pursuit, creating a world worthy of the dignity of the human individual, here on Earth, and above it?

Or, will we shackle ourselves to centuries-old sources of power, like wind, and condemn ourselves to destitution, compared to that abundance that could be ours?

The answer lies with us.