ARE HUMANS OBSOLETE?

Langdon Winner

Langdon Winner is Professor of Political Science in the Department of Science and Technology Studies at Rensselaer Polytechnic Institute. His work focuses on the social and political implications of modern technological change. His books include: Political Artifacts: Design and the Quality of Public Life *(forthcoming);* The Whale and the Reactor: A Search for Limits in an Age of High Technology *(1986); and* Autonomous Technology: Technics-out-of-Control as a Theme in Political Thought *(1977).*

IN MAINSTREAM WRITINGS ON SCIENCE AND SOCIETY from the seventeenth century to the end of the millennium, the beneficiary of the growth of knowledge was perfectly clear. Humanity as a whole, often referred to as "man," was bound to reap the benefits from the advance of scientific research and its manifold practical applications. Optimistic depictions of progress assumed that eventually the growth of science, technology, and modern institutions would benefit not only powerful elites, but the world's population more broadly with improvements evident in health, nutrition, housing, industrial production, transportation, education, and numerous other areas.

Among the first to grasp the possibilities were Francis Bacon and René Descartes, whose writings on the promise of the new science included bold projections of the godsend that would flow from the laboratories and workshops. Explaining why it was important to overcome his modesty and publish his discoveries in physics, Descartes comments, "I believed that I could not keep them concealed without sinning grievously against the law by which we are bound to promote…the general

good of mankind." It is at last conceivable, he argues, that "we might…render ourselves lords and possessors of nature."[1]

It did not take long, however, for flaws in these hopeful projections to gain the attention of social critics (Karl Marx most prominent among them), who noted that, in practice, the march onward and upward had benefited some groups more than others and left working people in the dust. In later decades, criticisms that were initially focused on divisions of social class were broadened to emphasize varieties of discrimination associated with race, gender, and ethnicity, ones as potent as social class in withholding the boon to "ourselves" that Descartes and others had promised. But even as the scope of criticism enlarged, most thinkers still assumed that the proper beneficiary of progress was humanity as a whole, including populations more diverse than early modernist visions had recognized. To this day, in venues like the Human Development Reports published each year by the United Nations, the dream is alive and well; it remains possible, the U.N. staff insists, to direct the powers of science and technology for the benefit of human beings everywhere, including those who have enjoyed little of the bounty so far.[2]

In recent years the conventional understandings of progress have been challenged yet again, not in this instance by intellectuals concerned about inclusion and social justice, but by entrepreneurs who have discovered a fine new heir to the accumulation of useful knowledge. The writings of several prominent scientists, engineers, and businessmen brashly proclaim that, at the end of the day, the telos of science has nothing to do with serving human needs or alleviating humanity's age-old afflictions. For contemporary developments point to the emergence of a new beneficiary, one vastly modified and improved as compared to its anthropoid ancestors. Yes, human beings may pride themselves in thinking that their presence is required both to generate and enjoy the benefits of scientific advance, but this vain prejudice is false. According to the new prophets of perfectibility, the true inheritor of the legacy of

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[1] René Descartes, *Discourse on Method*, Book Six.

[2] See, for example, *Human Development Report 2000*, United Nations Development Programme (New York: Oxford University Press, 2000).

science will be an entirely new creature, one variously named metaman, post-human, superhuman, robot, or cyborg.

Prophets of Post-Humanism

Predictions that humanity will soon yield to successor species are especially popular among those who spend a good amount of time in corporate and university research laboratories where movement on the cutting edge is the key to success. While most scientists and technologists at work in biotechnology, artificial intelligence, robotics, man/machine symbiosis, and similar fields are content with modest descriptions of their work, each of these fields has recently spawned self-proclaimed futurist visionaries touting far more exotic accounts of what is at stake—vast, world-altering changes that loom just ahead. Colorful enough to be attractive to the mass media, champions of post-humanism have emerged as leading publicists for their scientific fields, appearing on best seller lists, as well as television and radio talk shows, to herald an era of astonishing transformations.

