

Panel III: The Frontiers of Science

From the Question & Answer Session

Panel III of the Feb. 16, 2019 Schiller Institute conference, in Morristown, N.J., concluded with a question and answer session moderated by Jason Ross. An edited transcript of selections from the question and answer session follows.

Jason Ross: Well, with that, we will be able to take questions.

Question: Hi, my name is Ian from Maryland. My question is about the potential future of exploration on the Moon, Mars, and possibly further to Europa, Ganymede, and even Phobos. What would be the future after, say, the Mars rovers, after the Chang'e-4 and the Yutu-2, and what are the potential futures for exploration of Europa?

Larry Bell: As I see it, we're looking at a phased program. We would go to the Moon in order to develop and test the technologies that we'd use to go to Mars. This has to do with testing ways of establishing habitats. But I think, in particular, the big mother lode in the Moon and Mars will be water. The reason we'll be looking for water is really for fuel, so we can reduce the amount of rocket fuel we have to bring with us.

We'll be going to the Moon, because it's so much more difficult to go to Mars; it's a lot farther away from the hardware store if something breaks; you don't have the windows to get back when something goes wrong. You have to be absolutely certain that things will be reliable.

I think, among the biggest issues we face—and the least understood—is radiation, cosmic radiation in particular, because it's very hard to shield against, and also solar radiation. So, we'll be looking at ways of providing shielding. Also, we're going to be interested in knowing how long people can work effectively in partial gravity. On the Moon, it's one-sixth the Earth's gravity; on Mars it's about 40 percent. We need to look at the biological issues.

We'll be looking at whether we can grow food, and how much nutritional value we can get from doing that. We'll go to the Moon, we'll be testing the technologies,

and then, in parallel, we'll be moving to Mars. It won't be one and then the other. The hope is this time it won't be [just] footprints and flagpoles: that we will establish infrastructures, where we can reduce the amount of back-packing. We're looking at 3D printing. I'm a little skeptical whether we'd be printing structures with 3D printing, but I think we'll be increasingly producing a lot of our equipment.

One of the big opportunities for technology is in the area, first, of tools to fix things; then of parts that have motors and gears and pumps inside of them. And understand that the things we put on the Moon or Mars, we can't exchange them; so we're going to have to have a whole new paradigm of thinking now, in which we focus on the things we can build and augment later. But we're augmenting with things we haven't even invented yet!

This is where the LaRouche idea comes in, where you have to look forward, beyond,—where we're going to be going, what are we going to be doing? And how are the systems and technologies we're using for the Moon going to be applied to Mars? Actually, I'd reverse engineer it. If we go to Mars, what do we need to test on the Moon, to be certain we can do that?

Optimistic China To Share Technology

Thomas Wismuller: I just want to bring out one thing here: The far-side Moon landing by China's Chang'e-4 was a spectacular achievement. Larry Bell and I know the complexity of the work breakdown structure that you need to make that happen. The fact is, thousands of things could have gone wrong, *but none did*.

Here's the positive: We have two countries that have advanced space programs, that now can start thinking about working together, and combining that knowledge and have us acting as a *planet*, as opposed to a nation, where we explore the rest of the universe. We've actually put a stop to a lot of the technology sharing, because of technological theft and things like that. However, China has made up its mind to share a lot of what they have achieved. If you go on the Internet, you're going to find a

lot more. We didn't do that, but China is. This is like a negative shot across the bow; China is saying: "Hey, we're going to share technology, why don't we start working together? We're already doing it with the Russians."

So I'm very optimistic about a future for humankind.

Question: My name is Faz. I'm from Michigan. I've got a seven-year-old, and we've actually "been" to Mars and to Europa—in our bedtime stories. He's designing a probe to go into Jupiter's atmosphere and figure out what's there. So we just make this stuff up.

But, my question is about terra-forming Mars. Is it possible to rebuild the magnetosphere of Mars, and have that rebuild its atmosphere?

Kesha Rogers: I want to answer that by thinking about first of all, is it possible to do this? Well, we're going to find that out as we explore more and develop the Moon. We'll learn a lot from the discoveries and the development of permanent settlements on the Moon and developing cislunar space. This is key, and I think it also answers the previous question.

