TRANSHUMANISM, TECHNOLOGY, AND THE FUTURE: POSTHUMANITY EMERGING OR SUB-HUMANITY DESCENDING?

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Abstract

I explore how the horizon of the future has shifted dramatically from Bertrand Russell's grim early 20th century prognostications based on the Second Law of Thermodynamics to the Transhumanist early 21st century predictions based on the Law of Technology's Accelerating Returns. I argue that Transhumanism combines the values of the developed world's consumer capitalism with the late 20th century realization that technology can be used to re-design the human form of life to fund its vision of technological advancement bringing us to a virtually immortal posthuman future. My conclusion is that there are good reasons to think that this technocalyptic vision rests on a very naïve view of technology, one that fails to recognize how technologies subtlety but inevitably re-make their users in their own image, and that consequently the future that Transhumanism will likely bring will be a deeply subhuman one.

Key Words

Transhumanism, posthuman, Singularity, technological convergence, cyborg, technologies of human enhancement, life extension, mind uploading, Moore's law, Nick Bostrom, Ray Kurzweil, Francis Fukuyama, Martin Heidegger, Steve Talbott, Neil Postman

'A Free Man's Worship,' an essay Bertrand Russell penned in 1902, expresses eloquently and precisely the judgment of early 20th century science concerning the origin and final destiny of not just humanity but of the universe itself:

> That Man is the product of causes which had no prevision of the end they were achieving; that his origin, his growth, his hopes and fears, his loves and his beliefs, are but the outcome of accidental collocations of atoms; that no fire, no heroism, no intensity of thought and feeling, can preserve an individual life beyond the grave; that all the labours of ages, all the devotion, all the inspiration, all the noonday brightness of human genius, are destined to extinction in the vast death of the solar system, and that the whole temple of Man's achievement must inevitably be buried beneath the debris of a universe in ruins—all these things, if not quite beyond dispute, are yet so nearly certain, that no philosophy which rejects them can hope to stand. Only within the scaffolding of these truths, only on the firm foundation of unyielding despair, can the soul's habitation henceforth be safely built (Russell, 1917/1957, p. 45-46).

One can hear the cold, ruthless second law of thermodynamics churning in the background of Russell's grim pronouncement—this was the dark 'music' he thought rationally enlightened thinkers had to be man enough to face. How starkly this projected future contrasts with the future heralded by a relatively recent and growing international movement of speculative science and technology known as Transhumanism.[1]

Transhumanists agree with Russell's claim that humanity 'is the product of causes that had no prevision of the end they were achieving'—this is precisely the reason why it is incumbent upon humans to devise technologies that will enable us to have a say in our future development. As well, they entirely concur with Russell's contention that humanity's origin, growth, hopes and fears, loves and beliefs 'are but the outcome of accidental collocations of atoms.' Transhumanists want technologically to enhance and augment human being into a designer species that bears no unchosen physical, emotional, or psychological givens deriving from Mother Nature's mindless eons of meandering through the potentials of organic life. Moreover, the Transhumanists would beg to differ with Russell's fatalism regarding the preservation of 'individual life beyond the grave' and his bleak predictions concerning 'the whole temple of Man's achievement.' With the human genome now decoded, information technologies doubling their computational capacities every year or so, and nanotechnologies promising to provide the means whereby the consequences of pollution and human aging can be brought to a halt and even reversed, Transhumanists have other things on their minds than building their souls' habitation on the 'unyielding despair' Russell recommends. The post-human future Transhumanism predicts does not require manly bravado to face, but, in fact, appears to be everything anyone could wish for: a future where our senses, intellect, emotions will be technologically enhanced right off the human scale of function and performance, and we will either have bodies so merged with computer and robotic augmentation and power that we will be able to upgrade them into an endless future or, perhaps, even more radically, we will have completely surrendered our perishable bodies for a more durable non-biodegradable

platform so as to take up permanent residence in the virtual worlds of cyberspace (Bostrom, 2005, p. 10).

How the future has changed in just over a century! Clearly 'the future ain't what it used to be!'[2] One might reasonably wonder, therefore, how we, in one century, got from the dismal and depressing future dictated by the science of Russell's turn of the century essay to the bright and promising future of today's Transhumanism?

My paper's fundamental project is to introduce the recent and still largely unknown Transhumanist movement to a broader audience and to raise a few concerns regarding the movement's assumptions about technology and human nature and how these assumptions fund its radically optimistic vision of a posthuman future. I believe that Transhumanism's spectacular pretensions are worthy of careful consideration because they invite us, like no other movement past or present, to rethink the question of technology and its place in shaping our self-understanding and social imaginaries. I'm convinced that it is crucially important to understand Transhumanism and to raise consciousness of its covert and overt workings in our culture because this movement embodies within its doctrines and visionary speculations the subtle and mostly unrecognized trajectories of the consumerist and therapeutic dimensions of our late capitalist culture, both the Id (narcissistic hedonist yearnings) and Super-ego (fanatical perfectionist pursuits) of western civilization.

Just a few years ago Francis Fukuyama referred to Transhumanism as 'the world's most dangerous idea,' (Fukuyama, 2004) a sentiment typical of the bioconservative view shared by Leon Kass, Jeremy Rifkin, Bill McKribben, and many others. Yet most recently an article entitled 'Ten Ideas Changing the World Now' in *Time Magazine* listed Transhumanism (aka, Amortality) as the fifth most important idea of 2009 (Meyer, March 12, 2009). So what exactly is Transhumanism that it should elicit such apprehension and such acclamation?

1. A closer look at Transhumanism

Transhumanism may be justly described as an interdisciplinary and international movement whose project is to *trans*form human nature through technological interventions so radical that *Homo sapiens* will *trans*ition in the relatively near future into a superior successor post-human species, one that *trans*cends the fragilities and failures of our fleshly finitude. Transhumanists believe our technological ingenuity has brought us to the place that we can now begin to dissolve '[t]he bonds that tie us to nature's biological ancient, accidental design' (Natasha Vita-More, 2004, p. 2), that through our technological prowess we are maturing out of our evolutionary adolescence and are now posed finally to take control of our own evolution.

Transhumanism is not a static or crystallized doctrine—it has already had its share of schisms and internecine skirmishes. Rather Transhumanism is better understood as a strange attractor that draws around itself an array of diverse techo-futurist views whose underlying unity rests in a common commitment to an optimistic and instrumentalist reading of technology and an informational conception of self. This recent but quickly growing movement is part science, part philosophy, but also part science-fiction, and I might add, part faith: in short, a strange brew of bits from Plato, Bacon, Hobbes, Nietzsche, Ayn Rand, Marvin Minsky, thrown into a rather thick broth of commitments deriving from Enlightenment liberal humanism and advanced consumerist and therapeutic capitalism.

To many readers who are not familiar with the Transhumanist movement, their ideas and vision of our species' future will hardly merit serious attention and will likely be written off as a tissue of cleverly interwoven science fictions. However, whether Tranhumanism's predicted future is even probable or its doctrines conceptually coherent is not what is most significant about the movement (although I will devote some time showing why their vision of the future attains to a certain plausibility given the trajectory of technological advancement in the world today). The real significance of Transhumanism is, I believe, what its pretensions actually signal about the state of western culture today and how its rather dramatic claims are nourished through roots extending deeply into the modern west's sensibility. It seems to me that a Transhumanist future of sorts is *in a sense* already here, having arrived before it has begun, and although we can't see it directly, we can see it reflected in the metaphors, models, and images that subtly imbricate ourselves in the computational register that, as we'll see, funds most of its techno-futurist aspirations.[3]

Despite its rather shocking features, I suspect we all can understand the Transhumanism's quest and can feel its allure. Just spend a few minutes watching the evening news and you too will be susceptible to believing that *Homo sapiens*, despite thousands of years of seeking to realize its best intentions through education, will power, and religion, has failed miserably. We are still killing each other and in the most heinous ways, our nations are at war with each other, our cities and our highest levels of government are filled with crime, and all the while our bodies are aging mercilessly, racked with diseases, depression, psychosis, and profound

anxieties. It certainly does seem that Mother Nature, that ancient and blind watch-maker, has really fallen down on the job, and she can't seem to get back up. All the past efforts of humanist reform and religious education have failed to de-bug the product of her best efforts; the soft technologies of self-discipline, moral education, social engineering, and religious indoctrination have all but failed to produce a kinder and gentler human being. Surely something must be done. Transhumanists believe it is time to step up to the plate and take over Mother Nature's remit, convinced that they possess the techno-savvy to transform humanity into new and improved forms of being.