While the claims of post-humanist futurism are always pitched as unprecedented, sensational forecasts, the rhetorical form of such messages has assumed a highly predictable pattern. The writer enthusiastically proclaims that the growth of knowledge in a cutting-edge research field is proceeding at a dizzying pace. He/she presents a barrage of colorful illustrations that highlight recent breakthroughs, hinting at even more impressive ones in the works. Although news from the laboratory may seem scattered and difficult to fathom, there are, the writer explains, discernible long-term trends emerging. The trajectory of development points to revolutionary outcomes, foremost of which will be substantial modifications of human beings as we know them, culminating in the fabrication of one or more new creatures superior to humans in important respects. The proponent insists that developments depicted are inevitable, foreshadowed in close connections between technology and human biology that have already made us "hybrid" or "composite" beings; any thought of returning to an original or "natural" condition is, therefore, simply unrealistic, for the crucial boundaries have already been crossed. Those who try to resist these

earth-shaking developments are simply out of touch or, worse, benight-ed Luddites who resist technological change of any sort. Nevertheless, the post-humanist assures us, there is still need for ethical reflection upon the events unfolding. For although these transformations will necessarily occur, we should think carefully about what it all means and how we can gracefully adapt to these changes in the years to come.

Typical of this way of arguing is Gregory Stock's *Metaman: The Merging of Humans and Machines into a Global Superorganism*. With a PhD in biophysics from Johns Hopkins and an MBA from Harvard, Stock is prepared to map both the scientific and commercial possibilities at stake in re-engineering the species:

> Both society and the natural environment have previously undergone tumultuous changes, but the essence of being human has remained the same. Metaman, however, is on the verge of significantly altering human form and capacity….

> As the nature of human beings begins to change, so too will concepts of what it means to be human. One day humans will be composite beings: part biological, part mechanical, part electronic….

> By applying biological techniques to embryos and then to the reproductive process itself, Metaman will take control of human evolution….

> No one can know what humans will one day become, but whether it is a matter of fifty years or five hundred years, humans will eventually undergo radical biological change.[3]

As Director of the Center for the Study of Evolution and the Origin of Life at UCLA, Stock explores the changes he believes the future holds

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[3] Gregory Stock, *Metaman: The Merging of Humans and Machines into a Global Superorganism* (New York: Simon & Schuster, 1993) 150, 152, 164, 168.

in store, including the conquest of aging. "The human species," he writes, "is moving out of its childhood. It is time for us to acknowledge our growing powers and begin to take responsibility for them. We have little choice in this, for we have begun to play god in so many of life's intimate realms that we probably could not turn back if we tried."[4] Yet Stock believes that ethical reasoning must still play a role. In particular, the present generation must recognize its "responsibility," a positive commitment that accepts the "inevitability" of Metaman and actively exploits every opportunity to use genetic engineering to move the human organism beyond what Stock depicts as its present decrepit condition. While he recognizes that such developments will generate "stresses within society," he argues that moral deliberation and decisions about public policy are irrelevant: "But whether such changes are 'wise' or 'desirable' misses the essential point that they are largely not a matter of choice; they are the unavoidable product of the technological advance intrinsic to Metaman."[5]

Similar enthusiasm for the abolition of old-fashioned human beings informs the writings of Lee Silver, professor of molecular biology at Princeton. His book *Remaking Eden: Cloning and Beyond in a Brave New World* surveys near and distant prospects for the clever management of human reproduction. In his view, developments already visible in scientific laboratories will produce a revolution in society, an upheaval whose results include a radical division of the species into superior and inferior genetic classes. Contemplating the situation he believes will prevail in the U.S.A. in 2350 C.E., he writes:

> The GenRich—who account for 10 percent of the American population—all carry synthetic genes…. The GenRich are a modern day hereditary class of genetic aristocrats.
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> All aspects of the economy, the media, the entertainment industry, and the knowledge industry are controlled by

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[4] Gregory Stock, "Introduction," *Human Germline Engineering: Implications for Science and Society* <http://research.mednet.ucla.edu/pmts/Germline/bhwf.htm>.

