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What a Long, Transhuman Trip It Has Already Been

Congratulations. You are the proud owner of the latest, new-and-improved-model human brain and body, a version that has only recently become available and that renders all previous models obsolete. Do you think your brain is the same as that of a hunter-gatherer of your species who lived 10,000 years ago? What does it mean that in ancient, oral societies human memory was a principal indicator of intelligence, but we now have search engines that give anyone with a computer access to the world's accumulated memory? Put somewhat differently: Are you as smart as Homer? How do you think you compare to a thirteenth-century peasant, or to Queen Victoria? Queen Victoria could not have even imagined your iPod, and she would have been baffled and probably appalled by what you call music; nor could she have imagined the world's capacity to wipe out smallpox, to control typhus and cholera in European and American cities, or to annihilate itself through an arsenal of 20,000 or so nuclear weapons. To mention just a few of the standard features of your enhanced brain and body, you now come equipped with a fully re-engineered immune system, an up-to-date capacity to distinguish fact from fiction, a completely revised set of cultural assumptions about gender, ethnicity, and sexuality, and, for those of you under thirty, or addicted to i-Phones, a special condensed-language module for instant messaging—all in your own brain and body. Perhaps even more

impressive is the amazing range of customized enhancements that some of you have chosen to add to your standard equipment package, including ceramic alloy joints, neurochemical mood modulators, and hormone performance boosters. And if you're cramming for an exam, you may well have just absorbed some psychopharma to enhance your concentration and cognitive function . . . maybe coffee, maybe something more potent and less sanctioned by the U.S. Food and Drug Administration.

You are, in other words, enhanced; some would say *transhuman*, that is, in transition to the next evolutionary phase of humanness. And as such you are also part of a technology-induced evolutionary program that has been going on more or less since the origins of humankind—a program that distinguishes and defines humankind, a program of continuing expansion of the human desire to understand, modify, and control its surroundings, its prospects, and its self, and to couple to the technologies that surround us ever more intimately. From the pre-dawn of civilization, when human tool-making and meat-eating were co-evolving with brain development into the version 1.0 enhanced *Homo sapiens* model almost 200,000 years ago, through the rise of agriculture and the development of early cities with their new capacities for networked human action, through the harnessing of horse power and wind power and water power and the organization of mercantile activities with an intercontinental reach, through the proliferation of the printed word and literacy, and above all through the constant race to develop new ways to exercise military might and kill one's adversaries—in all this business of enhancing the reach and the constitution of our brains and bodies, you are the latest and most advanced iteration.

But perhaps a different game—transhumanism—is now afoot. Until now, some are saying, our application of technology to enhancing our capabilities was largely external: we constructed tools that we could wield to increase our capacity to do

things, but as wielders we were essentially fixed in our capabilities. We controlled our external environment, not our internal selves. Even when we did things to enhance our inner capabilities, we did them with external interventions—eyeglasses, education, and the like. Now, we are told, with powerful new genetic technologies on the horizon, with the increasing fusion of human and machine intelligence, and with neuropharmaceuticals, artificial body parts, and stem cell therapies, we are beginning the business of transforming ourselves from the inside out, of exerting explicit and conscious control over our existing selves and our evolving selves in ways that create new opportunities, new challenges, and new ways of thinking about who we are and where we are going. The very notion of what it means to be human seems to be in play. For some people this is a thrilling and wonderful prospect indeed, while others are filled with dread and despair.

But is anything new really going on? Maybe the game is afoot, but what is the game and perhaps more relevant, how can we understand it well enough to play it skillfully, ethically and responsibly? We don't mean these questions to be simply rhetorical: How would you prepare for the Reformation if you were a twelfth-century monk? How would you prepare for the railroad if you were the owner of a general store in Ohio in the 1820s? And if the world we are now making through the technologies of human enhancement really is as complex and unpredictable as we think it may be, what can we do prepare? What *should* we do? And how do you prepare now for a future in which the crucial lessons and values of the past may no longer be sufficient for rational, ethical, and responsible behavior in the future?

As we asked these questions, the 2010 Winter Olympic Games had ended and another Tour de France was about to begin. Amid the determined optimism, the corporate spontaneity, the political scrambling, and the often inspiring athletic competition, eternal questions of doping and fairness remained

at center stage. Before the 2008 summer games, *The Economist* had dourly commented "Another Olympics, another doping debate."[1] The Tour de France has become as much a race that pits the latest doping techniques against the newest detection technologies as a contest among the cyclists. Books about doping in baseball are about as common as books about the Iraq War being a mistake. But new themes are sneaking into these debates. One is technological: as gene therapy and genetic engineering replace steroids, bodies are being redesigned rather than merely juiced. Another has to do with the terms of the debate itself, as questions of legality and fairness are giving way to questions of whether genetically engineered athletes are still "real," still "human." If you were born with genes that give you enormous stamina on a bike or on cross-country skis, and I wasn't, why shouldn't I be able to add those genes to myself?