Some of the most vocal advocates of this doctrine are widely recognized and deeply respected scientists and academicians, whose impressive pedigree has earned immense funding for their R & D projects from the US Department of Defense and from the dot-com sector. Included in a broad definition of Transhumanism are Marvin Minsky, Toshiba Professor of Media Arts and Sciences, Professor of Electrical Engineering and Computer Science at MIT, and author of nine books, including the highly acclaimed *Society of Mind* (Simon and Schuster); Hans Moravec, founder of the Mobile Robot Laboratory of Carnegie Mellon University, the largest robotics lab in the country, presently Chief Scientist at Seegrid Corporation and author of *Mind Children: The Future of Robot and Human Intelligence* (Harvard) and *Robot: Mere Machine to Transcendent Mind* (Oxford); Nick Bostrom, a philosophy professor at Oxford and Director of its Institute for the Future of Humanity; Kevin Warwick, professor of Cybernetics at the University of Reading, strong proponent of cyborgism, and author of *March of the Machines* (U of Illinois Press); Ray Kurzweil, world renown inventor of numerous AI technologies, member of the US Patent Office's National Inventors Hall of Fame, and author of *The Age of Intelligent Machines* (MIT) and *The Age of Spiritual Machines* (Viking); Frank Tipler, Professor of Mathematics, Tulane University, and author of *The Physics of Immorality* (Doubleday)—to name just a few of its more prominent exponents.

In what follows, I want to explain how we moved from Russell's bleak prognostications about the future based on early 20th century science to the bright and enticing Transhumanist depictions of the future based on 21st century technoscience. Next I will look at the theoretical feasibility of a Transhumanist future by examining the convergent and exponential development of contemporary technology. Then I will take a quick look at the practical probabilities that our culture will actually take up the Transhumanist trajectory by looking at some human enhancement technologies already available and a few being developed and likely to be available soon. Before I conclude with an effort to place Transhumanist aspirations in a narrative of nostalgic recovery, I will identify and challenge the rather naïve assumptions about technology and the nature of human being that underwrite Transhumanist visions of the future, arguing that their facile instrumentalist reading of technology inclines them to wildly inadequate ideas about human flourishing and blinds them to the profoundly subhuman features their Posthuman futures would possess.

2. The shifting ground of the soul's habitation

How is it that the horizon of the future has so dramatically shifted in the hundred years separating the early twentieth century from the early twenty-first century? I'm convinced that the most significant factor fuelling the buoyant eschatology of Transhumanism is that the technologies are now within sight that will enable us to surmount, or to put it more relevantly to our topic, *transcend*, the limitations and demands of our species' genome, and therefore human nature itself.

Francis Fukuyama argues that this dramatic change of outlook on the future is the result of the promise of recent biotechnological advances. He recognizes that emerging biotechnology will in all likelihood (and in the not too distant future) enable us to actually change human nature, bringing to us heavy and arduous moral responsibilities, for we are about to enter a brave new world of possibilities that will untether us from the past and its social, political, and ethical reserves of wisdom. Fukuyama's realization of the monumental significance of technology's capacity to, as it were, morph humans out of their nature, led him to repudiate the original thesis of his ground-breaking book The End of History and the Last Man. The central thesis of The End of History was that the evolutionary logic of human history has brought human history to its telos, stabilizing the global population in liberal democratic market economies. When Fukuyama wrote The End of History in 1992, he believed that human nature was the ultimate and final constraint on the social, political and economic future of our species because he believed the constant of an unchanging human nature would keep social, political, and economic experiments on a short leash—an understanding of things amply corroborated by the fact that in the past all utopian projects of social engineering (most recently socialist Marxism)—have come to grief by running into 'the brick wall of human nature' (Fukuyama, 1999, p. 14).

But when human nature itself becomes an object of technological manipulation and design, everything changes—not just the game and game plan, but the players themselves:

> If human beings are infinitely malleable, if culture [and most determinatively, biotechnology] can overwhelm nature in shaping basic human drives and preferences … then clearly no particular set of political and economic institutions, and certainly no liberal democratic ones, can ever be said to be, in Kojeve's phrase 'completely satisfying'. … The ultimate implication of this is that biotechnology will be able to accomplish what the radical ideologies of the past, with their unbelievably crude techniques, were unable to accomplish: to bring about a new type of human being. (Fukuyama, 1999, 14-15)

In the past, new political aims and social innovations had to mesh with the given of human nature, and this put some heavy constraints on what futures could be reasonably expected. However, with biotechnologies that enable us to re-design human nature, the sky is [not even] the limit. With the biotech means to morph ourselves as we please, we can remake human nature to mesh with any vision of the future we can imagine. What this means essentially is that we can choose what nature our species will possess in the future, and the looming question is what norms or values or ends will direct our choice. If biotech has rendered human nature entirely revisable, then it has no grain to direct or constrain our designs on it. And so whose designs will our successor posthuman artifacts likely bear? I have little doubt that in our vastly consumerist, media-saturated capitalist economy, market forces will have their way.[4]

If Fukuyama is right, then we see that the Transhumanists are vigorously pursuing changing technology's traditional 'direction of fit'. Traditionally, technology has always been used to reshape the world to better fit the limits and potentialities of our ancient and unchanging human nature. But to the Transhumanist, buoyed up with the promise of the biotech revolution, human nature is viewed as nothing more than a technical problem. They are confident that before long, we will be able to re-design human nature into a better fit with the brave new world that our technologies—which themselves are held under the sway of our deeply consumerist economies—are birthing. Perhaps the fact that our most technologically advanced countries are the least happy, most discontent and heavily medicated countries in the world is not really a coincidence. Perhaps these are rather indicators of the need to revamp human nature to better mesh with the inhumane (or post-humane) pace and social exigencies that our technologies, and the economies that feed them, have already entrenched as normal features of our lives? As Scott Lash confesses in his *Critique of Information*: 'I operate as a man-machine interface—that is, as a technological form of natural life—because I must necessarily navigate through technological forms of social life. … Because my forms of social life are so normally and chronically at-a-distance, I cannot navigate these distances, I cannot achieve sociality apart from my machine interface,' (Lash, 2002, p. 15).

Past utopian regimes sought to socially engineer a new way of being human. Even the more dreadful Nazi attempts to artificially standardize (via eugenics) a certain type of human being remained brutally faithful to their species and to a humanism however thinned out it might have been. Transhumanism, in contrast, has entirely given up on the long-term viability of human being, viewing it as a botched work-in-progress of the Blind Watchmaker. It is time, therefore, that we become willing accomplices to development of a successor species, a posthuman species better fit for the coming techno-future whose pre-figurations in our culture today have already begun to overwhelm our abilities to cope. Transhumanism does not withdraw in horror at this program of self-immolation, but instead calls us to recognize the nobility of our fate, viz., that of serving ourselves up as the 'transition form' to a new more promising species of post-human 'mind children' who will live forever in a technoverse aflame with information. Hans Moravec, Transhumanist extraordinaire, devotes a whole chapter in his book, Robot: Mere Machine to Transcendent Mind, to detailing how we parents can gracefully retire into extinction as our mind children outgrow us, create their own goals, go their own way 'with us perhaps a fond memory—but that too is the way of children' (Moravec, 1999, p. 78). Here it is instructive to note, that so far, our only self-replicating 'mind children' are computer viruses!

It is abundantly clear that technology plays a central role in leveraging Transhumanist visions of the future. Without the techno-optimism that gilds its every proposal, Transhumanism is little more than a whistling in the dark for the messianic Ubermensch. I want to explore in some detail, therefore, how Transhumanists take their bearings on the future from the accelerating pace of technological development.

3. Technology: Convergence and Singularity

When Transhumanists look to the future, they see it as indelibly shaped by the forces of the accelerating returns of technology. In fact, Transhumanists see two contemporary trends in technology—namely, the increasing convergence of technological domains of research and development and the developed

world's eager embrace of technologies of human enhancement—as already setting the stage for the drama of participatory evolution: the point at which humans, through technological ingenuity, decommission the blind forces of natural selection and replace them with their own intelligent intentions of artificial selection. They read these two trends as clearly signaling that the West is primed for a future of the posthuman variety.

