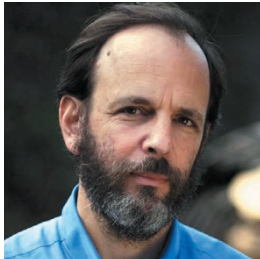


MICHAEL TEMCHINE



Donald Trump's appeal should be a call to arms

Trump's nomination as Republican presidential candidate is a reminder that scientific progress has not benefited all Americans, says Daniel Sarewitz.

If, as the French counter-revolutionary Joseph de Maistre wrote in 1811, every nation gets the government it deserves, what might the United States have done to deserve Donald Trump?

A well-functioning democracy should undercut the appeal of blustering, xenophobic demagogues by ensuring that most citizens have a stake in government and hope for the future. And although no single cause or problem can explain Trump's appeal to a large part of the American electorate, his nomination as the Republican presidential candidate should be cause for serious reflection about what is going wrong in America. For many Americans, one thing that has gone wrong is that the promise of scientific and technological progress has not been fulfilled.

This promise is at the heart of the American identity: it is anchored by founding fathers Benjamin Franklin and Thomas Jefferson, scientists and inventors both, extolled by Alexis de Tocqueville in his 1835 masterwork *Democracy in America*, embodied in the inventions of Thomas Edison, and codified in its modern form in *Science, The Endless Frontier*, Vannevar Bush's famous 1945 science-policy report to President Franklin D. Roosevelt, which laid out the still-powerful argument for government sponsorship of basic science.

Indeed, Bush's linking of the frontier metaphor to the promise of scientific progress was a distinctively American flourish. And his formula was simple: three factors — “the free play of initiative of a vigorous people under democracy, the heritage of great natural wealth, and the advance of science and its application” — would deliver to all Americans full employment and rising standards of living, improved health, and military security. Government investment in science, especially research carried out at the nation's elite universities, would prime the pump of continual progress.

Not everyone, however, was buying Bush's story. Starting in the early 1940s, Senator Harley Kilgore, a Democrat from West Virginia, championed a different national approach to science policy, one in which government investment would focus research and development directly on social goals and economic growth. A six-year political battle between Kilgore and Bush followed, to control not just US science policy itself, but, equally importantly, the rhetoric of science and progress. Bush, who had much of the leadership of academic and industrial science on his side, and who saw Kilgore as a threat to the independence of both elite academic science and the economic marketplace, became the decisive winner on both fronts: the 1950 bill creating the National Science Foundation gave scientists primary responsibility for determining the agency's research agenda.

Over the subsequent 65 years, scientists and science advocates have not shirked from parroting Bush's *Endless Frontier* vision of

scientific knowledge, flowing from “the free play of free intellects”, as an unalloyed good from which all citizens would benefit through the ever-expanding economic opportunities created by science-based innovation. It has been an appealingly non-ideological view of progress, adopted across the political spectrum. As Nobel-prizewinning physicist Leon Lederman put it in 1992: “What's good for American science ... is good for America.”

Maybe not. Although Trump supporters are by no means a homogeneous lot, a clever analysis in *The New York Times* in March showed that they can most reliably be characterized by two attributes. First, they identify their ancestral heritage as American, rather than any particular ethnic or religious stock. And second, they live in regions of the country that have not only failed to benefit economically from innovation, but have been harmed by it.

Mainstream media analysis of the Trump phenomenon almost never links it to the science and technology policies pursued by the nation since the Second World War. Yet technological revolutions arising from these policies have contributed to more than 40 years of wealth inequality, disappearing middle-class jobs and eviscerated manufacturing communities in the places where support for Trump is strongest. Indeed, economic theory throws aside these millions of people as the inevitable losers in the ‘creative destruction’ that science catalyses, as if ruined cities and livelihoods are just side effects of the strong medicine of science-based innovation. These people are the cost of the prevailing myth of progress, and, given their core identity as ‘Americans’, it is no wonder

they are susceptible to Trump's jingoistic populism.

No one remembers Harley Kilgore any more, and it's impossible to know whether his socially oriented vision of science policy might have contributed to a more equitable linking between scientific advance and economic benefit. But it is more than simply ironic that Kilgore's home state of West Virginia — whose per capita income ranks 49th out of the 50 states — is now Trump's strongest supporter.

Having claimed for more than a half a century that science-based innovation would be good for everyone, science advocates and scientists who have benefited so greatly from this line of argument can hardly now say, “Oh, but it's not our fault, these are problems of trade and labour and economic policy”. Trump's ascendance should rekindle the Bush–Kilgore debates, and policymakers should seriously consider what a system of socially responsible and responsive science would look like. The current system has failed the test. ■

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