[5] Stock, *Metaman*, 168.

members of the GenRich class…. In contrast, Naturals
work as low-paid service providers or as laborers.[6]

Silver speculates that by the end of the third millennium, the two
groups will have become "entirely separate species with no ability to
cross-breed, and with as much romantic interest in each other as a cur-
rent human would have for a chimpanzee."[7] For those who think his
vision of the future resembles a bizarre science fiction screenplay, Silver
answers that, in fact, his scenario "is based on straightforward extrapo-
lations from our current knowledge base."[8] It is "inevitable" that the
use of reprogenetic technologies will change the species in fundamental
ways. In Silver's view, parents who have the financial resources to pass
on "enhanced genes" to their offspring will jump at the chance to do so
and resist any attempts to restrict the practice. "Evolution—the old-
fashioned way, through natural selection—will stop because people will
choose which genes to add to their children."[9]

The speculations of Stock and Silver, rooted in biotechnology and the
biomedical sciences, are matched in exuberance by visionaries in com-
puter science and robotics who predict the eventual replacement of the
human being by ingenious feats of engineering. One of the more col-
orful exponents of this position is Ray Kurzweil, an information scien-
tist known for several major breakthroughs—the development,
according to his web page, of "the first print-to-speech reading machine
for the blind, the first CCD flat-bed scanner, the first text-to-speech
synthesizer, the first music synthesizer capable of recreating the grand
piano and other orchestral instruments" and other useful devices.[10] In
The Age of Spiritual Machines Kurzweil notes that his own gadgets and

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[6] Lee M. Silver, *Remaking Eden: Cloning and Beyond in a Brave New World* (New York: Avon, 1997) 4, 6.

[7] Silver 7.

[8] Silver 7.

[9] "Liberation Biology," an interview with Lee M. Silver, *Reason Online* (May 1999) <http://www.reason.com/9905/fe.rb.liberation.html>.

[10] See "A Brief Career Summary of Ray Kurzweil," <http://www.kurzweiltech.com/aboutray.html>.

those of other information technologists have far outpaced earlier predictions about what computers would be able to do. Ongoing developments in computing will soon generate machines far more intelligent than human beings and with far brighter prospects than their biological forbears. His conviction hinges on a view of accelerating evolutionary change, one increasingly common among high tech professionals, that sees evolution moving from its original locus within biological systems to a new realm of possibilities, the self-organizing dynamism of artificial systems.[11] In effect, he argues, time is speeding up because the time between salient events in the development of computing power is rapidly diminishing; accomplishments that recently seemed impossible are upon us in an instant:

> Evolution has been seen as a billion-year drama that led inexorably to its grandest creation: human intelligence. The emergence in the early twenty-first century of a new form of intelligence on Earth that can compete with, and ultimately significantly exceed, human intelligence will be a development of greater import than any of the events that have shaped human history.[12]

Central to Kurzweil's prophecy is an experience increasingly familiar to those who use personal computers and other digital equipment, that is, the continuing replacement of computing systems by newer, faster, more powerful ones in ever shortening cycles. With each successive upgrade, people transfer valuable information from the older system to the newer one. In the not-too-distant future this sequence of replacement, download, and renewal will, acccording to Kurzweil, include not just Pentium chips and personal digital assistants, but human beings themselves. "Initially," Kurzweil opines, "there will be partial porting—replacing memory circuits, extending pattern-recognition and reason-

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[11] See, for example, Kevin Kelly, *Out of Control: The New Biology of Machines, Social Systems and the Economic World* (Reading: Addison-Wesley, 1994).

[12] Ray Kurzweil, *The Age of Spiritual Machines: When Computers Exceed Human Intelligence* (New York: Viking, 1999) 5.

ing circuits through neural implants. Ultimately, and well before the twenty-first century is completed, people will port their entire mind file to the new thinking technology."[13] Before long, humans and machines will totally merge, and the new creature's artificial features (in contrast to its biological ones) will be universally recognized as superi-or. Looking forward to this new era, Kurzweil condescendingly refers to humans as MOSHs, "Mostly Original Substrate Humans," people "still using native carbon-based neurons and unenhanced by neural implants."[14] Within this world even the most conservative MOSH would be forced to realize that the crucial, enduring entity—intelli-gence itself—no longer depends on any particular, physically and spa-tially defined, computational home. Barring unforeseen mishaps, intelligent beings of this sort can expect to be immortal. Alas, the poor souls who do not find ways to download their intelligence into the mechanism will be excluded from any meaningful participation in the new order of things.

On the scale of outrageous projection, robotics engineer Hans Moravec outdistances even Kurzweil in imagining a future thoroughly sanitized of human beings and their debilities. As he proclaims in *Robot: Mere Machine to Transcendent Mind*, "Today, as our machines approach human competence across the board, our stone-age biology and infor-mation age lives grow ever more mismatched."[15] The growth of increas-ingly "intelligent" computerized robotic devices, he believes, points to the creation of both new, superior, artificial beings and new worlds to house them: "Our artificial progeny will grow away from and beyond us, both in physical distance and structure, and similarity of thought and motive. In time their activities may become incompatible with the old Earth's continued existence."[16]

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[13] Kurzweil 126.