One of the exciting things—Tom just brought this up—about what China's doing, is it wasn't just a one-time mission to get the Chang'e-4 to the far side of the Moon. It was a first, it was an achievement that had never been done before—but the Chinese don't expect to stop there. As a matter of fact, they just laid out their long-term proposal for six additional missions: Chang'e-5 for lunar sampling on the near side; Chang'e-6 will continue to look at the South Pole of the Moon; Chang'e-7 and -8 will start to advance our understanding of the lunar soils and what's there, and our capabilities for building permanent lunar bases and settlements.

I think we can accomplish what you're saying: Yes, that's the idea, that we can discover new means of life on Mars, in terms of advancing the magnetosphere and so forth, but we have to do this in terms of scientific economic phases that are going to build up the whole of the Solar system.

The Oomph to Escape Earth Gravity

Follow-Up: Should we use fusion power, or fusion rockets, to go to Mars, as a different and faster way? And then fusion power, to power something like an artificial magnetosphere—capabilities that we don't have today? These rockets that [Elon] Musk and [Jeff] Bezos and so forth are using are the same

things that we've had for 60, 70 years.

Rogers: As Mr. LaRouche has continued to emphasize, we need increased, high energy density drivers of fusion for propulsion. I disagree with Mr. [Buzz] Aldrin, with all due respect to him and all his accomplishments, but the idea is not to send humans to Mars on a one-way mission that's going to take nine months to two years, and we don't even know if they're going to get there, if they're going to be a puddle of putty, or if they're going to be able to be productive on Mars, and be able to come *back* to planet Earth.

We do have to go with higher energy densities of fusion propulsion, and to advance 1-g acceleration, to get people more quickly to Mars in a short period of time and be able to return them safely. We want to get them to Mars, and be able to return them safely to Earth, and collaborate back and forth.

Bell: I'd like to comment just briefly on propulsion systems. We'll probably be using chemical propulsion systems for a very long time. When we talk about ion systems, what happens when you're launching from Earth, it takes a tremendous amount of energy to break through the gravity pull of the Earth to go to orbit. These rockets are going to be chemical-propulsion systems for the foreseeable future.

Ion-propulsion systems are a very efficient system once you get out of the Earth's gravitation pull. It's very low thrust. Unlike the chemical systems where you want a big blast, and it takes some tremendous amount of energy, ion systems once they get into orbit, they keep going and they keep accelerating; they keep accelerating, they keep accelerating—but the thing is, it takes a long time to get out of the Earth's influence.

And we also have this really nasty area called the Van Allen belts surrounding the Earth; it's very radiation intensive, probably worse than the whole Solar system surrounding the Earth. So, we want to get people through that area as quickly as possible, and we're not going to do it with ion systems. It takes them too long to get out and to get there. Once they're out there, then we can keep them in big cycling orbits like what Buzz [Aldrin] has been proposing with the cyclers and so on.

The point is, we're going to be using chemical systems for a very long time. They're going to be either hydrogen-oxygen or eventually, if we go to Mars, maybe we'll harvest methane, and do this. We're going to need power.

Think Long-Term, Like LaRouche

One of the things that needs to really be developed is nuclear power, whether it's fusion, helium-3, like [Harrison] "Jack" Schmitt and others have been proposing; but we need power, and we're going to need nuclear power. We don't have enough access to sunlight to electrolyze the water and get the resources and so on, we're going to have to have advanced nuclear systems. Those systems need to be developed on Earth, to be tested, at the scale we can use, like 100 kilowatts, not megawatts, but we'll need nuclear power.

One thing we can use as a model is the Antarctic Treaties, where we've had international cooperation, and that basically was leveraged into the Space Station program, where we have international cooperation on the Space Station, although China was excluded because of technology transfer issues. Whether or not we'll be able to bring China into that community, in terms of technology transfer, I think is going to depend a lot on what Donald Trump does, now, in terms of these treaties, in terms of protecting proprietary information.

As I said earlier, space can be a dream or it can be,— we can think of space as nuclear, as North Korean missiles coming down on our head: That's space. Or, you can think of space as going together forward, to the Moon and Mars and so on. These are very expensive programs; they're long-term programs. One of the concerns is, let's say you team up with China or Russia, and you have this long-term program, and they're going to develop a critical element in that program that you depend upon. And now you're at war with them, or you have a Cold War; they don't deliver their part of the program that's critical to getting there.