Why not indeed? We have a friend who teaches in law school on questions of law, culture, and emerging technologies. He asks his students how many of them "have close friends or associates" who are taking prescription pills to enhance their cognitive performance.[2] For several years now, more than half of the students have raised their hands—and they have been willing to tell our friend where he can get them.

But if transhumanism is only gene doping and using drugs in ways not approved by the US Food and Drug Administration— off-label uses—why does it suddenly appear as a concept now? Does the concept signal an acceleration of what's been going on anyway—or the beginning of a transformation to something entirely new?

Let us differentiate between two separate dialogs about transhumanism. One involves the ways in which living humans use technologies to change themselves, for example through replacement of worn-out knees and hips, or enhancement of cognitive function through pharmaceuticals These sorts of technological changes are real, although many would argue

that such changes have been a part of being human for tens of thousands of years—even if they are now accelerating rapidly.

The second dialog positions transhumanism as a cultural construct that considers the relations between humanness and social and technological change. Many people are excitedly talking and writing about the prospects for the technological enhancement of human brains and bodies and a transition to new versions of humanness. The most avid and optimistic of these people call themselves transhumanists. The meaning of "transhumanism" sounds obvious—"between states of humanness"—yet is remarkably difficult to specify. A significant part of the ambiguity arises from one's notions about what it means to be human. This, of course, is contentious cultural territory; after all, without agreement on the meaning of humanness one cannot specify when the technology-enabled leap to transhumanism occurs.

This definitional ambiguity suggests to us that defining "transhumanism" more precisely is less important than understanding the implications of that ambiguity. In other words, "transhumanism" functions more usefully as a lens for observing than as a specimen for studying. If people can't agree on what state we are "transing" from, or to, what then is the deeper issue at stake here?

The World Transhumanist Association originally defined "transhumanism" as follows[3]:

> (1) The intellectual and cultural movement that affirms the possibility and desirability of fundamentally improving the human condition through *applied reason* [emphasis added], especially by developing and making widely available technologies to eliminate aging and to greatly enhance human intellectual, physical, and psychological capacities.
> (2) The study of the ramifications, promises, and potential dangers of technologies that will enable us to overcome fundamental human limitations, and the related study of the ethical matters involved in developing and using such technologies.

This definition was accompanied by promises:

Humanity will be radically changed by technology in the future. We foresee the feasibility of *redesigning the human condition*, including such parameters as the inevitability of aging, limitations on human and artificial intellects, unchosen psychology, suffering, and our confinement to the planet earth.

More recently, the Association, having rebranded itself as "Humanity+," states on its website (http://humanityplus.org) that its goal is "to support discussion and public awareness of emerging technologies, to defend the right of individuals in free and democratic societies to adopt technologies that expand human capacities, and to anticipate and propose solutions for the potential consequences of emerging technologies," and defines transhumanism in more conceptual terms:

Transhumanism is a loosely defined movement that has developed gradually over the past two decades. It promotes an interdisciplinary approach to understanding and evaluating the opportunities for enhancing the human condition and the human organism opened up by the advancement of technology. Attention is given to both present technologies, like genetic engineering and information technology, and anticipated future ones, such as molecular nanotechnology and artificial intelligence.

The new tone is less insistent, less libertarian, and more sensitive to the need to respond to challenges that emerging transhumanist technologies may raise. The essential focus on the individual and individual capacities remains, however—a focus that we will consider at many points in this book.

Both of the definitions quoted above seem to assume that individual humans are coextensive with technologies that enhance them. But as we suggest below, this assumption carries with it a severe cost, by radically oversimplifying both the challenges that transhumanism claims to address and the institutional and social frameworks within which real people are defined and function.

To start with, the transhumanist assumption that, whatever "human" is, it will only be improved and enhanced—not transcended, rendered obsolete, or even degraded—by the

development of transhumanism has the effect of burying both arbitrary values and limits in the definitions of words such as "improve" and "enhance." Many of us may agree, for example, that, with all else equal, enhancing cognitive abilities or reducing pain and suffering is desirable. But as we will consider in later chapters, the technologies that can achieve such benefits may also be potent enough to have other, perhaps less happy effects. Similar questions arise when one contemplates overcoming "fundamental human limitations," for, just as "setting limits" for children may provide the structure that allows them to act more freely and effectively in a social world, so may "limitations" more generally be an important part of what it means to be human, or of how we structure our political and social institutions.