[14] Kurzweil 311.

[15] Hans Moravec, *Robot: Mere Machine to Transcendent Mind* (New York: Oxford University Press, 1999) 7.

[16] Moravec 11.

Moravec sees the eventual replacement of humans as foreshadowed by ongoing innovations in the business world, changes propelled by the quest for better service at lower prices. Phone calls are handled by intelligent systems of voice mail; automated teller machines handle much of the work of banking; and automated factories increasingly handle the work of production as the contribution of human labor subsides.[17] He expects developments of this variety to spread, absorbing all significant areas of economic activity before long. Even the belief that the owners of the means of production are the ones who will guide these changes and benefit from them is, in Moravec's view, woefully mistaken. Before long, he suggests, "owners will be pushed out of capital markets by much cheaper and better robotic decision makers."[18]

Moravec imagines generations of robots in the distant future that look less and less like the clunky machines we see today, and more and more like artificial, self-reproducing organisms. One has the shape of "the basket starfish"; another model, "the Bush Robot" features a stem, tree-like branches, balls attached to its limbs like fruit, and microscopic fingers that "might be able to build a copy of itself in about ten hours."[19] Eventually super-intelligent creatures of this kind, "Ex-humans" or "Exes," would grow weary of the limitations of Earth, seeking their fortunes elsewhere in the universe. The question of what will become of ordinary humans in this brave new world is for Moravec of little concern. It is clear that his sympathies lie with the smarter, more resourceful, more powerful successors to our pathetically weak and incompetent species. At one point he suggests that when robots end up producing all foods and manufactured goods, "humans may work to amuse other humans."[20] In the longer term, however, this pattern is likely to prove unstable. "Biological species," he writes, "almost never survive encounters with superior competitors." He speculates that generations of robots who leave the Earth may eventually return with aggressive intentions.

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[17] Moravec 130.

[18] Moravec 133.

[19] Moravec 152.

[20] Moravec 132.

> An entity that fails to keep up with its neighbors is likely to
> be *eaten*, its space, materials, energy, and useful thoughts
> reorganized to serve another's goals. Such a fate may be rou-
> tine for humans who dally too long on slow Earth before
> going Ex.[21]

There is something refreshing in the sheer candor of Moravec's predic-
tions. Pushing the logic of the post-humanist dreams to their ultimate
conclusion, he imagines that anthropoid throwbacks will be hunted
down and shot.

For some fascinated by notions of post-human beings, merely imagin-
ing these possibilities is not enough. A small but vocal collection of
social activists has taken it upon themselves to demand a rapid transi-
tion to a higher form of being, seeking to play a role in its early stages.
The Extropians, The Transhumanist Association, the French guru Rael
and his followers, as well as publicists J. Hughes and the late F. M.
Esfandiary, are among those who have made transcendence of ordinary
humanity their central mission, promoting human cloning, genetic
engineering, life extension, and human/machine symbiosis as key steps
to a better life.[22] One of the more visible campaigners at present is
Kevin Warwick, professor of cybernetics at Reading University in the
U.K., who has gained notoriety in his efforts to blur the line between
scientific research and vigorous advocacy. "I was born human," he
writes. "But this was an accident of fate—a condition merely of time
and place. I believe it's something we have the power to change."[23] To
this end, Warwick has launched a series of experiments, implanting his
own body with computer chips, hoping to enhance his nervous system

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[21] Moravec 146.

[22] J. Hughes' views are especially interesting because he situates them in the context of
radical democratic political theory. See Hughes, "Embracing Change with All Four
Arms: A Post-Humanist Defense of Genetic Engineering," *Eubios Journal of Asian
and International Bioethics* 6.4 (June 1996): 94–101 <http://www.changesurfer.com/
Hlth/Genetech.html>.

