Technophilia's Big Tent

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Fall 2010

Review of

What Technology Wants

By Kevin Kelly

New York: Viking, 2010, 416 pp.

As the effects of climate change and other environmental stresses become more apparent, some technological prophets are alarmed, while others are more sanguine than ever. Jared Diamond has gone from *Guns, Germs, and Steel* (1997) to *Collapse* (2005). James Lovelock's original *Gaia*, a light of hope in the gloomy late 1970s, has been succeeded by *The Revenge of Gaia: Why the Earth Is Fighting Back—and How We Can Still Save Humanity* (2007) and *The Vanishing Face of Gaia: A Final Warning* (2009). In 2010 Lovelock even told a newspaper interviewer that "democracy may have to be put on hold" to deal with "global heating." An opposing Singularity movement, led by Ray Kurzweil, sees instead a millennial convergence of innovation potentially leading to a new golden age and even the conquest of death itself.

Kevin Kelly's *What Technology Wants* (available October 14) is a plea for nuanced optimism. Kelly rejects submission to inexorable trends. To the contrary, while acknowledging the inevitability of change, he recognizes its risks and seeks to promote better choices. He admires advocates of social control of technology such as Langdon Winner and David Nye, and the more radically skeptical educator and philosopher Ivan Illich, finding value even in the Unabomber Manifesto. Conversely, he lauds Kurzweil's utopian vision only as a myth, "like Superman." A former editor of the *Whole Earth Catalogue*, Kelly the technology critic just wants to know the best tool for the job, whether it's the latest electronic device or the result of 3,000 years of refinement.

Throughout the book, Kelly makes a strong case against nostalgia and for technology's benefits to the welfare of ordinary men and women around the world. He cites studies of the high rate of violent death in early human societies—which could be deadlier than the 20th century with its horrific wars. Human longevity continues to increase. The world's increasingly urban population is far better nourished and healthier than its peasant forebears.

These improvements flow from the spread of information. The culture we create, Kelly argues, is not so much a collection of things as an ever-multiplying realm of ideas—patents, blueprints, drawings, poems, music—that interact in unpredictable but ever more complex ways, just as the DNA and other information of living creatures has been changing for billions of years, creating an ever richer web of life, evolving into enhanced "evolvability." The technium is the term Kelly gives to this dynamic order, influenced by evolutionary thinkers such as the Russian biogeochemist Vladimir Vernadskii and the French philosopher Pierre Teilhard de Chardin. It's not a spiritual principle for Kelly, though; it's an inevitable consequence of a small number of physical and chemical principles. Beside the pragmatic Kelly there is a cosmic Kelly who forthrightly sees progress as a consequence of the evolution of the universe.

Despite his rejection of vulgar determinism, Kelly urges us to embrace and help accelerate long-term change. Unlike some other enthusiasts, he denies that the new necessarily replaces and obliterates the old. The technium, like life on Earth, is a reservoir of concepts that often endure even after they go out of favor. Selecting a two-page spread of apparently obsolete farm tools from an 1894–1895 *Montgomery Ward* catalogue, he discovered in a few hours online that every one was still available in some form because the old designs still served their purpose—as the historian of technology David Edgerton reminded us in *The Shock of the Old*. But where Edgerton cites such facts to question belief in progress, Kelly redefines progress as the optimal combination of old and new.

Kelly also does not slight the technium's messes: "Hiding behind the 10,000 shiny high-tech items in my house are remote, dangerous mines dug to obtain rare earth elements emitting toxic traces of heavy metals. Vast dams are needed to power my computer." This grimy underside may comprise nearly half the technium. Yet the technium sincerely wants to clean up its act. It offers tools such as satellite photography for making its own environmental costs more transparent and thus influencing consumer and producer behavior. And in the long run the technium is moving to ever-lighter and even intangible objects, from a stack of 78-rpm records to music download with only a minute carbon footprint. Technology analysts have been studying this "dematerialization" of consumption since the late 1980s, but Kelly makes it a foundation of his world view. Technology wants to be lighter. For this reason, Kelly does not subscribe to the view of the economist Nicholas Georgescu-Roegen that entropy is an implacable constraint on the human standard of living. In fact, he believes that the long-term history of the universe reflects a trend from energy to mass to information, a process he calls exotropy, adopting a concept popularized by a radical futurist movement of the 1990s. There may still be no free lunch, but for Kelly it's more important that recipes now can be exchanged globally, virtually without cost.