The convergent trajectory of contemporary techno-science received official governmental recognition in December of 2001, when the National Science Foundation (NSF) and the Department of Commerce in the US sponsored the first of three work shops entitled 'Converging Technologies for Improving Human Performance: Nanotechnology, Biotechnology, Information Technology, and Cognitive Science.' These workshops show-cased the opportunities and challenges that are already arising out of the techno-scientific synergies fundamental to 21st century research and technology development. The blurb on their website explains the underlying rationale for the conferences: 'The convergence of nanoscience, biotechnology, information technology and cognitive science (NBIC) offers immense opportunities for the improvement of human abilities, social outcomes, the nation's productivity and its quality of life.' The report produced by this NSF workshop contains a clever poem that gets to the heart of convergence:

> If the Cognitive Scientists can think it
> The Nano people can build it
> The Bio people can implement it, and
> The IT people can monitor and control it.
>
> (Roco & Bainbridge, 2002, 12).

As this witty poem implies, converging technologies reference the cross-pollination of technologies that has originated in separate domains of research and development—a phenomenon that many Transhumanists read as the single most important step toward the fulfillment of their techno-cyber dreams. Recent breakthroughs in computer science, telecommunications, microelectronics, robotics, nanotech, and biotech have begun to converge, to cross-fertilize, promising to change not merely industry and business, government and warfare, but also culture, psychology, philosophy and religion. When biotechnology and microelectronics begin to converge, as, for example, in the case of introducing biocompatible technologies (e.g., nanobots and electronic implants) into the human body, the boundaries separating the natural from the artificial—the grown from the manufactured, bodies from bytes, or more specifically, humans from machines—get thinner and thinner. Such boundary crossings are the stuff Transhumanist dreams are made of.

Not only has techno-development begun to converge, but as a direct result of this convergence, technology's rate of development has begun to grow at a doubly exponential rate, that is, its exponential development is itself beginning to develop exponentially, according to Ray Kurzweil (2005, pp. 41 & 68). Consider that it took well over 20 years to sequence the genetics of the HIV viruses, an effort that began in the 1980s; in 2002, it took only 31 days to sequence the DNA of SARS. When the project to sequence the whole of the human genome started in 1991, genetic sequencing speeds were so slow that without speed increases it would have taken thousands of years to complete. Thanks to the non-linear development of technologies, the first draft of the human genome was actually completed in twelve years (Kurzweil, 2005, pp. 73-74 and fns 43-46).

Today, we use computer technology to help us design and build new technologies. In the very near future, humans with direct brain-computer interfaces will create the next generation of brain-computer interfaces. But there will come a point in the not too distant future, Transhumanists claim, when human cognitive limitations will show themselves to be impediments to the production of the next generation of intelligent artifact, signaling a threshold crossing where our computers have become more adept at designing themselves than we are. When this occurs, intelligent artifacts will go it alone, designing and building new intelligent artifacts with smarter-than-human intelligence. The crossing of this threshold is referred to as the 'singularity.'

The singularity is the point at which machines become sufficiently intelligent to start teaching themselves how to design machines. Eliezer S. Yudkowsky asserts that 'our sole responsibility is to produce something smarter than we are; any problems beyond that are not ours to solve …' (quoted in Kurzweil, 2005, p. 35). Vernor Vinge, the man who coined the term 'singularity' for use in contexts of artificial intelligence, notes that just as our model of physics breaks down when applied to the singularity at the center of a black hole so also will our model of historical development break down when applied to a future populated by artifacts with smarter-than-human intelligence. I. J. Good, in 1965, was the first to clearly articulate the singularity thesis as the intelligence explosion that will take place when humans can hand over to intelligent machines the task of designing intelligent machines. Good claimed 'the first ultraintelligent machine is the last invention that man need ever make' because 'shortly after, the human era will be ended,' (Good, 1965, p.

33).

The parameter shifts we see today in computer technology, for example, miniaturization, increase in processing speed, and decrease in cost, are the direct result of the technological convergences that make Transhumanists confident THE SINGULARITY IS NEAR (title of Kurweil's recent book). Ray Kurzweil refers to a 1949 article in *Popular Mechanics* where ENIAC is described as a giant calculator bearing 18,000 vacuum tubes and 30 tons of weight. The article goes on to predict that 'computers in the future may have only 1,000 vacuum tubes and perhaps weigh 1.5 tons' (Kurzweil, 2005, p. 56)—a humorous example of what happens when predications about technological advancement are locked into the specious linear view of techno-development! As Kurzweil observes, 'technological progress in the twenty-first century will be equivalent (in the linear view) to two hundred centuries of progress (at the rate of progress in 2000)' (Kurzweil, 2005, p. 50). In the mid-sixties, Gordon Moore, inventor of integrated circuits and later to become chairman of **Intel**, articulated what today is known as Moore's Law, which, in his 1970s version of it, claimed that the number of transistors packed into a square inch integrated circuit doubles every 18 months or so. However, since this doubling of transistors over a square inch of circuit board also meant that electrons would have smaller distances to traverse, there is also an overall boost of computational power thereby yielding a doubling of computational speed every 12 months. Currently we are 'shrinking both electronic and mechanical technology by a factor of 5.6 per linear dimension per decade' (Richards, ed., 2002, p. 219).

This trajectory of miniaturization has already led to the nanotech revolution that is presently taking our most advanced industries by storm. Nanotechnology is predicated on the ability to manufacture objects and structures with atomic precision—assembling them literally atom by atom—allowing us to impose our own design specifications on the biological machinery of living cells. A key component of the Transhumanist vision of the future rests upon the nanotech development of nanobots, small robots that 'will interact with biological neurons to vastly extend human experience by creating virtual reality from within the nervous system,' and as this internally generated virtual reality becomes 'competitive with real reality in terms of resolution and believability,' many Transhumanists agree with Kurzweil's claim that 'our experiences will increasingly take place in virtual environments,' (Kurzweil, 2005, pp. 28 & 29). When nanobot production and deployment becomes a matter of course in our medical and health care practices, we will become, as it were, brains in cocoons of simulated, designer environments, whose own desires, emotions, wills, and intelligences will be as artificial as the environments with which they 'interact'—both utterly freed from the distressing impingements of the real world. Moreover, nanobots will be important too for the reverse engineering of the human brain. They will be small enough to breach the blood-brain barrier so they can scan the salient details of our brains and then upload them 'into a suitably powerful computational substrate. This process would capture a person's entire personality, memory, skills, and history' (Kurzweil, 2005, p. 199). After all, for the Transhumanists, we are our minds, and our minds are just protein computers whose patterns of information processing, if they are preserved when transferred to silicone platforms, will preserve us—our bodies are just jelly (Moravec, 1988, 117).

Kurzweil recognizes that conventional silicon lithography circuits will reach a miniaturization limit within a decade or so, but Moore's Law will prevail as we move into a new paradigm of computational substrate. Molecular three-dimensional and nanotube computing have already arrived, and Kurzweil is optimistic about the possibilities of computing with DNA, exploiting the spin of electrons and quantum qubits for memory and computation—any of which will extend the life of Moore's Law into the indefinite future (Kurzweil, 2005, pp. 111-122).

Another consequence of converging technologies is the exponential increase of processing speed and improvements of cost performance. Graham Lawton observes that within living memory, the information storage capacity of computers has increased more than 100 million-fold: 'You probably have more processing power in your microwave than was available to the entire world in 1950,' (Lawton, 2006). Speaking of the exponential progress of information technology development, Kurzweil claims his 2009 model cell phone is a billion times more powerful per dollar than the building-size computer all the students and faculty at MIT shared when he attended there in the 1960s. And regarding the trend of miniaturization, he asserts 'What used to take up a building now fits in my pocket, and what now fits in my pocket will fit inside a blood cell in 25 years' (Kurzweil, 2009). Kurzweil notes that '[c]omputer speed (per unit cost) doubled every three years between 1910 and 1950, doubled every two years between 1950 and 1966, and is now doubling every year' (Kurzweil, 2002, p. 18). Although it took nearly ninety years to achieve the first MIPS [Multiple in Processing Speed] per thousand dollars, thanks to the law of accelerating returns, 'now we add one MIPS per thousand dollars

every five hours' (Kurzweil, 2005, p. 70). He predicts that 'By 2019, a $1,000 computer will match the processing power of the human brain—about 20 million billion calculations per second' (Kurzweil, 2002, p. 12).