[23] Kevin Warwick, "Cyborg 1.0," *Wired* 8.02 <http://www.wired.com/wired/archive/
8.02/warwick_pr.html>.

with additional computing power and thereby contributing to his ultimate goal, the creation of a race of "superhumans." One of his hopes is to eliminate the cumbersome barriers to communication, the need to use language to express our thoughts and feelings. A far better method is to "send symbols and ideas and concepts without speaking."[24] To demonstrate this possibility Warwick installed matching computer chips implanted in his own body and that of his wife, Irena, hoping to establish direct communication between their nervous systems including their most intimate sexual responses. This research, he believes, could dispatch one of humankind's ancient maladies, the faked orgasm. "The nervous system is full of electronic signals emanating from the brain, which have physical effects, like the way Irena jumps when she sees a spider," Warwick observes, "The implication could be never faking an orgasm again."[25] Indeed, for a society in which Viagra has become a best selling prescription drug, Warwick's chips could prove highly marketable.

Perfectibility in Decline

Because they are pitched at the level of pure fantasy or tongue-in-cheek provocation, the claims of the post-humanists are often difficult to accept at face value. Some of their conjectures and proposals, however, are well within the realm of plausibility, close enough to ongoing projects in fields of contemporary research and development that they deserve careful scrutiny. We know, of course, that cutting-edge technologies typically require large amounts of public funding during their early stages. For that reason, both citizens and elected officials should critically examine government support of projects within the various orbits of post-human research, especially since their success would have problematic policy implications, for example, placing homo sapiens on the endangered species list.

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[24] Warwick in <http://www.wired.com/wired/archive/8.02/warwick_pr.html>.

[25] Kevin Warwick, quoted in "Microchip Hailed as 'End of the Faked Orgasm,'" *Annova* (5 October 2000) <http://www.ananova.com/news/story/sm_76805.html> <http://www.changesurfer.com/Hlth/Genetech.html>.

A useful setting in which to gauge post-humanist intentions is the lengthy heritage of thinking about perfectibility, one that includes the world's great religions, several schools of classical and medieval philosophy, as well as much of modern social theory. From Pythagoras to B. F. Skinner, perfectibilists in the West have suggested a variety of paths for improving the species—mystical reflection, religious devotion, moral discipline, well-tuned education, psychological therapy, scientific advance, technological productivity, rational breeding, and the creative shaping of political, economic, and social institutions.[26] Within this sprawling, eternally optimistic tradition, the post-humanists have selected a distinctive route, seeking to improve discrete units, the physical bodies of present and future individuals. This approach, found as early as Plato's commitment to selective breeding and pursued more recently by the nineteenth- and twentieth-century eugenics movements, gains renewed hope in potentially effective means of technological intervention. Today it seems possible to succeed where earlier attempts failed, fixing the ills and weaknesses of particular bodies while realizing the vast potential stored in humanity's decrepit physical shell. So thorough is the commitment of post-humanists to the single unit, single body approach that it seems inconceivable to them that other routes to perfectibility are open to us.[27]

In fact, an alternative vision about how to improve humankind has often been favored in modern philosophy, an approach whose concerns and commitments provide a revealing contrast to post-humanist schemes. Although the many expressions of this vision are far from uniform in either theory or practice, its core of beliefs are fairly consistent. The key premise is that humans are fundamentally social beings whose development depends upon favorable conditions for forming social bonds and sentiments. From this perspective, the path to improvement for humanity involves changing institutions—laws, governments,

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[26] An excellent overview of this tradition can be found in John Passmore, *The Perfectibility of Man* (London: Duckworth, 1970).

[27] The reasons why visionary technologists sometimes prefer "operating unit designs" are discussed in Robert Boguslaw, *The New Utopians: A Study of System Design and Social Change* (Englewood Cliffs: Prentice Hall, 1965) chapter 5.

workplaces, dwellings, schools, and the like—in ways that will nurture the potential of individuals and the groups of which they are members. Real creativity in this regard comes not so much in operating on particular atomistic individuals, but in shaping the rule-guided frameworks and material structures of community life. Such were the hopes of Condorcet, Rousseau, Godwin, Paine, Saint-Simon, Fourier, Owen, Comte, Marx, Kropotkin, Goldman, Dewey, and a host of others who believed that the essentially social character of men and women offered the most promising prospects for positive change.[28]