Indeed, despite the reassuring new name "Humanity+" and the apparent effort to move away from dogma, transhumanism remains, in the eyes of many who promote it, a movement. And, as with any political movement, there are significant and growing arguments about what constitutes the movement, and whether it is going in a desirable direction. Some argue in favor of human enhancement on practical, ethical, and even theological grounds; others argue against it as inequitable, futile, or misguided, and even as constituting blasphemy—a primordial sin against the order that God (or Darwin) has established, the Great Chain of Being that gives us all our place.[4]

Transhumanism can also be recognized as just another variety of the technological optimism—one might say hyper-optimism—that has often been conspicuous in Western culture, and especially American culture, having grown out of the Enlightenment commitment to the application of reason to human betterment.[5] Transhumanists, as well as other advocates and visionaries of human enhancement, see many possible avenues of technological development that will continue to drive changes in human capabilities. We will devote little space in this book to consideration of these technological specifics, but they emerge

from the by-now familiar claims of advance in several related and perhaps converging areas of knowledge and innovation: nanotechnology, biotechnology, robotics, ICT (information and communication technology), cognitive science.

The ambitions of transhumanism are comprehensive, extending beyond health and longevity to radically enhanced intelligence, creativity, and emotional capabilities, conscious control over the attributes of offspring and the evolution of the species, and even a greater capacity for mutual understanding through, for example, massively networked brain-to-brain interfaces. At the limits is total transcendence. As one employee of the U.S. National Science Foundation writes, "advances in genetic engineering, information systems, and robotics will allow archived human beings to live again, even in transformed bodies suitable for life on other planets and moons of the solar system."[6] This remarkable statement exemplifies the tendency among transhumanists to extrapolate from observations about current technology states to breathtaking visions of immortality, spatial transcendence, and social transformation. Among the better-known examples of this tendency are the predictions by technical experts such as Hans Moravec and Ray Kurzweil that, given current accelerating rates of evolution in information and communication technologies, we will be downloading our consciousness into information networks within decades.[7]

And yet what calls attention to transhumanism is less the specifics of the agenda and its promiscuous predictions than the legitimacy that the agenda has garnered. Scientists, engineers, journalists, philosophers, and political theorists, among others, are discussing the prospects for "redesigning the human condition." The key claim here is that we are at some sort of technical threshold where, in the words of a fairly restrained report titled *Better Humans*, "a new set of possibilities for [human] enhancement is opening up,"[8] and where these efforts to use technology for human betterment move decisively

inward—into the brain and body and genes—so that, as the journalist Joel Garreau has noted, we become the first species to take control of its own evolution.[9]

But let us first follow the words of the King of Hearts in *Alice's Adventures in Wonderland*, and begin at the beginning. In 2003, the philosopher Andy Clark published a book, titled *Natural Born Cyborgs*, in which he argued that humans have always been cyborgs. In fact, Clark and others claim that our major competitive advantage as a species lies in our brain's unique and innate ability to couple to external social, economic, information, and technological systems in such a way as to evolve distributed cognitive networks. Clark is one of a growing number of scholars arguing not that we will become transhuman, but that we already are transhuman, and have been so almost from the beginning. As our archeologist friend and colleague Sander van der Leeuw has shown, the Paleolithic hunters who over millennia developed increasingly sophisticated sharpened stones for hunting were at each stage in that development themselves cognitively different as well (van der Leeuw 2000). From this perspective, "transhumanism" itself turns out to be a superficial construct that, to us, seems to be of interest principally because it enables continued conflict over the appropriate way to think about being "human," and what the relationship between faith and rational inquiry should be, conducted in familiar frameworks of Western thought.

The recognition that transhumanism may just be what humans do anyway leads, however, to far more interesting questions about the implications of profound technological and social change, and about how poorly we are perceiving, much less adapting to, the challenges posed by those processes in a world already increasingly transformed by human presence. In exploring these questions, we found the swirling arguments over values and transhumanism to have worthwhile illuminating effects. The primary benefit of the discussion, in fact, turns out to be how wonderfully well it illustrates the increasing

difficulty of seeing and framing the world we already have created, much less the world that is now coming into being—however intellectually and socially sophisticated we may be. Even as technological, social, economic, organizational, and (yes) cognitive changes coevolve around us, we fall back into classic European Enlightenment terms: liberty, equality, progress, natural order, human "dignity," the Christian Great Chain of Being (and thus the blasphemy of engineering ourselves), and, perhaps above all, the individual as the meaningful unit of cognition, action, and meaning.[10]