The fallout of exponential development in information technologies is also driving price reductions in biotechnology, and this, of course, bears directly on the feasibility and affordability of human enhancement technologies—about which more in a moment. In 2007, James Watson, Nobel Prize winner along with Francis Crick for discovering the molecular structure of DNA, had his genome sequenced for $2 million dollars US. As of June 2009, *Illumina*, a genomics technology company headquartered in San Diego 'announced the launch of a $48,000 genome-sequencing service at the Consumer Genetics Conference' (Singer, 2009).

With these empirical trends of non-linear technological advancement apparent everywhere one turns, the baby-boomer Transhumanists believe if they take good care of themselves, they may well be around for the Singularity's techno-rapture into posthumanity (Kurzweil takes 250 supplements a day and undergoes six intravenous therapies a week, Kuzweil, 2005, p. 211).[5]

4. Technology: Human Enhancement and Body-Machine Boundary Crossings

The second trend in the West that signals its Transhumanist trajectory is its eager embrace of technologies of human enhancement. As opposed to therapy, which seeks to prevent or cure disease with the sole aim of restoring normal functioning, *enhancement* is the alteration of normal personal and physical characteristics, traits, and abilities beyond the statistically normal. Our therapeutic culture has prepared the ground for Transhumanism by viewing all suffering as avoidable, an unalloyed curse, and therefore pointless, while our consumeristic culture has, by construing life as one continuous chain of purchases and regarding any limitation on consumer choice as scandalous, already set us on a slippery slope inclined to a Transhumanist future. In late capitalist economies like ours, a transformative social dynamic has been set afoot by the rise of technologies of human enhancement that is pushing us all in the direction of Transhumanist amenability. The dynamic goes something like this: first *medicalize* certain statistically normal human characteristics (e.g., shyness or waning erectile function) by showing that they are largely manifestations of genetic or hormonal factors that can be modified through pharmaceutical, genetic, or surgical interventions; use mass media campaigns both to *pathologize* these traditionally non-pathological characteristics and to *normalize* the potential of enhanced characteristics (e.g., indefatigable confidence or three-hour erections in 70 year olds); finally *commodify* these newly normalized enhanced human traits by offering to sell them as a means of bringing us into a better fit with the demands and expectations of our deeply consumerist techno-culture.

The actual, as opposed to the ideal, trajectory of this social dynamic, however, suggests that in the near future unenhanced people will be perceived as dis-abled or perhaps in-valid people, people who stubbornly remain unimproved, inefficient, and (most significantly) socially costly, ignorantly refusing to upgrade their ancient Paleocene hunter-gatherer wetware. Perhaps not all of us will be merrily prancing hand-in-hand down the technologically paved 'yellow brick road' leading to the singularity.[6]

Among the most prevalent and popular human enhancement technologies are the psycho-pharmaceutical *cognitive* enhancers like Modafinil or Adderall, *personality* enhancers such as Prozac or Ritilin, physico-pharmaceutical *weight loss* and *sport* enhancers such as fenfluramine-phentermine (Fen-Phen), or anabolic steroids, and *sexual* enhancers like Viagra or Cialis. Although most of these drugs were initially developed to restore normal functioning to afflicted individuals, they are now available and can be used by anyone seeking an advantage or seeking to stand out from the crowd. An interesting unintended ratchet-effect (highly visible today in the case of anabolic steroids in sports) inevitably accompanies the use of enhancement drugs: as people recognize they are dis-advantaged by not using them, more and more people begin to use them, creating a new higher statistical norm, which in turn, creates a demand for the availability of a more potent enhancer—an arguably unwinnable 'arms race'. Of course, a collateral effect of this dynamic is the creating of a new 'have/have not' divide, since only by already possessing a certain degree of financial advantage will one be able to purchase these high-priced pharmaceuticals in the first place.[7] In a competitive world that promises only to get more competitive, and in particular, in the fiercely competitive domain of the economy, where it seems we're willing to do almost anything to land the highest paying jobs or to get that next promotion, who of us can persistently resist the siren call to this arms-race that subtly tilts us in the direction of the singularity?

Longevity enhancement (life extension) technologies are already available in the precincts of regenerative medicine, if only in risky and not yet debugged form. Recent developments in stem cell

research and cloning are poised to teach us how to rewind the telomere DNA cellular clock that triggers somatic cells' demise. Telomeres shorten slightly every time the chromosomes replicate in preparation for cell division, suggesting that cells become senescent and die when the telomeres have shortened beyond a certain point. That shortening takes place because normal somatic cells, unlike germ line cells, do not make telomerase, the special enzyme needed to synthesize telomeres. But in cancer cells, telomerase synthesis is reactivated in somatic cells, explaining cancer cells' ability to divide continually and proliferate out of control. Recent research into egg cell transcription factors' capacity to regress somatic cells back to embryonic stem cells or induced pluripotent stem cells (iPS), has given hope to the regenerative medicine community that soon we will be able to reverse the aging of human somatic cells by engineering them to become more like germ cells. Kurzweil commenting on the difficulty of separating the desired from the undesirable effects (e.g., inadvertently generating cancer cells) of radical life extension interventions, lightly brushes them aside with this parting comment 'they are all solvable engineering problems,' a confidence common amongst Transhumanist deriving from their conceiving of biology as an information technology (Kurzweil, 2009).

Another approach to life extension comes from age-decelerating interventions, where the genes 'regulating the molecular mechanisms of aging could be altered or at least delay[ed]' (Glannon, 2008, p. 175). The idea here is to slow down the aging process thereby postponing, perhaps indefinitely, the degenerative diseases and handicaps that come with age. Some progress in this direction has been made in experiments with the worm C. elegans by manipulating the SIR2 gene to alter the function of the enzyme telomerase (Hekimi and Guarente, 2003, pp. 1351-1354). Nanotechnology, however, is the real heart of Transhumanist hope for immortality, the belief that we will soon be able to inject or swallow nano-size robots (nanobots) that will immediately go to work repairing the body's failing organs and reversing cellular degeneration (Gelles, 2009, p. 39), which brings us to medical nanotech.

With billions of dollars around the world now being devoted to nanotech R and D, there are any number of products on hand whose manufacturing involves nanotech, for example stain resistant clothes, self-cleaning windows, clear sunscreen, spray-on contraceptives, dental adhesives, smart drug delivery systems, etc. And in the very near future we are promised many human enhancement technologies, such as respirocytes. These are theoretical nanomachines (still in the R and D stage) that function as artificial red blood cells, carrying oxygen and carbon dioxide molecules through the body. Each one can store and transfer 236 times the amount of oxygen of natural red blood cell (Wikipedia, 'Respirocyte'), and would enable an individual whose red blood cells were replaced by respirocytes to 'sprint at the level of an Olympic sprinter for 15 minutes without taking a second breath' (Mick, 2008). Robert Freitas, the mind behind respirocytes, is also exploring the white blood cell equivalent to the respirocyte, what he calls the 'microbivore' nanobot that would attack pathogens (Kurzweil, 2005, p. 254). In 2008, researchers from the Nano Medicine Center at the California Nanosystems Institute at UCLA developed a nanomachine drug delivery system, called a 'nanoimpeller', that captures and stores anticancer drugs and can be directed to release them into cancer cells (Lu, et al., 2008, pp. 421-426). On the horizon are nanobots that we will either ingest or have injected into our bodies so they can repair damaged genes, destroy bacteria, viruses, cancer cells, and strip our arteries of fatty deposits (McGee, 2008, p. 212).

Research on neural prosthetic and brain-computer interface technologies began in the 1970s at UCLA, while the first neuroprosthetic devices implanted in humans, as opposed to non-human animals, took place in the 1990s. Some of the most recent advances in semiconductor devices, bioelectronics, nanotechnology, applied neural control electronics, prosthetic devices, and techniques of implantation of biocompatible technologies give real credibility to the Transhumanist claims that, as we have grown more incestuous with our technologies, we are already launched into a trajectory of post-biological existence. Each new therapeutic triumph over sensory, motor, or cognitive defect, disease or handicap through biotechnological melding of body and electronics further acclimatizes our culture to the Transhumanist techno-cyber-future.