One of most beautifully crafted statements of this position in modern thought is Antoine-Nicolas de Condorcet's *Sketch for a Historical Picture of the Progress of the Human Mind*, published in 1795. A nobleman by birth, mathematician and philosopher by vocation, Condorcet was one of the literati who organized the Encyclopaedia and promoted ideas linking scientific enlightenment to political reform. Enmeshed in partisan struggles of the French Revolution, he eventually found himself on the wrong side of a factional dispute and was forced into hiding where, just before his capture and death in prison, he wrote the *Sketch*, a much-abbreviated version of a larger work he had planned. The book describes nine stages in world history plus a tenth that lies in the future, arguing that there is a necessary, irreversible tendency for human faculties to seek perfection:

> In spite of the transitory successes of prejudice and the support that it receives from the corruption of governments or peoples, truth alone will obtain a lasting victory; we shall demonstrate how nature has joined together indissolubly the progress of knowledge and that of liberty, virtue and respect for the natural rights of man.[29]

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[28] A classic interpretation of ideas of this kind is Frank E. Manuel and Fritzie P. Manuel, *Utopian Thought in the Western World* (Cambridge, MA: Harvard University Press, 1979).

[29] Antoine-Nicolas de Condorcet, *Sketch for a Historical Picture of the Progress of the Human Mind*, trans. June Barraclough (1795; London: Weidenfeld and Nicolson, 1955) 10.

Resisting any hint of scientific elitism or technocracy, Condorcet insists that the growth of knowledge is a powerful force for equality and solidarity among the world's people. He recognizes that three main causes of inequality—wealth, status, and education—are found everywhere, but predicts their demise as improvements in the practical arts expand productivity, eliminate scarcity, and make it possible for everyone to earn a comfortable living. By the same token, the spread of well-planned systems of universal education will tend to rectify existing inequalities by informing people of the "common rights to which they are called by nature."[30] Echoing the Socratic teaching that evil is rooted in ignorance, he argues that age-old practices of tyranny and oppression will gradually vanish as a scientific grasp of political affairs inspires new frameworks of law. Because these favorable tendencies are universal among human beings, not just in populations of Europe, he predicts that the achievement of freedom, equality, and human rights will eventually occur in all the nations of the world. "In short," he asks, "will not the general welfare that results from the progress of the useful arts once they are grounded on solid theory…incline mankind to humanity, benevolence and justice?"[31]

The warm generosity of Condorcet's essay stands in stark contrast to the hard-edged boosterism characteristic of today's post-humanist manifestos. Nevertheless, the quest for improvement mapped by Condorcet and his successors shares some common ground with today's would-be visionaries: belief in the development of creative intelligence ("reason" as the philosophes preferred) as the underlying source of historical change; faith in limitless scientific advance as a prime expression of this faculty; hope for the apotheosis of humanity within a transcendent, deeply spiritual form of being. Where the two approaches abruptly part company is a fork in the road where the advocate has to decide who will continue on the journey and who will not. Dreams of human equality and solidarity embraced by liberals, utopians, socialists, and pragmatists of earlier generations have no standing in theories of a post-

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[30] Condorcet 184.
[31] Condorcet 193.

humanist future. As we have seen, the concerted effort to cultivate highly unequal successors to homo sapiens is routinely applauded in post-humanist schemes, celebrated as evidence that genetic and cybernetic breakthroughs are finally proceeding apace. Obligatory expressions of ethical concern about tensions between old-fashioned inferiors and newly engineered superior specimens are typically given short shrift. After all, bold pioneers busily charting our future have little patience with annoying quibbles of that kind. As Silver, Stock, Kurzweil, Moravec, and Warwick make perfectly clear, the unity of humankind is now in the cross hairs, a likely casualty of the grand evolution of creative intelligence. People who agonize about its demise are simply out of touch with the direction of current and future events.[32]

For thinkers who claim to revere evolution so thoroughly and who feature themselves as agents of the next evolutionary leap, the post-humanists' choice of an unsocial, single unit atomism as the best path to perfectibility is highly problematic. Recent scientific accounts of evolution have stressed the inherent sociality of humans; the ways in which human existence, survival, and ability adapt to changing circumstances depend upon the inborn tendency of the species to form and maintain groups. In fact, humans do not live as isolated individuals characterized by bundles of atomistic traits. They are always found in social settings and treat each new situation they encounter as an opportunity to develop social bonds and social norms. This fact is evidently given in our make-up, crucial to any realistic understanding of who we are.[33] Yet attention to the social dimensions of human being and human evolution is missing in post-humanist accounts of how we

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[32] For a modestly worded critique of proposals for human bioengineering, see Francis Fukuyama, *Our Posthuman Future: Consequences of the Biotechnology Revolution* (New York: Farrar, Straus and Giroux, 2002). Fukuyama worries that "the posthuman world could be one that is far more hierarchical and competitive than the one that currently exists, and full of social conflict as a result" (218).