We have a choice then: I believe that the U.S. has to be in a position to say, "We're going to go, and if you want to join us, you can, but you're going to have to demonstrate that you're a reliable partner." And that's going to be a very big hurdle to solve. These are enormously long-term programs, they have to be long-term programs, but because of this, they force us to look at the future, and I think that's what Lyndon LaRouche was urging us to do.

Ben Deniston: Just briefly on propulsion. I think it's an issue of the priorities and the vision. We had a pretty much fully functional nuclear fission rocket in the early 1970s, where every element was tested independently, and instead of putting it together and flying it, we decided to abandon that perspective.

When it comes to propulsion, Mr. LaRouche's perspective, which I thought was very insightful, was that you need *high-thrust* fusion propulsion, not just simply *low-thrust ion*, but high-thrust fusion propulsion for avoiding the radiation issue in space. Reduce the travel time to Mars to an issue of weeks, instead of the many months which is currently proposed, with all kinds of health issues.

So I think we fundamentally need a return to a science-driver perspective and program as Lyn said in that video, as we had in the Kennedy era. That's really what we have to be fighting for.

The Stretto

Ross: Given the time we have left, I think if everybody takes 45 seconds to ask a question, let's hear from everybody, and then we'll give a very, very brief response.

Question: I'm Mrs. Turner from the Bronx. This question is for Professor Cooper. I don't think we're ever going to get these projects done in Africa, as much as I would like to. I have heard that Libya was going to do something similar, but they were stopped in their tracks. They had a wonderful water system in their country; Qaddafi had a plan to make the African gold dinar, to help Africa get out of its underdevelopment stage and build Africa up with gold dinar, just for Africans. Get rid of the dollar, get rid of the franc.

Question: Joel from Houston. The Direct Fusion Drive (DFD), I don't know if it came through in the video, but DFD devices are using deuterium and helium-3 as fuel, thus generating charged particles as fusion products that can be controlled by magnetic fields.

Now, when we met with [Michael] Paluszek, he mentioned that Apollo 17 astronaut Harrison Schmitt called for going back to the Moon to mine helium-3. Paluszek said that the Apollo astronauts were the first helium-3 miners. And if we don't get on the stick, we're going to import our helium-3 supplies from China. I'm sure they will sell it to us at a slight markup. We need to tell Buzz that if he wants to come back from Mars, he can ride one of these direct fusion drive rockets. Paluszek is a fellow MIT graduate, so Aldrin would be in good company.

Question: I'm from New York. I would like to say thank you for this good conference, with the great music

earlier to celebrate the great man. I'm a member of this organization, and surely I'm so thrilled with that man's great work.

My question tonight,— the theme of our conference is “Let's Create a New, More Human Epoch for Mankind,” and I'm asking, can that be physical? Although we have great things happening with technology, we also have the other side of it, for example, what happened in Cuba. I don't hear people talk about that. And Monsieur Jacques touched on that this morning, about the mind control—we didn't talk about that as well.

Question: We could probably get the Greenies off our back about terraforming Mars, by pointing out that Phobos is doomed, and if we don't intervene, it'll crash into the Mars. So if they want to keep everything in the Solar system just the way it is, there's only one alternative, that's to let us get out there and keep it the way it is!

Question: The topic of space exploration, albeit a truism for the necessity to expand the realm of civilization, to me has a similar ring to the call of manifest destiny, leading to one of the softest genocides of cultures, you know, roughly 80 million Native Americans, on the behest of cultivating national identity.

This is a three-part question:

First part, how can we be sure that powerful figures like Elon Musk or Jeff Bezos, worth over \$140 billion or whatever, or other corporations, would treat the resources of celestial bodies better than their own home?

Part 2: Who gets left behind, or who is allowed to explore space? I think that's a pretty important question.

And 3, you can decide to answer this or not, kind of a joke: Should we be sending war criminals to space using magnetic propulsion systems instead of chemical propulsion?

