China Lays Out the 'Science Driver' For Its New Development Path

by William Jones

Jan. 15—With the increasingly strident tones coming from Western media and many Western officials, who have bought into Secretary of State Mike Pompeo's anti-China rant and continue to speak of the "malign influence" of China's ruling Communist Party in every positive initiative taken by China, the Chinese government has taken the decision to rely more on its own resources to drive its growth rather than on the vagaries of the "world market," so easily disrupted by "geopolitics." The key to the success of the policy is enhancing the development in China of science and technology, which holds the key to real sustainable economic growth.

As statesman and economist Lyndon LaRouche continually emphasized during his lifetime, the key to economic development is the advancement of technology. And the secret to developing science is for a nation to have a *science-driver* program. Throughout his life, LaRouche underlined the importance of this by pointing to President John Kennedy's Apollo program, which provided the U.S. economy with a myriad of technological breakthroughs, and fueled its economic growth. (This is also true of the Artemis Moon-Mars program launched by the Trump Administration—if it is allowed to continue under the new administration.)

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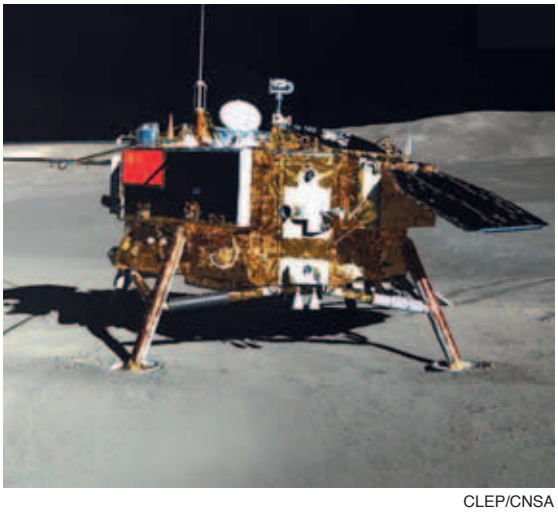
Workers on the fourth generation high-temperature gas-cooled pebble-bed reactor project.

LaRouche spent the last four decades of his life trying to convince several U.S. administrations to return to this successful path. Alone among the economists of his day, LaRouche saw the fundamental role of technological progress as the real "driver" of production: defining the issue in 2001 in an article titled, "The Science-Driver Principle in Economics: The Gravity of Economic Intentions":



CLEP/CNSA

The Chang'e-4 lander and rover, the first space vehicle to land on the far side of the Moon.

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China unveiled a 600 km/hr maglev train on July 19, 2020, shown here on a test run at Tongji University in Shanghai.

> The central feature of any long-term economic program for today, will be the role which *a series of "crash program" types of science driver programs, of accelerated scientific discovery and technological change,* must contribute, if the world's population is to escape *a long-term economic catastrophe already built into the current state, of combined technological underdevelopment and attrition, of the world at large.* [Emphasis in the original.]

China today has taken these lessons very much to heart and can well serve as a model for what LaRouche was describing. In a press conference on January 2, Wang Zhigang, the Chinese Minister of Science and Technology (MOST), referred to both the Apollo program and the World War II era Manhattan Project as paradigms for that model which China is now placing, with the recent proposal for the next (the 14th) Five-Year Plan, at the center of its national policy. While China has had science and technology as a fundamental driving force from even before the "reform and opening up," it is now at a more advanced stage. China is now a country, indeed the only country, that has eliminated extreme poverty. With the vision now laid out in the 14th Five-Year Plan, China will no doubt be looking at multiple science drivers as it moves forward.

The Organization of Science

In a speech presented to Chinese scientists and engineers on September 11, 2020, President Xi Jinping identified the "four faces," or rather "four challenges," as the criteria for scientific work. The first was the challenge of the "frontiers" of science, which required totally new discoveries of things hitherto unseen; second, scientists had the challenge of supplying the "economic battlefield," that is, maintaining the engine of growth and the ability of China to become a major scientific power in the world; third, it had the challenge of meeting the major needs of the country, filling the gaps in areas in which the country was deficient and providing the security of an endogenous "supply chain"; and fourthly, they had to meet the needs of people's lives and health, more important now in the fight against COVID and related diseases than ever before.