Today we use artificial heart valves, cardiac pacemakers, implantable pumps to supply insulin, pain medications, and to assist pulmonary function or blood circulation. First-generation neuroelectronics are already implanted in over 150,000 deaf people as straight-to-brain implants (Keim, 2009). There has been remarkable progress with optoelectronic retinal implants as well. There are over 30,000 people now using implants for deep-brain stimulation. These are pacemaker-like brain implants that not only dampen the essential tremors of Parkinson sufferers, but can also download software upgrades directly from outside the implant. Recently, a 25 year-old individual with quadriplegia was able to check e-mails, play computer games, control a television, type messages,

and turn lights on and off by thought alone because of an implanted bionic **Braingate** interface device. Moreover, the US military (DARPA) is busy developing similar implants that will allow army personnel to control robots and airplanes through their thoughts alone (Martin, 2005). There is little doubt about the enhancement potential and market for the off-label uses of these emerging technologies—biocompatible implants delivering parabolic hearing capacities, and/or microscopic, telescopic, and infra-red visual capacities, and/or expandable memory and information processing capacities, and/or the ability to access a search engine through thought alone, and/or the ability to dampen the violent or sexual reactions of paroled felons, etc.

Transhumanists take delight in the progressive breakdown of boundaries separating body and technology that these interventions and implants bring to the public in the non-controversial arena of therapeutic technologies because they make the transition to using them for enhancement and augmentation seem like a mere matter of course. Our culture's embrace of these technologies pre-positions us for easy acquiesce to the future that Transhumanism promises. Through a few decades of progressively radical bodily enhancements and augmentations, we will, says the Transhumanist, inevitably transition into a largely cyborgic body-machine configuration that will make the final morph into a wholly new computational substrate seem almost natural. To fully grasp the meaning of the Transhumanist enterprise however, we need to take a deeper look at the rather superficial and un-nuanced conception of technology that motivates and sustains their vision of the future.

5. Technology: An External Tool or Means of Becoming a Tool of Our Tools?

At the most basic level Transhumanists understand technology as the continuation of evolution by other, more efficient means. The painfully slow biological phase of evolution involved a few billion years of chance and necessity to produce *Homo sapiens*, the 'technology creating species' that, through recent technological developments, is now poised to launch into the self-designing phase of evolution (Kurzweil, 2002, p. 16). Ironically, Kurzweil's vision of the posthuman future is shamelessly based on a techno-anthropocentrism:

[I]t turns out we are central, after all. Our ability to create models—virtual realities—in our brains, combined with our modest-looking thumbs, has been sufficient to usher in another form of evolution: technology. That development enabled the persistence of the accelerating pace that started with biological evolution. It will continue until the entire universe is at our fingertips (Kurzweil, 2005, p. 487).

Technology viewed as evolution by other means involves an expansion of human responsibilities since, as the Transhumanist believe, technologies are merely tools of human intention and design that we control. Suddenly, we are responsible for our embodiment because we can or soon will be able to change it; we are responsible for our future evolution because we can now change it: 'I regard the freeing of the human mind from its severe physical limitations of scope and duration as the necessary next step in evolution,' (Kurzweil, 2001). David Gelles in his article, 'Immortality 2.0' asserts that 'Transhumanism views sickness, aging, and death as unnecessary hindrances that we have the right and the responsibility to overcome. Our bodies, frail and unpredictable, are just another problem for these engineers to solve. The brain, our body's computer, is due for an upgrade,' (Gelles, 2009, p. 35).

Transhumanists believe in perpetual progress and therefore in questioning traditional humanistic and religious constraints on the progress that technoscience promises, assuming that only science and technology can bring the unlimited horizons of lifespan, intelligence, personal vitality, and freedom we all yearn for: 'We have decided that it is time to amend the human condition. We do not do this lightly, carelessly, or disrespectfully, but cautiously, intelligently, and in the pursuit of excellence,' (More, 1999). David Pearce (co-founder of the World Transhumanist Association) expresses boldly the new responsibility evolution has passed on to its 'technology creating' offspring: 'If we want to live in paradise, we will have to engineer it ourselves. If we want eternal life, then we'll need to rewrite our bug-ridden genetic code and become god-like. …only hi-tech solutions can ever eradicate suffering from the living world. Compassion alone is not enough,' (Interview Cronopis, 2007).

As many of the quotations above and even a cursory reading of Transhumanist literature reveals, they harbor a deeply instrumentalist understanding of technology, and I shall argue that it is this simplistic conception of technology that underwrites and funds the plausibility of their posthuman promises. When one recognizes how deeply hermeneutical, dialectical, and self-reflexive human involvement with technology truly is, one becomes suspicious that that Transhumanist attempts to 'remotely' control the future of our species through technology may more likely be a symptom of their already being unwittingly controlled by technology as the result of the naïveté of their present embrace of it. Anyway, that's my hunch.

Like Margaret Thatcher who in 1982 claimed

'Information technology is friendly: it offers a helping hand; it should be embraced. We should think of it more like E. T. than I. T.' (Robins and Webster 1989, p. 25), Transhumanists are technophiles who are literally in love with technology and who understand it instrumentally, as a fascinating but neutral means of expansive and efficient goal procurement. In their view, the projective goals that technology is deployed to deliver are what brings non-neutrality into the picture, while the technologies used to pursue these goals are, as it were, innocent by-standers. Instrumentalist views of technology woefully underestimate the dialectical nature of technologies, harboring, as they do, a rather naïve realism that understands humans to be unchanged by their use of technologies and the human world to be massively constrained by the objective features of its micro-constituents which technology merely helps us arrange or rearrange into aggregates that conform to our preferred configurations. The world is an arena of problems and obstacles that a rational deployment of technology will solve or overcome. Technology is nothing more than an array of tools that if used rationally will do things for us, and that is the end of it.

But surely a more adequate and less naïve understanding of technology recognizes that technologies themselves are not entirely inert but interact with their users and changes them in subtle yet non-trivial ways. Technologies, by virtue of what they enable and disable in the form of life that uses them, embed certain individual and social biases, certain telic tendencies of their own functionality that incline their users in certain directions. Think for a moment about how the invention of so simple a tool as a hammer altered human perception, remembering Abraham Maslov's quip 'to a man with a hammer, everything looks like a nail.' Or how the simple technology of the wheel revolutionized not only the human body's limitations and possibilities, but the social world in which the human mind takes shape. Or how an invention originally designed to regulate the religious routines of the monastery, the mechanical clock, ultimately enabled the rise of capitalism which has progressively transformed human self-understanding in innumerably and largely unnoticed ways. In this sense, technologies are never merely means or exclusively instrumentalities or totally tools.

Although Heidegger's ruminations on technology as found in his 1955 lecture 'The Question Concerning Technology' are often obscure and at certain points contentious, I think there are some sound insights woven into this abstruse piece that can help us illuminatingly question the vision of technology upon which Transhumanist speculations about the future rely. In this essay he challenges head-on the naïve instrumentalist conception of technology that Transhumanism assumes. The essence of modern technology, says Heidegger, is not found in an array of instrumental artifacts, but is most profoundly understood as a cast of mind or a way of representing the world that arose when early modern science brought to fruition certain objectifying and abstractive impulses of the human psyche that reduced nature to disenchanted mechanical mass in motion, an exhibition of 'a coherence of forces calculable in advance' (Heidegger, 1977, p. 21).

According to Heidegger, wherever there are technologies, there is always already a way of revealing the world that preceded them (Heidegger, 1977, p. 12). What he seems to be claiming is that technology is never an hermeneutic-free enterprise. He contends that the rise of modern science brought about a drastic shift in the way the world would thereafter be revealed, and since humans are beings who understand themselves in relation to the world's otherness, a drastic shift in human self-understanding would gradually ensue in the West.

