The little ball made science bigger

When the Sputnik satellite went into orbit in 1957, it revolutionized the practice of international science and changed the demography of Western research.

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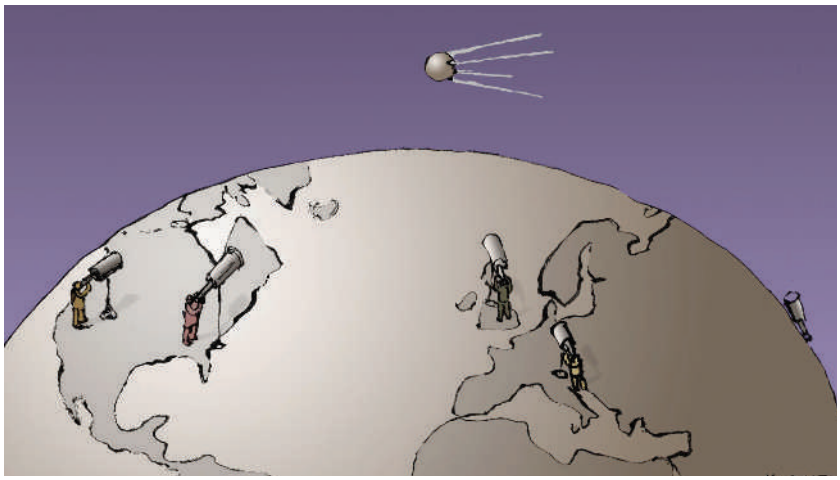

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The original Sputnik, a polished metal sphere with radio transmitters and antennas that orbited Earth, was a relatively humble venture. It was launched 50 years ago, partly by chance and before the space race, as publicly perceived, even existed.

The lead designers of the Soviet Union's R-7 intercontinental ballistic missile, including Sergei Korolev and Valentin Glushko, understood that their main mission was to develop strategic defence of the Soviet homeland, not cosmonautics. Capable of reaching the American continent, their machine would offer, for the first time, the possibility of retaliation against and deterrence of nuclear bombs from US forward airbases in Europe and Asia.

Some of the engineers still remembered their dream of space travel though, which at around 1930 had brought them as youngsters into the then amateur field of rocket design. At an opportune moment, when the Soviet leader Nikita Khrushchev was particularly pleased with progress, Korolev suggested using one of the missile's future tests for launching an artificial satellite into space.

Politicians demanded reassurances that such a distraction would not delay the main job, but agreed to reward the scientists and engineers — even though their desire seemed somewhat childish. Without waiting for more sophisticated instruments to be developed, Korolev went ahead with launching what was formally referred to as the 'simplest sputnik' — a basketball-sized satellite that could confirm the possibility of radio communication through the ionosphere. Although the R-7 was at a stage when roughly every second test encountered problems, the launch of Sputnik on 4 October 1957 went smoothly.

In the eyes of the Western public, Sputnik was a very different story. Even the Soviet engineers, aware that they had accomplished something very important, did not anticipate the enormity of the political reaction. Typically, the Soviets had looked down on the Western media's propensity for sensationalism. In this case, they found it working in their favour and started supporting it with propaganda claiming that the socialist system was taking the lead in technological development. Later, as the public and media attention shifted towards manned flight, the importance of Sputnik was unjustly downplayed.

The cold-war mentality is partly responsible for Russia and the United States choosing to celebrate the 1961 orbital flight by Yuri Gagarin and the 1969 moonwalk by Neil Armstrong as their respective victories in the space race. Instead, both should have recognized Sputnik as humanity's first great breakthrough in space. In the past 50 years, the series of sputnik missions has proved invaluable — from allowing global communication to fostering our common environmental awareness. The purpose of manned missions has remained uncertain.

Like the discovery of DNA's structure, Sputnik changed the practice of international science. Although a product of military research, it initiated a period of relative decline in the militarization of science that had become so overwhelming in the wake of the 1945 atomic bomb. The contrast between the indifference with which the public greeted the announcement of R-7's first successful military test, and the excitement generated two months later when the same missile launched Sputnik, spurred politicians to direct more support towards science through at least nominally civilian agencies. R-7 was eventually found to be impractical for military purposes and was replaced by other designs, but it remains the most successful, reliable and frequently used vehicle in the history of space launches.

> "Many of the scientists now retiring owe their jobs to the launch."

Some science policy concepts that were previously thought specific to Soviet culture were borrowed internationally, first by the United States. For decades the Soviets had been accused of denying the value of 'pure research'. Until about 1960 they were ideologically committed to the notion that basic research is inseparable from the development of technology and other useful applications. In the wake of the Sputnik launch, the idea of separating pure and applied science began to lose ground among science policy-makers in the West. The notion that the two kinds of research should be considered and pursued separately has all but disappeared in the current era of genomics and nanotechnology.

Sputnik also changed the demography of the scientific profession. The Soviet success was attributed to a scientific education system that had for some time been producing more highly trained scientists and engineers per capita than the West. The communist belief that science should be treated as a mass profession, not an elitist activity, led to wide recruitment from lower classes, women and ethnic minorities.

A corresponding shift in the United States came partly from the National Defense Education Act of 1958, which aimed to boost education at all levels. More importantly, changes in immigration laws led to an influx of trained professionals from Europe, Asia and later other regions.

A big portion of the generation of scientists now retiring, and those who are replacing them, owe their jobs to the launch of the little aluminium sphere in 1957. That science in the West is now much larger, and more multiracial and multicultural, is the most important — if unintended — consequence of Sputnik. ■

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