Creativity at the Center

This will also involve a grand mobilization of new scientific cadre. Again, Minister Wang:

> Entering a new development stage, implementing new development concepts, and building a new development pattern, we urgently need to build a "technical army of aces," using it as a national strategic scientific and technological force…. At the critical moment of safeguarding the national strategic interests, it must be able to rush forward.

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To fuel its ambitious development strategy, China has placed great emphasis on the development of nuclear energy.

Minister Wang underlined the importance of the individual creativity of the scientists and researchers:

> The experience of reform tells us that the cre-

ativity and innovation of researchers are the most critical elements in scientific research activities, and that the future reform of the scientific and technological framework will be transformed from its past support of institutions and tasks to more support for talented people.

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Hualong One, China's first nuclear power facility with domestically developed technology, was connected to the electrical grid on November 27, 2020.

Creating an Innovation System

Many of these issues were laid out in detail three days later at the 2021 National Science and Technology Work Conference on January 5, also chaired by Minister Wang. At this meeting, Minister Wang noted that the COVID pandemic had placed the area of people's life and health on the front burner and had given a boost to major research programs in the area of epidemic prevention and control, with a number of practical results in the fields of drugs, vaccines, and testing.

With regard to the task of developing research in the key "core technologies," he noted, China will initiate a major program to construct new scientific centers. China intends to build 13 national applied mathematics centers to carry out major "special tasks." The Plan will also entail the construction of the three major innovation centers in the Beijing-Tianjin-Hebei city cluster, in the Yangtze River Delta area around Shanghai and in the Guangdong-Hong Kong-Macao area in the south. Cooperation between institutes and enterprises in different parts of China, which previously occurred in single "point-to-point" links between individual institutions will now be woven into a "systemic layout" to create greater synergy in the scientific work nationally.

The mainstay of innovation work will be the enterprises in close collaboration with the universities and research institutes. Twenty-one national independent innovation zones and 169 national high-tech zones have become the major drivers of innovation, and the science ministry aims to develop one hundred new high-tech centers in the second- and third-tier cities and one hundred high-tech industrial parks in the central and western parts of the country. Creative technology centers, technology business incubators, accelerators, and university technology parks constitute a full-chain innovation and entrepreneurship incubation system. The number of high-tech SMEs (small and medium-sized enterprises) and high-tech enterprises now exceeds 200,000.

ITER

The EAST fusion reactor in Hefei, China's first major fusion reactor.

One of the key areas designated is in the all-round development of nuclear technology. This was also un-

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The HL-2M fusion reactor in Chengdu, an advanced tokamak design, will provide key technical support for China's participation in the ITER project.

derlined by Minister Wang. China has a three-step program for nuclear energy: third and fourth generation nuclear facilities, conventional breeders, and controlled fusion reactors. At present, China has a complete nuclear fuel cycle system found in only a few countries in the world. In addition, China is a founding nation in the International Thermonuclear Experimental Reactor (ITER) project in France to develop fusion energy. (See the interview in this issue of *EIR* with Luo Delong, the head of China's representation at ITER.) While China now has 49 nuclear reactors, it is accelerating the pace with its desire to significantly reduce its dependence on coal, which now provides over 58 percent of China's electricity.

Fostering Creativity

China will also significantly increase its investment in basic scientific research and applied basic research, encouraging researchers to venture into what Wang somewhat jokingly called the "no man's land" of science. Wang said that scientists should not only be encouraged to explore the frontiers of science driven by their curiosity, but also with an eye on the problems of economic and social development and industrial practice, and solve the basic theories and resolve the underlying technical "hard nuts" in key core technologies. The Ministry will formulate a ten-year program for the development of basic science.

Scientific research personnel will be given the right to own or use the long-term rights to their scientific and technological achievements, according to Minister Wang. Also in accordance with the new Five-Year Plan, much research will continue in those areas which can accelerate the program of rural revitalization and stabilize the gains of the poverty alleviation campaign by introducing new technologies into the rural economy .

