Polanyi in the Face of Transhumanism

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ABSTRACT Key Words: Michael Polanyi, Hans Moravec, Nick Bostrom, Ray Kurzweil, Transhumanism, Marxism, technological singularity, posthuman, cyborg, nanotechnology, Laplacean mind, tacit dimension, technological determinism, mind-downloading, embodiment.
This essay gives a brief overview of Transhumanism and explores a few of its central ideas in the light of Polanyi's views about embodiment, Marxism, and reality's hierarchal order, concluding that although Polanyi would likely appreciate the possibilities of cyborgic augmentation that feature in the Transhumanist route to the posthuman, he would utterly repudiate its metaphysics of disembodied intelligence and its underlying technological determinism.

Transhumanism (hereafter TH, an abbreviation also used for transhumanist) is a rather grand and ambitious enterprise, one arising from some common assumptions about the nature of the human mind and its capacities, and from some not so common assumptions about the status and destiny of humanity. TH is a very recent outlook whose arrival on the international scene came a decade after Polanyi's death, although its ideological roots extend as far back as recorded history. TH has attracted a following that every year is growing significantly in numbers and in diversity.[1] Thus, on the occasion of the fiftieth anniversary of the publication of Polanyi's *Personal Knowledge* (henceforth, PK), I thought it a good time to ask "Given the ideas expressed in PK, what would Polanyi have thought of this movement?" The task I set myself for this paper is to bring pertinent ideas found in Polanyi's writings, and in particular his PK, to bear on the prospects of TH aspirations.

Although its popularity is growing spectacularly and some of the assumptions underwriting it are culturally pervasive, I think the movement itself, let alone its defining commitments, are not common knowledge. Before I explore Polanyi's writings for some orientation in and direction regarding the TH vision, I will offer an introduction to its most notable tenets, using a few of the more popular TH views as representative of the fundamental claims around which a variety of self-ascribed THs gather.[2] Next I will set TH in its contemporary context of contestation. When I turn to Polanyi, I will first address the issue of the TH vision's feasibility from a Polanyian perspective, and I will conclude by identifying where Polanyi would likely be highly apprehensive of TH ideological commitments.

TH is an interdisciplinary movement arising from the prospects of some fairly recent technological developments in various disciplinary sectors, e.g., nanotechnology, biogenetics, information technology, and cognitive science that are converging in an ever accelerating relationship of mutual reinforcement towards capacities of human modification. However, lest you get the immediate impression that the ideas I discuss as comprising the TH outlook are so "way out there" that nobody in his or her right mind would entertain them seriously, let me quickly dispel this impression by merely mentioning a few of the outstanding advocates of the TH agenda and their academic/professional qualifications. As you will see, some of the most vocal advocates of this doctrine are widely known and deeply respected scientists and academicians. Included in the broad definition of TH I'm working with here 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, Director of the Mobile Robot Laboratory of

Carnegie Mellon University, the largest robotics lab in the country 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 Oxford's Institute for the Future of Humanity; 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); Lee M. Silver, a professor at Princeton in the Department of Molecular Biology, and author of *Challenging Nature: The Clash of Biotechnology and Spirituality* (Harper) and *Remaking Eden* (Ecco); 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.

TH is a truly postmodern phenomenon bringing together science and sci-fi and some of the most serious and respected scientists, philosophers, sociologists, technologists, and futurologists as well as some of the most eccentric and academically suspicious individuals imaginable,[3] all of whom are united by their confident conviction that the days of human being are numbered and an almost giddy enthusiasm for doing whatever they can to speed the final day's arrival.

Aims of Transhumanism: Transhumanism is an appropriate appellation for the movement I'm discussing because to this way of thinking, humans are a ***trans***itional form of a species intent on ***trans***cending itself—we are a species on the way to a new and yet unimaginable posthuman form of intelligent life.