No matter how bad the situation looks now, the technium has powerful built-in corrective mechanisms. Essential to Kelly's argument is that striving to avoid all adverse results in the future can create problems of its own, blocking solutions as well as disasters. To the Precautionary Principle now popular in Europe Kelly opposes an idea from the 1990s Extropian movement: the Proactionary Principle. Try as many innovations as possible, but monitor them closely for long-term indirect problems. The technium doesn't want prior constraints or advance orders.

The tension between Kelly's green *Whole Earth Quarterly* communitarianism and his *Wired* cornucopianism, between Illich's concept of conviviality and the Extropian Max More's transhumanism, makes *What Technology Wants* a dialectical wonder. Yet there are a few errors. Kelly quotes Carl Mitcham's statement that "[m]ass production would be unthinkable to the classical mind, and not just for technical reasons." But late-classical philosophers undoubtedly read and wrote by the light of mold-stamped clay oil lamps from industrial-scale workshops. One brand, Fortis, was coveted enough to have been counterfeited. Kelly also invokes the alleged dependence of U.S. railroad

gauges (and thus of the size of space shuttle rocket engines shipped over them) on the distance between wheel ruts of ancient Roman war chariots–an oft-cited erroneous example of path dependence that has been laid to rest by the economic historian Douglas J. Puffert.

Kelly's assertion of long-term human progress is also hard to prove—or disprove. He sees democracy and equality as among the desires of the technium. And so they often have been. But when the Plains Indian tribes acquired horses from Mexico in the 18th and 19th centuries and expanded their technological capabilities, they became more likely to wage war on each other. More recently, 19th-century slaveholders and 20th- and 21st-century tyrants have been enthusiasts and early adopters of many technological innovations. Is it not possible that the technium, like its avatar Wernher von Braun, is really interested in whatever social order, free or unfree, will advance it most steadfastly at the moment? Was the humorist Mort Sahl closer to the truth when he observed about Braun's work that it aims at the stars but sometimes hits London?

Apart from electronic miniaturization and social networking, the technium's progress has slowed in the past decade. We seem to be losing ground against infectious disease. The threat of pandemic influenza still has no solution, and there is no vaccine or therapy against Alzheimer's disease. The number of new FDA-approved drugs declined by more than 50% between the 1996–1999 and 2006–2009 periods. Only 29 were approved last year. Some epidemiologists have been predicting a "post-antibiotic era" in which we cannot develop new therapies as quickly as resistant strains are evolving. We are also making slow progress in designing radically new energy systems such as nuclear fusion and thorium reactors, announced with great optimism in the later 20th century. The improved but venerable diesel engine is competitive in fuel economy with the latest hybrids. Battery capacity is advancing slowly. Dematerialization is failing to create skilled jobs and investment opportunities comparable to more massive 1950s and 1960s innovations such as the Xerox 914 photocopier. We may yet be able to overcome these challenges, but Kelly does not confront them directly.

In particular, he puts too much trust in the number of patents as a measure of innovation. It isn't necessarily true that each patent is "a species of idea"; it's really a way of disclosing and legally protecting one or more aspects of an idea. A patent, by blocking competitors from pursuing certain paths of innovation, may actually reduce product diversity. The 2008 Berkeley Patent Survey of technology company executives found that patents offer "mixed to relatively weak incentives for core innovative activities, such as invention, development, and commercialization." Increasing patent applications might indeed signify more creativity, but they might also reflect "salami slicing" of the same work into smaller units, to use a phrase applied to some scientific papers.

Kelly believes that our ability to accelerate cultural evolution is opening a new stage of human consciousness; that we are evolving a growing ability to evolve. He writes that we should "see more of God in a cell phone than in a tree frog," but he is surely also aware that the frog is a miracle of biochemical complexity beside which the

phone is primitive and anything but divine. Our real risk is not global catastrophe—I'm with Kelly against the doom-sayers—but banalization, the loss of the variety of the biological species and human languages and cultures that we have only begun to understand. It's the pathos of the technium that no sooner does it start to reveal the wonder of the world to us (through, among other things, images and sound recordings of amphibians and other wildlife) than it threatens to remove them. *What Technology Wants* is a brilliant book, essential reading for all debates on the human future. But despite Kelly's formidable learning and generous open-mindedness, the state of the world economy and environment will leave many readers with the question: What has the technium done for us lately?

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Issues in Science and Technology 27, no. 1 (Fall 2010).
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