There will also be a major reform in the evaluation system for scientific research. The system of judging the performance of a researcher or scientist solely on the basis of the number of papers he or she has written, will be scrapped, and broader criteria used to determine the creative work of individual researchers. Measures will be taken to help reduce that burden on scientific research personnel in order to stimulate their innovation vitality. A whole new system of academic and scientific evaluation will

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A small village in 1978, Shenzhen has become the leading science innovation center in China.

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China's polar icebreaker and research vessel, Xuelong II*, entered service in 2019.*

be established, national scientific and technology award regulations will be revised, and scientific research project management reform pilots will be carried out to determine the best means of promoting innovative thinking.

At the same time, China will continue its cooperation with the international community in the realm of science, both in participating in major projects internationally and inviting foreign researchers to work in projects in China. Many researchers from all over the world are flocking to the science centers in China to participate in the exciting work being done there. In Shenzhen, the leading innovation center, over 7,000 foreigners are now residents, engaged primarily in research, management, and education. China's Belt and Road Initiative (BRI) has also promoted scientific exchanges among the participant nations, with the creation of industrial and science parks in the BRI countries.

In spite of the overwhelming problems of COVID in 2020, China has experienced a strong period in its science programs in the last couple of years. In space, Chang'e-4 landed on the far side of the Moon, and Chang'e-5 completed a successful robotic sample return from the Moon, creating new inroads in space exploration. The Tianwen-1 is on its way to Mars and is scheduled to land there in February. China launched satellites with new and improved capabilities, such as Wukong, which is investigating "dark matter" in the universe, and Micius (or Mozi), which is at the center of China's quantum communications network, the largest such system network in the world. Quantum communications provides a system that "hackers" cannot penetrate. China's BeiDou Navigation Satellite System (BDS) is now a complete global navigation satellite system comparable to the U.S. GPS and the European Union's Galileo.

China's deep-sea vessel, *Striver,* has plunged to a depth of 10,000 meters in the Mariana Trench, bringing back samples from a region designated in the 1930s by Russian scientist Vladimir Vernadsky as most important for understanding the history of our planet. Last October, the *Xuelong II,* (Snow Dragon2), a China-built icebreaking research vessel made its first voyage to Antarctica. The China Spallation Neutron Source and the Five-Hundred-Meter Aperture Spherical Radio

NASA

The Five-hundred meter Aperture Spherical Telescope (FAST), in Guizhou, southwest China, is the largest filled-aperture radio telescope in the world.

Telescope (FAST)—the world's largest filled-aperture radio telescope, which is available to scientists worldwide—were both completed in 2020. The first 600 km/hr maglev rolled off the assembly line, and a prototype of an entirely new generation of maglev based on superconducting magnets has been debuted. But much of this could well pale in the face of what China hopes to achieve in the "new development era."

The U.S. Response?

While much of this development seems to have taken many U.S. policy-makers by surprise, as reflected in the eagerness of some to undermine China's development, it was foreseen and promoted by Lyndon LaRouche during his lifetime. In an interview with *Xinhua* on August 3, 2013, LaRouche, speaking of the world still suffering in the aftermath of the 2008 financial crisis, said the following:

> China has to be an active factor in making the decisions which are going to be required, if we get rid of this problem. And it will mean a change in China's orientation, because China will move into a greater emphasis on high-technology development, than now. And more emphasis on the increase of the productivity of the Chinese labor force. The idea is to increase the power, per capita, of the China population. And under those conditions, China will have a greater self-independence, which is a very important factor. This is not to depend entirely on exports, but to have a self-increase of the productivity of the labor force of China. And with a higher technology, that can be achieved.

Looking at the situation from LaRouche's perspective, what is happening in China represents a genuine step forward in dealing with our suffering world. If the U.S. were to return to those principles of scientific discovery that made America great—including cooperation with China in space as it did with the Soviet Union—it would find greater affinity with what China is in the process of accomplishing, and greater reason to cooperate with China, this time as an equal partner rather than a "mentor," in solving those problems of mankind that are now crying out for a solution.