The cognitive, emotional, perceptual and kinematic capacities of humans are strictly limited by their biological underpinnings. THs recognize that the traditional means of overcoming these limitations in efforts to improve human nature through, for example, education and social-ethical-cultural refinement, are insufficient to bring humans enough control over their lives to live truly happy and satisfying lives. THs refuse however to accept these limitations and failures as fate. They rail against the biological limitations that their flesh inflicts, rejecting the notion that they are destined to have desires whose satisfactions are beyond the immediate control of their wills.[4] They argue that we possess *today* the techniques and technologies of psychopharmacology, genetic engineering, neurosurgery, and nano-machinery implantation to alter the flesh's exigencies and to meld bytes and bodies, that by harnessing this convergence of technological capacity, humans can begin to re-invent their own natures, fashioning them to conduce more readily to their own ideals and conceptions of well-being. In other words, THs believe we can technologically engineer ourselves into states of being that old-fashioned "low-tech" humanistic approaches of self-discipline, hard-work, and patience aimed at but could never really deliver. However, the THs aren't merely pursuing technologically mediated states of well-being; they have their eyes set on an array of possible forms of cybernetic immortality.

The ultimate aim of TH is to eliminate aging, illnesses, unsatisfied desires, and death. However, some THs acknowledge that they will die before technology is available to keep them from dying. The more optimistic THs, someone like Ray Kurzweil for example, believe that so long as they can keep themselves healthy for another few decades,[5] until the Singularity erupts, they will never have to die. (I will explain the Singularity in a moment). Among the THs, there are two popular ways of envisioning the realization of techno-immortality, both of which are underwritten by their informational metaphysical materialism,[6] i.e., their conviction that essences are information patterns that can be reproduced digitally without remainder.[7] The most radical and speculative vision of immortality involves having one's mind uploaded into a super-computer where one could live either in virtual worlds of one's own choosing or in the physical world by controlling a robot proxy.[8] The more immediately realistic vision requires progressive cyborgic augmentation that replaces vulnerable flesh, in manageable steps,

with durable and non-biodegradable materials. Moravec points out that the protein and the neurons of which humans are presently composed aren't ideal materials because they are stable only in very narrow temperature and pressure ranges, they are very sensitive to radiation, and neurons switch less than a thousand times per second lagging far behind even today's computer components that switch at a rate of billions-per-second. [9]

Assumptions of Transhumanism: The fundamental assumption that underwrites the project of TH is that humans are not the end of evolutionary development but a transitional form in its modus operandi, a transitional form leading from carbon-based life forms to a new form of life, a successor species whose substrate may well be primarily silicon.[10] Human nature is "a work-in-progress, a half-baked beginning that we can learn to remold in desirable ways," says Nick Bostrom.[11] TH seeks to bring about a transition where the genetic lottery created by the "Blind Watchmaker's" fumbling with forces of chance and necessity is replaced with the intelligent and intentional designs engineered by some of the brightest minds that evolution has thus far been able to produce.[12]

So as the age of the human is drawing to a close, THs eagerly anticipate that their descendants will be posthuman, beings whose capacities will so far exceed those of humans today that they will look back upon us as we now view our mono-cellular ancestors.[13] Apparently, as N. Katherine Hayles observes, "Humans can either go gently into that good night, joining the dinosaurs as a species that once ruled the earth but is now obsolete, or hang on for a while longer by becoming machines themselves."[14]

Another central assumption of TH is that the future is gaining speed everyday, owing to the accelerating nature of technological progress. This assumption is fundamental to their rather utopian aspirations, and derives from their expectation of what has been dubbed "the technological singularity:" the view that there looms on the horizon an explosion of technological advancement. In 1965, Gordon Moore formulated his now famous "Moore's law:" the observation that the number of transistors that we can make to fit on a chip increases in a nonlinear fashion over time.[15] Recently, Ray Kurzweil has demonstrated that chip speed, cost-effectiveness, and miniaturation also exhibit similar growth rates.[16] I. J. Good, in 1965, first clearly articulated 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 claims "the first ultraintelligent machine is the last invention that man need ever make"[17] because "shortly after, the human era will be ended."[18] Kurzweil explains:

> [W]e won't experience 100 years of progress in the 21st century—it will be more like 20,000 years of progress (at today's rate)…. Within a few decades, machine intelligence will surpass human intelligence, leading to technological change so rapid and profound it represents a rupture in the fabric of human history.[19]

Here it is sobering to recognize that today the computers in our fifty-dollar cell phones are a thousand times more powerful than all the computation shared by all the students and faculty at MIT when Kurzweil attended there in the late 1960s, and this at a billion-fold price performance.