Prior to the rise of modern science, tools, implements, and simple mechanisms were understood, with few exceptions, as rationally forged devices created and employed by humans care-fully to 'bring-forth' (Heidegger, 1977, p. 11) nature's own potentials to realize basic human goods. For example, the ship's sails or the windmill's blades would catch the wind, allowing it to be wholly itself as it served human ends. In the classical and premodern understanding of nature, human goods or ends were understood as a sub-set of nature's own ends. The whole cosmos was conceived to be ordered by objective ends that naturally and inextricably conduced to the realization of basic human goods. Nor did human will or desire have anything to do with either the origination or shape of these human goods or ends; they were not the result of human deliberation or choice, but fundamental givens of the supernatural forces that originally ordered nature and continued to hold it in being. The cosmos was revealed to these premoderns as bearing an ontological grain that to go along with brought human fulfillment and to go against brought alienation and ruination. The tools and simple technologies developed in the premodern world were understood to have arisen through the natural ends of the cosmos evoking within humans the means of their realization—Heidegger refers to this kind of revealing of nature as 'a bringing-forth in the sense of *poiesis*' (Heidegger, 1977, p. 14).

However, things changed dramatically, according to Heidegger, with the rise of modern science and

the technological way of being it entrenched in the West. After the late medieval voluntarism and nominalism effectively de-Formed the cosmos—flattened its ontological hierarchy into a uni-verse of matter in mechanical, end-less motion, and disenchanted it of intrinsic values and ends—modern techno-science arose to *order* the universe of matter in motion into serving human welfare (and, of course, human war-fare!). From this point on, if the universe will have any ends or values, they will be those imposed or projected onto it by the autonomous and alien subjectivity of human desire. Heidegger referred to the revealing through which modern technology discloses the disenchanted world-machine as *Herausfordern*, a cold, aggressive, commanding forth (Heidegger, 1977, p. 14). From within this cold hermeneutic of modern techno-science, all of reality shows itself as storable, abstract, inert stuff, standing on reserve as resources to be shaped and ordered by the contingent projections of human ends and values. Such ordering or framing (*Gestell*) of reality is the essence of modern technology, says Heidegger: as the only subjectivity within the desert landscape of a disenchanted world, humans are moved or feel summoned to so frame nature that it shows itself only as *Bestand* (Heidegger, 1977, p. 17) or standing-reserve, a stock of energy resources standing on reserve for human use and disposal.[8] In contrast to the sailboat's use of wind to carry the vessel over the water's surface, where nature's wind, un-worked over by humans, literally breaths through our technology to realize a human end, the internal combustion engine, a prime example of what Heidegger calls 'modern technology,' thrusts the speed boat violently through the water by virtue of gasoline which is the product of humans working over the earth's limited resource of petroleum, and a product available only because it has been stored up, distributed, and regulated through a vast bureaucracy. Modern technology frames the earth and all it contains as capital, standing ready for technological transformation and human consumption.

Heidegger says 'So long as we represent technology as an instrument, we remain held fast in the will to master it,' (Heidegger, 1977, p. 32). Ominously and somewhat paradoxically, Heidegger seems to be suggesting that our attempts to master technology will bring with them a kind of slavery or addiction to technology's formatting of our world picture, making every thing, eventually even our selves, show up *sub species manipulanda*. That is, embracing the superficial instrumentalist conception of technology as neutral gadgetry, a position whose appeal is compelling in a world whose enchantments have lost their independent standing, ensnares us in a cold hermeneutic 'in the worst possible way,' by inclining us to a 'precipitous fall … where [we ourselves] will have to be taken as standing-reserve' (Heidegger, 1977, p. 27). In this way, Heidegger sees modern technology implying the nihilistic metaphysics of will to power. In short, if Heidegger is taken seriously, those who hold to the modern instrumentalist view of technology have themselves been *framed*, framed like the man with a hammer into seeing the world as a vast array of nails waiting to be pounded, framed like the men with advanced computational devices into seeing all of reality as computable information, or 'computronium'—as Kurzweil calls it (Kurzweil, 2007, p. 13).

Given Heidegger's rather less simplistic reading of technology, where technology is not so much about efficient gadgets and time-saving devices, but more about a way of representing nature and human nature in particular, we begin to see that it is perhaps not at all surprising that Transhumanists, being entirely instrumentalist in their uptake of technology, proudly view human being as problematic raw material to be technologically worked over into conformity with the shadowy posthuman adumbrations they claim to glimpse just the other side of the singularity. Having fallen under the spell of an instrumentalist reading of technology, the Transhumanists are largely blind to how much of their vision of a posthuman future might just be a consequence of their own imaginations having been contoured and compromised by the hidden workings of the purportedly 'neutral' technologies they have already embraced. That is, perhaps the apparent inevitability of posthumanity might reveal more about how Transhumanists have become 'tools of their tools,' as Thoreau expressed, well over a century ago, a tendency he could already discern in the social impact of industrialization's modern technologies (Thoreau, 1854/2003, p. 33).

Neil Postman (and many others) has argued that technologies not only do things for us, they also do things *to* us. Moreover, they not only do things for us and to us, they also and at the same time *undo* things; they give and take away, often giving us something we desire (ease, efficiency, convenience, etc.) and taking away something we need (friction, concrete contact with nature, a sense of our limitations, etc.). For example, as they enable us to do more without as much physical exertion, they at the same time weaken our bodies. As they advance the acquisition of information and establish new knowledge monopolies, they at the same time undermine traditional practices and wisdom. As they expand the band-width of our communication capacities, they at the same time diminish the depth

of our dialogues and subtly and unconsciously impoverish the meanings of key words we use (e.g., the meaning of 'information' after the computer revolution, or the meaning of 'friend' to an avid Facebook user). As they increase the power and entrench the authority of the rich and enfranchised, they at the same time take away power from and diminish the voice of the poor and disenfranchised. And, perhaps most importantly of all, they conceal what they take away even as they highlight what they give—*and this is why they are always more dangerous than anyone who presumes they are neutral instruments are likely to recognize*. Marshal McLuhan warned that 'unconsciousness of the effect of any force is a disaster, especially a force that we have made ourselves,' (McLuhan, 1962, p. 248). The admittance of any new technology into a culture does not merely add a new item to that culture; it also transforms that culture by changing those who use the technologies, revising their bodies, beliefs, languages, imaginations, communities, and this drastically alters their sense of limitations and possibilities in the world.

Postman maintains every technology 'embeds an ideological bias,' predisposing its users 'to construct the world as one thing rather than another, to value one thing over another, to amplify one sense or skill or attitude more loudly over another,' (Postman, 1993, p. 13). Technologies bring about 'ecological change' (Ibid., p. 18): 'New technologies alter the character of our interests: the things we think *about*. They alter the character of our symbols: the things we think *with*. And they alter the nature of community: the arena in which [our] thoughts develop,' (Ibid., p. 20). On this more nuanced understanding of technology, technology is understood to be a system of psychic and social forces; not merely physical forces that direct nature to procure our goals, but also symbolic forces that incline thought, language, and society in certain directions, effectively reflecting even as it revises something of what it means to be human. New technologies we accept immediately and largely imperceptibly begin to restructure human practices into conformity with the demands of their efficiencies and their ever evolving interdependencies on other and newer technologies, and consequently they will also require new social policies to accommodate and entrench these new practices, all of which will have profound impacts on the type of people we become and the type of communities we inhabit. Technologies don't just re-arrange the world of objects in more efficient ways; they revise our expectations, our beliefs, our perceived needs, changing how we understand ourselves, what we conceive of as a life well lived, how we relate to others, and therefore bear profound yet rarely noticed political and ethical dimensions.

Steve Talbott offers an interesting perspective on the techno-slavery that Transhumanists proffer as the means to an ultimate liberation. In his wise and deeply insightful book, *Devices of the Soul: Battling for Our Selves in an Age of Machines*, he reminds us that technology originates from us and even from within us. Every technology is an amplification of human potentials, some primarily amplify certain bodily capabilities, and others, as in the case of information technologies, amplify certain mental capabilities, habits, and routines. Think of a hammer for a moment. It's an analogue of our fist with its properties of density and imperviousness to pain greatly amplified. Informationally driven technologies also externalize, mimic, and amplify certain low-level functionalities of our minds that are amenable to abstraction, externalization, and mechanization. A hand-held calculator, for instance, abstracts our basic skills of rule following, symbol manipulation, memorization, and externalizes these abstractions in a complex of hard- and soft-ware whose output amplifies our native calculating speed and memory capacities.