Question: Ed from Wilmington, Delaware. I'm glad to hear that we're talking about the Strategic Defense of the Earth that LaRouche put forward years ago, and Ben, you've done some great work on this stuff. I'm just concerned, because I'm not sure people understand how vital this is. It may not be as remote a possibility as people may think. There were extinction events many million years ago, but some people believe, based on lots of evidence, that the Earth has been hit by celestial bodies within the last 15,000 years, *twice*, and this caused major disruptions of the planet. So, it's a lot more urgent.

How Will African Rail Get Built?

Question: My name is Innocent, from the Ivory Coast, and now a New Jersey resident. The question is about the rail in Africa. One of the observations that people might not know, is the influence of the French government in certain parts of Africa. They have their hands on everything—the economy, and everything. How would you deal with these issues, to develop these types of project? Thank you.

Ross: Given our time, I am going to answer all of the questions, except for the one about African rail, which Hal, who has not spoken on this panel, will respond to.

Thank you for the point that the DFD is using helium-3. This is very important. As Joel said, helium-3 is a very special fuel, because all of its fusion products are charged, allowing its easier use for propulsion and for power generation.

Regarding whether it's feasible to achieve our goals, given mind control and other sorts of things, we're going to have to determine that. Many people would believe that it is not possible for the universe to exist in a state that we can't achieve good in it. I'm among them.

Good luck with the Greenies and Phobos.

Definitely war criminals should be sent to Mars, using perhaps the StarTram technology. They might not even make it off the planet.

Let's turn next to Hal Cooper for a very brief response about the Libyan rail. We're then going to have two important concluding remarks.

Hal Cooper: I'm going to answer the questions about the rail. Yes, the British got their hands in it. The rail lines need to be nationalized by the individual governments, and I think ultimately you're going to have rail networks constructed not by the British, but by the Chinese in particular.

We also have the issue of helium-3. I had some information that was presented to me by one of the companies that is producing helium, and they tell me that in western Kansas, near Hays, Kansas, the helium deposits have 100-150 ppm of helium-3.

Ross: Interesting!

Cooper: Can that be recovered by fractional distillation? It certainly can!

LYNDON LAROUCHE

Concluding remarks from Lyndon LaRouche, taken from his 1988, Woman on Mars nationally televised broadcast.

It means a much better way to live, than the drab misery, illiteracy and decay, into which our nation has drifted in the past 20 years.

Then, 39 years from now, we shall hear the broad-

HELGA ZEPP-LAROUCHE

Mrs. LaRouche is the founding President of the Schiller Institute. She convened the Feb. 16, 2019 Schiller Institute conference, in Morristown, N.J. These are her closing comments to the conference.

I want to thank all of you, especially for the extreme expression of love which I have felt over the day and also the last couple of days. That's the one thing which was not mentioned today about Lyn: That he was—in one sense, *is*—the most loving person I have ever met. Love, in the true sense, is love for mankind, passion to improve mankind. And I was so struck, not the first time, because it's one of my absolute favorite pieces of music, by the *Choral Fantasy*, and for those who understand the German, it says,

*Nehmt denn hin, ihr schönen Seelen,
froh die Gaben schöner Kunst:*

“Thank you, beautiful souls, these donations of

cast from Mars, announcing that the first permanent colony there is operational. Among those colonists will be some of the children and grandchildren of you watching this broadcast tonight. Many of you will be watching that first television broadcast from that new colony. Already, the woman who will speak to you then, from Mars, has just recently been born somewhere in the United States.

We shall give our nation once again that great future which our children and grandchildren deserve.

great art,” as a celebration of creativity. And this was actually leading to the Ninth Symphony—Beethoven's composition, which is a composition of the *Ode to Joy*. If you know the text there, it says, “All men will become brethren. Above in the skies, there must live a loving Father.” It is that celebration of the beauty of the universe, and the beauty of mankind which we have been celebrating today.

Having listened to the many comments from Lyn, here and there on all these different subjects, I think we should go out of this conference, with an absolute solemn commitment, that each and all of us become better people. Because this is the precondition for making the new epoch of mankind—it will start with us. We must take up the torch, we must be the example of what the New Renaissance means. If we improve our relations among each other and celebrate each other's creativity, then, we will be the shining example of what the new world, the new epoch, the new paradigm can be.

So with that, I want to thank all of you. And, go out and multiply.