Transhumanism is at best a local phenomenon in a far more pervasive reality. All around us is the evidence of our first terraforming adventure—and it is not Mars, but Earth. Indeed, many scientists are beginning to call this era the Anthropocene (meaning, roughly, the Age of Humans). The background to much discussion of transhumanism is a world in which human activity increasingly affects global systems, including the climate and the hydrological, carbon, and nitrogen cycles of the anthropogenic Earth.[11]

And yet we know it not. We are strangers in our own strange land, homeless because we have been turfed out by our very successes. As Stewart Brand put it in his first *Whole Earth Catalog* (1968), "We are as gods and might as well get good at it." So far, we fail that test, and we do so for reasons that the philosopher Martin Heidegger stated succinctly:

So long as we do not, through thinking, experience what is, we can never belong to what will be. . . . The flight into tradition, out of a combination of humility and presumption, can bring about nothing in itself other than self deception and blindness in relation to the historical moment.[12]

We are as gods. This became stunningly clear in 1945, in the New Mexico desert, when a human sun burst into being for the first time. Robert Oppenheimer, standing in the stark shade cast by the flash of the first nuclear bomb, is said to have thought "Now I am become Death, destroyer of worlds." But when

Vishnu, in the Bhagavad Gita, first spoke those words, many centuries earlier, it was as a true god; when Oppenheimer did, he was a mere mortal in awe not of what God or Nature had visited upon us, but what we had built for ourselves—even as that creation equaled the destructive powers that humans had always attributed to their gods. We have since gotten used to, even blasé about, the possibility of nuclear winter, in the way a two-year-old gets used to a loaded .357 magnum lying on the floor within easy reach. We are as gods? No, for we have created the power but not the mind. And as technological evolution continues to outpace the grasp of human intent, we have little time to waste. These are the questions of our time, and they cannot be engaged though flights into tradition.

The more we look at transhumanism as it is currently teed up by proponents and antagonists, the more it reveals itself as something that almost approaches its opposite – a flight into tradition barely disguised by the language of high technology. Rather than some grand prognostication about real future states, transhumanism turns out to be a conflicted vision offering a remarkable opportunity to question the grand frameworks of our time, most especially the Enlightenment, with its focus on the individual, applied reason, and the democratic, rational modernity for which it forms the cultural and intellectual foundation, and the technological New Jerusalem toward which it is flinging us. We accept this opportunity very cautiously. Even if Heidegger is correct and we are increasingly blind to the world we are already engaged in making, it also remains the case that much of modernity is, in our view, desirable—or at least unavoidable. This is our point: As we curl our fingers around the trigger of nuclear weapons, gaze into skies whose dynamics shift inexorably because of our manipulation of the carbon cycle, and unleash technologies that are changing the very essence of our physical and cognitive selves, we are already transhuman. But this is not the kind of transhumanism we thought we were creating, nor is it one we understand.[13]

Like Columbus, we may have started out trying to find the fabled Indies, but instead we have found something new, curious, and unexpected. We ain't (to recall Ellington) what we used to be. But then again, perhaps we never were. And as we go beyond the comfort of old arguments made on behalf of new technologies, we face again the cryptic notation found in some of the old maps of the age of discovery, at the edge of the known: *hic sunt dracones*—here be dragons.

Not to put too fine a point on it, the problem with trying to even figure out how to draw a better map is that people don't understand technology, or the complexity that technology engenders, very well. And this is only going to get worse as humans start redesigning themselves in many ways. So in this book we will proceed in steps. First, we'll try to tease out some crucial understandings of technology by developing a model of its place in the world that can help explain the challenge we, as a species, face, or at least give us a framework for thinking about it. We'll then use our model to explore two pillars of modernity: the idea of the individual and the quest for comprehensibility. And we'll test the model on two major socio-technical systems—railroads and modern military technology—to see how well it works and, equally important, to see if we can use it to think in new and hopefully better ways about the techno-human condition.

We are well aware that the standard approach is to discover deep problems and issues, then offer vague, tentative, or often utterly impractical solutions that pale next to the challenge identified by the analysis—or, instead, simply throw up one's hands in resignation.[14] We hope, in contrast, to end our analysis with some suggestions that have the potential to combine the pragmatic with the radical in confronting the essential dilemmas created by inveterate human ingenuity.

The essence of our response? Stop trying to think our way out of what is too complex to be adequately understood, and

seek the sources of rationality and ethical action in our uncertainty and ignorance about most things, rather than in our knowledge about and control over just a few things. Add to that—or derive from that—a degree of psychological and institutional flexibility that acknowledges and dignifies our ignorance and limits. Rehabilitate humility. But first to the essence: technology.