Not only do technologies amplify and reflect back to us aspects of our bodies' and minds' facilities and aptitudes, technologies are also dialectical to their very core. When we *create* tools and technologies, we ingeniously impose our own intentionality on the boundary conditions of matter's physical forces to deflect them to serve our ends, bending nature, as it were, around the inclinations of our nature. But interestingly, when we then turn around and *use* the tools and technologies we have made, these technical effigies of our own minds bring with them, by virtue of their externalized material embodiment, unforeseeable personal and unintended social consequences, i.e., certain ends or biases of their own that impose the demands of their functionality and form on our intentions, subtly bending our nature and that of our communities around their artifactual nature. Consider how the introduction of the automobile has not only transformed global geopolitical relationships, the globe's climate and landscape, and the global economy, but closer to home, changed our cities, suburbs, jobs, communities, and even our own personal senses of freedom, space, and time. Technologies give us more of what we consciously desire while taking from us what we are not even aware of needing, and along the way create new desires that we sooner or later experience as fundamental needs. To put it bluntly, technologies create addictions—perhaps some are positive, others innocuous, but there is no doubt that some are deeply de-humanizing.[9]

Our modern culture is ubiquitously woven through with computing technologies that are externalizations and amplifications of certain mechanical and automatic capacities of human intelligence, what Talbott calls 'devices' of the human mind (Talbott, 2007). The mental capacities that our information age and culture of informatics embodies in its technologies are the qualitatively, expressively, and creatively impoverished habits of mind that, as such, can be captured mechanically by opening and closing transistorized logical gates via voltage differentials to then be reduced to the ones and zeros of machine code. What this means is that we are cocooned in a world that reflects, everywhere we turn, ramped up externalized artifacts of the mechanical features of our own minds; in fact, these devices and the 'closely woven web of programmed logic' (Talbott, 2007, p. viii) they have spun into our lives, have so permeated, imbricated, and implicated themselves in our social, cultural, economic, political, and even religious environments that they are literally determining the rhythms and textures, that is, the *quality*, of our lives—explaining why, as Donna Haraway observes, we have become 'frighteningly inert' in our living (Haraway, 1991, P. 52).

If Talbott is right, and technologies, although embodied in external physical platforms, are nonetheless aspects of us, then technologies are never merely neutral gadgets. They bring into technical union external material forms that vector with their own predispositions and unpredictable biases combined with those aspects of our selves that are most susceptible to mechanical simulation, which means aspects of our lower-selves. And thus, the Transhumanist project of progressively replacing our flesh with more durable and efficient technologies can be read not so much as they propose, *viz*., as the only road to human liberation and to entering higher and potentially immortal orders of posthuman being, but rather as the most devious yet captivating path to sub-humanization the world has yet seen for it is nothing less than an invitation to re-make our humanity in the image of our lower-selves.

It is interesting to put this observation in the context of the traditional humanist project of self-remaking. With roots stretching all the way back to Plato and Aristotle, humanism is an effort of self-discipline, self-forbearance, and the pursuit of deep self-knowledge to bring the rationality, wisdom, and universal intent of our higher selves into harmonious integration with our lower hedonistic passions and selfish instincts—in Freudian terms, placing the Pleasure principle within the constraints of the Reality principle. The Transhumanist enterprise, if Talbott is right, reverses the trajectory of humanism's mission of self-remaking by unwittingly pursuing a policy of engineered intellects, contrived character qualities, and virtual virtues that will technologically enframe our higher self in the designs and devices of our lower self.

6. Concluding Reflection: Transhumanism's project of Technological Self-Making in the Sweep of Modern History

Ever since the rise of modern science in the 17th century, everything non-measurable and/or non-natural has been progressively called into question—either explained away as mythical superstitions or as merely illusions generated by subjective human projections. When the hierarchical and intrinsically normative medieval cosmos was flattened into mere matter in motion, under the cold hermeneutic of emerging modern science, the cozy premodern cosmos was transformed into our modern unbounded uni-verse, having all its qualitative features reduced ultimately to quantitative agglomerations under the deterministic impress of impersonal mechanistic laws, effectively purging the cosmos of inherent values, moral norms, and objective telic trajectories. What this accomplished was, as we have discussed, the releasing of nature into a wholly instrumental register, rendering nature what Heidegger called *Bestand* or 'standing reserve'—mere inert stuff to be shaped, stored, and deflected into the service of human desires. But this ontological reduction which freed science to treat nature as merely resource, also left human experience itself in an obvious interpretive bind: how are we to account for and deal with those undeniable yet non-measurable and apparently non-natural dimensions of our first-person perspective for which there is absolutely no place in a wholly quantitative universe, and what do we do with our deep, irrepressible moral aspirations to meaning and value that are denied legitimacy under this rising scientistic regime of disenchantment? These *aporia* were, however, largely ignored, repressed, or trivialized on the presumption that they would soon be vanquished by the inexorable advancement of natural sciences. Today, however, we are witnessing the return of the repressed. Those repressed moral and immortal longings and immeasurable dimensions of human being that modernity banished from the lifeworld are erupting again, all ramped up and now bearing scientific legitimation as Transhumanism's techno-scientific project of eliminating aging, illness, unsatisfied desires, and even death.

From this vantage, Transhumanism begins to look like an attempt to virtually re-cover the enchantment of reality that modernity literally conjured away. The original, premodern enchantment derived from the

Creator's expressing His character via exemplars in matter (creation's formal participation in the divine agency that brought it into being); Transhumanist enchantment will instead derive from the techno-ingenuity of humans capable of encoding their fantasies in silicon circuitry thereby eliminating the 'unchosen' dimensions of their world and their selves. In this categorical refusal of the givens of human existence, they will be launched into a thankless future, a future devoid of any grounds for thankfulness. The Transhumanist project is perhaps one of the last desperate efforts of modernist critical thought to recover the certainty and familiarity of the premodern cosmos, the repudiation of which ironically marked modernity's birth.

I think Transhumanism is all about this ancestral birthmark. Transhumanism enacts a nostalgic narrative of recovery: it wants premodern-like certainty, certainty about its beliefs and certainty about its blessed destination, but it wants it on its own terms: it wants to be the author of this certainty. Transhumanism wants to inhabit a premodern-like world that is familiar, predictable and reasonable, but it wants to be the author of this world. Having embraced modern science's objectivist ideals that leave no place for realities that cannot be quantified, rendered explicit, algorithmic and objective, it faces a disenchanted world, a dead world-machine with only quantities, no qualities, facts with no value, and mechanisms without purpose. Transhumanist aspirations arise from a hunch, long in the making, that Homo sapiens can manufacture on its own terms and through its own means not only the re-enchantment of the world with certainty and familiarity, and with virtual qualities, values, and purposes, but also that it can even give birth to an immortal self by re-engineering itself into the image of its desires and fantasies, finally exchanging its birthmark for a trademark: h+™!

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Bibliography:

Bendle, M. F., 'Teleportation, Cyborgs, and the Posthuman Ideology,' *Social Semiotics*, Vol. 12, No. 1, 2002.

Bostrom, N., 'A History of Transhumanist Thought,' 2005: available online at www.nickbostrom.com

Fukuyama, F., 'Transhumanism,' *Foreign Policy*, No. 144, Sept/Oct. 2004: 42-43

'Second Thoughts: the last man in a bottle,' *The National Interest*, Summer 1999.

The End of History and the Last Man, New York, The Free Press, 1992.

Gardner. J., *The Intelligent Universe: AI, ET, and the Emerging Mind of the Cosmos*, Franklin Lakes, NJ: The Career Press, 2007.

Gelles, D., 'Immorality 2.0,' *The Futurist*, Jan-Feb 2009.

Glannon, W., 'Decelerating and Arresting Human Aging,' in Gordjin and Chadwick (eds.), 2008.

Good. I. J., 'Speculations Concerning the First Ultraintelligent Machine,' in *Advances in Computers*, Franz L. Alt and Morris Rubinoff, eds., Vol. 6, New York: Academic Press, 1965.

Gordijn, B. and R. Chadwick, eds., *Medical Enhancement and Posthumanity*, Springer Science + Business Media, B. V. 2008.

Grant. G., *Technology and Justice*, Concord, House of Anansi Press Limited, 1986.

