

Science and social crisis in 2019

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In the opening days of the new year, a series of major scientific breakthroughs has demonstrated humanity's immense capacity for understanding the world and using this knowledge to solve the many social ills plaguing modern life:

- On January 1, NASA's New Horizons spacecraft flew past the Kuiper Belt object Ultima Thule. It was the second astronomical body observed by New Horizons, after Pluto, and the most distant asteroid ever observed by a robotic explorer launched from Earth. The data sent back by the probe, through the combined efforts of an international team of hundreds of scientists and engineers, has already begun to inform the research describing the early history of our Solar System.

- On January 3, the China National Space Administration (CNSA) lunar exploration mission Chang'e 4 achieved the first soft landing on the far side of the Moon and successfully deployed its rover Yutu-2. The scientific payloads were developed and are operated in tandem with researchers in China, Germany, the Netherlands, Saudi Arabia and Sweden. It sent back the first closeup images of the less explored half of the Moon via a relay satellite positioned so as to be able to communicate with Earth and the lander simultaneously. Both New Horizons and Chang'e 4 are among the dozens of spacecraft, landers and rovers that are currently studying the Earth, Sun, Moon, Mars, Venus, Jupiter, asteroids, comets and even the regions immediately outside our Solar System.

- On January 4, plant scientists from the United States Department of Agriculture and the University of Illinois showed that it is possible to make genetically engineered plants that fix a "glitch" in photosynthesis. This flaw sometimes causes plants to produce toxins within themselves that must be expunged. Crops grown without this flaw could improve their productivity by 40 percent, which has the potential to help mitigate climate change and abolish world hunger.

- On January 14, scientists operating Chang'e 4 announced the successful germination of food and

clothing crops on the Moon, under the very low gravity of that body and after being bathed in solar radiation. Cotton, potato and rapeseed were all grown inside a miniature, artificial self-sustaining environment that was launched as part of the spacecraft's scientific payload. While the experiment has reportedly reached the end of its lifespan, it was a critical step towards establishing and maintaining human life on the Moon, Mars and beyond.

- Concurrently, machine learning and artificial intelligence are becoming more and more integrated with aspects of modern life, including medicine, transportation and manufacturing. Computer scientists are constantly exploring new ways to use this technology and they have encountered as yet no limits. Whole cities are steadily becoming powered by AI. Self-driving cars are on the verge of mass implementation.

Each of these advances demonstrates the potential to alleviate the need for backbreaking labor, to vastly reduce the time and human resources needed to build homes, schools and hospitals, to roboticize farming and transportation and to develop breakthroughs in medicine and human health. They are powerful rebukes to the incessant contemporary glorification of irrationalism, whether through the cultivation of backwardness and religious prejudice or the promotion of postmodernism and its rejection of objective truth. They stand as a mighty vindication of the materialist understanding of the world, that there are objective laws of nature and that humans can comprehend them and through practice based on that understanding, shape the world to improve human life.

These breakthroughs, on the other hand, contrast sharply with developments in society that have heralded 2019:

- The most recent data collected from UNICEF, the World Health Organization and the World Bank show that one in nine human beings, 815 million people, faces malnourishment or hunger and 9.1 million people starve to death annually. These figures include 150 million children who are hungry and 3.1 million children who starve to death each year.

- There are currently 68.5 million people fleeing war, persecution and oppression. The UN estimates there are an additional 210 million people who have been displaced as a result of climate change.

- Fascist and extreme-right ideologies are once again being promoted by the political establishments in every country. Far-right parties are part of the governments in Italy, Austria, Brazil, Poland, Hungary, Japan, Finland, Bulgaria, the Czech Republic, Slovakia, the Philippines and Greece. The Alternative for Germany (AfD) has been welcomed into German parliament committees and its policies on refugees and internal security have been adopted by the German state. In France, President Macron has openly praised the country's World War II-era pro-fascist dictator Marshal Philippe Petain.

- Thousands of scientists at NASA, NOAA, the NSF, the USDA and the National Institutes of Health are currently furloughed as a result of the US government shutdown. Dozens of long-term experiments that are critical to monitoring Earth's climate, agriculture and public health are being increasingly disrupted. This disaster for scientific research comes as both Democrats and Republicans agree that the latest developments in modern technology, including drones and sensors, should be deployed against desperate refugees fleeing US-backed oppression and poverty in Central America.

These are only some of the contradictions of life in the 21st century. Even as technology is used to probe deep space, develop higher forms of global coordination and unlock the potential of key biological processes, it is being used to increase militarization, censorship and oppression at home and abroad. Every advance made in space exploration is intertwined with increased militarization internationally and the growing threat of world war. For every rocket that is aimed at studying the cosmos, many more are developed and built to destroy either a part or the whole of humanity. Crop science is used not to feed the tens of millions of starving humans on six continents but to increase the profits and market dominance of a few agriculture conglomerates and to develop biological and chemical warfare. Science under capitalism is used to increase, not decrease, social inequality.

Artificial intelligence plays a particularly sinister role. It is being increasingly used by companies such as Amazon, Uber and Lyft to track every move employees make and force them to work longer and harder. Tens of thousands of jobs will be eliminated as automation becomes more and more commonplace. And it has been deployed on a

mass scale by Google, Facebook and other tech companies in conjunction with US military and intelligence agencies to impose censorship on left-wing, anti-capitalist and socialist publications, track down immigrants with facial recognition, spy on virtually every human being and make war against the world's population on an ever increasing scale.

Both factions of the US ruling elite in Washington's political wars are at war with science. Trump and the Republicans deny climate change and openly promote religious obscurantism. Official liberalism and academia are in thrall to the postmodernists, who reject any conception of objective truth and the application of science to human thought, society and culture, denying in particular the revolutionary role of the working class.

In contrast, Marxists insist that science can and must be applied to society itself, above all, to the socio-economic structures in which humanity is currently trapped. This means cutting through the ideological domination of the corporate elite and studying unfolding events from the standpoint of the class forces at work. This means taking up a study of Marxism, which bases its revolutionary politics on an analysis of objective reality and class interests, and it means a turn toward the working class, the only progressive, revolutionary and international social force on the planet.

The working class offers humanity an alternative to the war, poverty and social misery that are endemic to capitalism. It is noteworthy that, in the ongoing Los Angeles teachers strike, educators are demanding not only better pay and smaller class sizes, but the defense of public education from a capitalist oligarchy intent on gutting it. While the ruling elite is set on dragging society backwards, the working class, in the struggle for socialism, offers it a way forward.

Only in a socialist society can the vast scientific and technological achievements of mankind be transformed from cudgels for enforcing class exploitation and making war to instruments for securing a prosperous and fulfilling life for all people.



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