[33] See L. R. Caporael, "Parts and Wholes: The Evolutionary Importance of Groups," *Individual Self, Relational Self, Collective Self*, ed. Constantine Sedikides and Marilynn B. Brewer (Philadelphia: Psychology, 2000) 241–58; and R. F. Baumeister and M. R. Leary, "The Need to Belong: Desire for Interpersonal Attachments as a Fundamental Human Motivation," *Psychological Bulletin* 117 (1995): 497–529.

arrived here and where we are headed. Even the list of human features scheduled for re-engineering, bio-technical projects reflects the lack of awareness of humanity's grounding in networks of sociality. Preferred are traits of intelligence, physical strength, beauty, freedom from disease, and longevity; it is these that dynamic research will seek to amplify. But other qualities widely recognized as crucial to our well-being—empathy, cooperativeness, the capacity to love and nurture—are never mentioned on the agendas of post-humanist science.

This lop-sided view of human beings is also reflected in the suggestions of post-humanists about how decisions on matters of policy should be made. Here again an atomistic, single unit view of human possibilities is the one praised as the best way to make choices, in particular the setting offered by the so-called "free" market in which rational individuals come together to make deals, buying and selling the valuable goods and services. This view accords with the pungent combination of market ideology and high-tech innovation that became a hallmark of economic and political ideology in the United States during the 1980s and 1990s. Notions of this kind are associated with the rise of Silicon Valley, the creation of the Internet, telecommunications reform, the vogue of venture capitalism, the stock market boom of the Clinton years, and ecstatic celebrations of cyberspace as the new locus of business and community life. Later, of course, the same alluring blend of market and technology fell on hard times, evident in the Dot-com bust, stock market collapse, and financial scandals of WorldCom, Enron, and other high-flying firms—the sad aftermath of what Federal Reserve Bank chairman Alan Greenspan called the era of "irrational exuberance." Many prospectuses in the post-humanist portfolio were penned during this New Gilded Age (some of them obviously in hope of attracting venture capital) and bear the distinctive stamp of the era's uncritical enthusiasm for innovation propelled by de-regulated markets.

An illustration of how an economic philosophy of this kind informs post-humanist programs is found in Gregory Stock's advice on how to "redesign humans." He assures us that what some people find disturbing possibilities for future genetic enhancement are merely extensions of already common practices.

> Even today, fashion and market preferences determine much more than merely the selection of consumer products we find in the stores. These factors also shape the biological world, determining the crops we plant, the domestic animals we raise, the flowers we grow, the pets we lavish with attention.[34]

It is a logical next step, in Stock's opinion, to regard genetic choice technologies (GCTs) as market commodities subject to the desires of individuals. Hence, the market is the best way to select good GCTs (the ones people actually want to buy) as compared to undesirable GCTs (those that fail to attract enough customers): "When people have a range of reproductive options, they generally try to get what they want in the easiest, cheapest, safest, most reversible way."[35]

Stock expects that the key decisions about human biology will be made within the framework of an emerging, capitalist, global economy, making good GCT market products available worldwide at bargain prices. His fear is that Americans will listen to those who have misgivings about human enhancement and designer children, missing a great opportunity to take the lead in this exciting growth industry. Thus, he urges Americans to forge boldly ahead with human genetic technologies and "not pull back and relinquish their development to braver souls in more adventurous nations of the world."[36]

In view of the market-centered calamities of the early 21st century and the frantic rush to re-regulate accounting and the rules that govern corporate management, advice of this kind seems reckless. Is it wise to subject fundamental, long-term choices about the structure and character of human beings to the caprices and vicissitudes of the global shopping mall? After all, who decided that market settings and market

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[34] Gregory Stock, *Redesigning Humans: Our Inevitable Genetic Future* (Boston: Houghton Mifflin, 2002) 34.

[35] Stock, *Redesigning Humans*, 60–1.