Hannemann, J., 'Search and Destroy' *U. S. Catholic Conference*, January 2006.

Haraway, D., *Simians, Cyborgs and Women: The Reinvention of Nature* New York: Routledge, 1991.

Heidegger, M., *The Question Concerning Technology and Other Essays* (trans. William Lovitt). New York: Harper & Row, 1977.

Hekimi S. and L. Guarente, 'Genetics and the Specificity of the Aging Process.' 2003, *Science* vol. 299.

'Interview with Nick Bostrom and David Pearce,' *Cronopis*, 2007.

Keim, B., 'Brain-Machine Interfaces Make for Tricky Ethics,' *Wired Science*, Feb. 2, 2009.

Kurzweil, R., 'Ray Kurzweil on How to Combat Aging,' submitted to *Technology Review's* interview with Leonard Hayflick, July 6th 2009. Available online at: http://www.technologyreview.com/blog/guest/23802/

'Forward to James Gardner's *The Intelligent Universe*,' in Gardner, 2007.

The Singularity is Near, Penguin Group, USA, 2005.

'The Evolution of the Mind in the Twenty-First Century,' in Richards, 2002.

'Are We Becoming an Endangered Species? Technology and Ethics in the Twenty-first Century,' 2001. Available online at: http://www.kurzweilai.net/articles/art0358.html

Lash, S., *Critique of Information*, London, Sage Press, 2002.

Lawton, G., 'The Incredibles,' *New Scientist*, May 13th 2006, Vol. 190, Issue 2551.

Lu, J., et al., 'Light-Activated Nanoimpeller-Controlled Drug Release in Cancer Cells,' *Small*, Vol 4, Issue, 4, March 2008.

Martin, R., 'Mind Control,' *Wired Magazine*, Issue 13, March 2005. Available online at: http://www.wired.com/wired/archive/13.03/brain.html

McGee, E. M., 'Bioelectronics and Implanted Devices,' in B. Gordijn, R. Chadwick (eds.), 2008.

McLuhan, M., *The Gutenberg Galaxy: The Making of Typographic Man*. London: Routledge & Kegan Paul, 1962.

Meyer, K., 'Amortality' *Time Magazine*, What's Next 2009: 10 Ideas Changing the World Right Now, March 12, 2009.

Mick, J., 'Conference Examines man and Machine

Merging: How Tech Will Make Human Brain Obsolete,' *DailyTech*, July 15, 2008. Available online at: http://www.dailytech.com/article.aspx?newsid=12384

Moravec, H., *Mind Children: The Future of Robot and Human Intelligence*, Cambridge, Harvard University Press, 1988.

Robot: Mere Machine to Transcendent Mind, Oxford, Oxford University Press, 1999.

More, M., 'Letter to Mother Nature,' 1999. Available online at: http://www.maxmore.com/mother.htm

Postman, N., *Technopoly: The Surrender of Culture to Technology*. New York, Vintage, 1993.

Richards, J. ed., *Are We Spiritual Machines? Ray Kurzweil vs. the Critics of Strong A. I.*, Seattle, Discovery Institute, 2002.

Robins, K. and F. Webster, *The Technical Fix: Education, Computers and Industry*. London: Macmillan, 1989.

Roco, M. and W. Bainbridge, 'Converging technologies for improving human performance: nanotechnology, biotechnology, information technology and cognitive science,' 2003, Dodrecht: Kluwer Academic. Available from: www.wtec.org/ConvergingTechnologies/Report/NBIC_report.pdf.

Russell, B., *Mysticism and Logic*, Garden City, Doubleday Anchor Books, 1917/1957.

Singer, E., 'The Human Genome: Yours for $48,000' *Technology Review*, June 11, 2009.

Talbott. S., *The Future Does Not Compute: Transcending the Machines in our Midst*, Sebastopol, O'Reilly & Associates, Inc., 1995.

'Editor Explores Unintended, and Negative, Side of Technology,' *New York Times* Interview of Steve Talbot by Lisa Guernsey, Nov. 25, 1999.

Devices of the Soul: Battling for Our Selves in an Age of Machines, Sebastopol, O'Reilly & Associates, Inc., 2007.

Thoreau, H. D., *Walden and Civil Disobedience*, New York, Barnes & Noble Books, 2003.

Vita-More, N., 'The New [human] Genre—Primo Posthuman,' April, 2004; Paper delivered at Ciber@RT Conference, Bilbao, Spain.

Warwick, K., *March of the Machines: The Breakthrough in Artificial Intelligence*, Champaign, University of Illinois Press, 2004.

Wikipedia, 'Respirocyte' http://en.wikipedia.org/wiki/Respirocyte

Notes:

1. 'Transhumanism' is a term coined in the late 1950s by Julian Huxley, and denotes a movement with historical ties to the now defunct Extropy Institute started by Max More and Tom Bell in 1990—'extropy' is a neologism that is intended to mean the opposite of entropy, i.e., negentropy.
2. A quip attributed to Yogi Berra, the famous New York Yankee's catcher (later to become the New York Met's coach) and renowned craftsman of aphorisms.
3. 'The future enters into us in order to transform itself in us long before it happens,' Rainier Maria Rilke, *Letters to a Young Poet*, trans. M.D. Herter Norton, revised ed. (New York: W. W. Norton, 1934), 65.
4. Ray Kurzweil admits that there is no absolute protection against the misuse of strong AI, but he is convinced that 'maintaining an open free-market system for incremental scientific and technological progress, in which each step is subject to market acceptance, will provide the most constructive environment for technology to embody widespread human values' (Kurzweil, 2005, 420).
5. But just in case the unthinkable were to overtake them (i.e., they actually die), they, like their elderly forebears, are hedging their bets with **Alcor** cryogenic-suspension contracts—for $120,000 one can have one's whole body cryogenically frozen or, if one is on an strict budget, one can have one's head put on ice for a mere $50,000! After all, why worry about the body (it's just jelly!) when the *real* you supervenes upon the brain's neuronal pathways and patterns.
6. Already since the practice of prenatal genetic screening and diagnosis (PNSD) has become routine prenatal medical care in the US, prospective parents who elect to forego it, are viewed as socially and parentally irresponsible to the point that it is not uncommon to have HMOs refusing treatment to special needs children on the grounds that the children's malady was a preexisting condition that the parents could have prevented via abortion had they not refused the services of prenatal screening (Hannemann, 2006, p. 16).
7. According to a 2005 report from the International Energy Agency, over 1.6 billion people (about ¼ of the global population) have no access to electricity today. This does not speak well for the idea that Transhumanist enhancements will be democratically distributed, despite the fact that Transhumanist always speak in the first-person plural, as if speaking for humanity in general. They, in fact, are really speaking for a small minority of the affluent and technologically empowered classes of the US and others of the global North. In the US, there are over 46 million without medical insurance, while others spend 1 billion a year on baldness remedies! Already the pharmaceutical companies are famous for their part in the have/have not divide: 'Millions in Africa and elsewhere who are dying from AIDS in the face of the scientific failure to develop a cure or even affordable treatment, or who stagger along legless and maimed from landmine explosions and high-tech wars, might have different views about the power of technology,' (Bendle, 2002, p. 51).
8. In a passage from George Grant's *Technology and Justice*, a text heavily indebted to Heidegger's meditations on technology, he expresses clearly what Heidegger hints at only obscurely: 'When we represent technology to ourselves as an array of neutral instruments, invented by human beings under human control, we are expressing a kind of common sense, but it is a common sense from within the very

technology we are attempting to represent. …We are led to forget that the modern destiny permeates our representations of the world and ourselves. The coming to be of technology has required changes in what we think is good, what we think good is, how we conceive sanity and madness, justice and injustice, rationality and irrationality, beauty and ugliness. … [Technology's] destiny … enfolds us in its own conceptions of instrumentality, neutrality and purposiveness. It is in this sense that it has been truthfully said: technology is the ontology of the age,' (Grant, 1986, p. 32).

9. I think this is what's behind Heidegger's referencing of 'But where danger is/ grows the saving power also' (Heidegger, 1977, p. 28 & 34) from Holderlin's 'Patmos'. Talbott puts the same idea less poetically, but perhaps more pointedly: 'The computer is our hope if we can accept it as our enemy. As our friend, it will destroy us,' (Talbott, 1999).