[36] Stock, *Redesigning Humans*, 201.

motives are the best means for deciding humanity's long-term future? In actual practice, a likely consequence of reliance on the unmodified market model is to favor the cultural preferences of small, unrepresentative groups of people—corporations and consumers in well-to-do countries of the North—over the desires and commitments of the world's populace as a whole. Unfortunately, the writings of post-humanists show little awareness of their deep cultural biases and, indeed, of the breathtaking cultural arrogance their proposals involve. Many of their ideas about how the future of humanity will unfold clearly assume that it is "Just we folks," ordinary, everyday people who will decide what will happen. But the advocates have not looked carefully at how their notions reflect unstated, unexamined preconceptions rooted in their own highly rarified, upper-middle-class, white, professional, American and European lifestyles. In post-humanist writings a deeply assumed map of the relevant lifeworld seems to stretch from the university laboratory to the fertility clinic, to the BMW dealer, and on to the nearest Nordstroms. Somewhere within this landscape they evidently expect to find the new Ubermensch, maybe wearing an Abercrombie t-shirt.

Nowhere is the obtuse arrogance of post-humanist rhetoric more apparent than in its incessant claim that the changes at issue are foreordained by history or, even better, by evolution itself. "The accelerating pace of change is inexorable," Kurzweil exclaims. "The emergence of machine intelligence that exceeds human intelligence in all of its broad diversity is inevitable."[37] Echoing these sentiments, Stock subtitles his book on the redesign of humans, *Our Inevitable Genetic Future*. The underlying message in such proclamations is perfectly clear: faced with the powerful momentum of bio-technical developments, only a fool goes searching for alternatives or limits.

Counsel of this kind is absurd on its face, for it denies what all serious studies of scientific and technological change have shown, namely, that technological changes of any significance involve intense social interac-

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[37] Kurzweil 253.

tion, competition, conflict, and negotiation in which the eventual outcomes are highly contingent. Within the making and application of new technologies, there are always competing interests, contesting positions on basic principles, and numerous branching points in which people choose among several options, giving form to the instrumentalities finally realized, discarding others that may have seemed attractive. Modern history is filled with examples of technological developments announced as "inevitable" that never took root—personal helicopters, atomic airplanes, videophones, and extensive colonies in outer space, among others. Nuclear power, for example, touted in the 1950s as an ineluctable product of modern physics and source of all future electricity, eventually encountered problems of construction costs, plant safety, and waste disposal that undermined its social and political support, perhaps for all time.

From this standpoint, announcements that particular outcomes are "inevitable" can be little more than attempts to hijack what might otherwise be a lively debate, excluding most people from the negotiations. A group of privileged actors proclaims: "Good news! The future has been foreclosed! Your needs, dreams, ideas, and contributions are no longer relevant. But thanks for listening."

At present there are more than six billion humans living on Earth, most of whom have not yet heard of the grand schemes flowing from Westwood, Princeton, Cambridge, Santa Cruz, and other meccas of posthumanist speculation. If this wider populace knew what the intellectuals and entrepreneurs had in store for them, they might want to take a closer look, asking to participate in the decisions at stake, not just as consumers of end products of innovation, but as citizens who would like a voice in deciding basic principles and policies. After all, to alter our species significantly or to seek to eliminate human beings for all time would seem to be a matter that requires the most serious study, reflection, and debate. At the very least, it makes sense to discover whether or not there is consensus among the world's people that the sweeping changes proposed with such alacrity are warranted or desirable.

I cannot predict much less prescribe what this wider set of groups and persuasions might decide when faced with these proposals. But if they

examined the agendas for the so-called improvements the post-human-ists prefer, a more inclusive population might notice some extremely odd judgments about what counts as superior. They might notice, for example, disturbing similarities to ideas of "superiority" that have been imposed through slavery, colonialism, and genocide, and, alas, occa-sional agendas of scientific research during the modern era, projects that have done little to buttress confidence that professionals in the North have everyone's best interests at heart. Asked what they would like to do, perhaps the world's populace might point to more urgent projects long promised but left undone, for example, securing adequate nutrition, sanitation, housing, health care, and education for the three billion among us who are still in desperate need. Better genes and elec-tronic implants? Hell, how about potable water?

In this light, the vision in Condorcet's last testament still demands attention; the real challenge lies in realizing the potential of all humans regardless of their prior condition of poverty and oppression. Until that hope is fulfilled, post-humanist ambitions will seem irrelevant or patently obscene.