Two of the technologies that THs predict will move us into the singularity launch are nanotechnology in the form of molecular manufacturing and brain-machine interface (BMI) technologies in the form of intelligence uploading. Nanotech is big business today, with research funding from the US alone amounting to several billions of dollars (the governments of China and Moscow have recognized the tremendous military potential of this technology and are also investing billions).[20] Nanotechnology is the technological manipulation of matter at the nanoscale (one-billionth of a meter). Molecular manufacturing is the brain-child Eric Drexler who argues that we

can harness the molecular machinery of cells to manufacture both biological and non-biological commodities. After all, if everything is just various arrangements of atoms, then, with molecular assembler nanotechnology we can, in principle, engineer DNA to build anything whatsoever from the ground (i.e., atoms) up.[21] As was demonstrated in 1989 when IBM, using their scanning-probe microscope, spelt their logo "IBM" on a nickel surface with 35 precisely placed atoms of xenon, we already have the technology for moving with absolute precision one molecule at a time. Molecular manufacturing will enable us, in the words of Bostrom "to transform … sand into supercomputers, … help us abolish most diseases and aging, … and—more ominously—lead to the rapid creation of vast arsenals of lethal or non-lethal weapons."[22]

BMI technologies are with us today—we have electronic prosthetics that make direct connections with human nerves[23]—but the hypothetical technology needed to upload a human mind to a computer is still only a twinkle in the TH's eye. This hasn't, however, prevented the THs from speculating on technological innovations that would realize their dream of immortal software bodies.[24] Successful mind uploading would result, according to Bostrom "in the original mind, with memory and personality intact, being transferred to the computer where it would then exist as software; and it could either inhabit a robot body or live in virtual reality."[25]

This leads us to the final key assumption of the THs, one upon which uploading intelligence crucially depends, namely that information patterns, not our biology, constitute our essences, rendering our body merely a temporary expendable prosthesis. Couple the stupendous advancement and power of information technologies with TH eschatologies of immortality, and it is not surprising that they privilege the abstract, heartily embracing information as the primary Real, and minimize the significance of material instantiation, viewing matter as "derivative manifestation" as Hayles puts it.[26] "In the beginning was Information" claim the THs: abstract pattern trumps concrete material presence delivering "a construction of immateriality that depends not on spirituality or even consciousness but only on information."[27] Michael Heims captures his updated Platonism as "the dream of perfect FORMS" becoming "the dream of inFORMation."[28]

The assumption of "pattern-identity"[29] underwrites THs aspirations of mind uploading. Pattern-identity defines the essence of a person as the pattern and the process going on in one's central nervous system, completely divorcing personal identity from the material supporting the pattern and process. Thus says Moravec, "If the process is preserved, I am preserved. The rest is mere jelly."[30]

Clearly the assumptions of TH minimize, if not utterly erase, the differences between human intelligence rooted in and enacted through bodily being and computer intelligence, making conceptually plausible their posthuman aim of seamlessly blending humans into intelligent machines, and laying the ideological framework wherein humans confidently regard their bodies as mere fashion accessories rather than the ground of their being.[31]

Contemporary Responses to Transhumanism

The extreme and rather boring reactions to Transhumanism can be slotted into the categories of techophile and technophobe reactions. The technophiles embrace TH as an undeniable inevitability of human technological progress and tend to enthusiastic confidence regarding the use of species modifying technologies and the unpredictable consequences of those technologies, certain that should anything unseemly erupt, there will always be a technological fix in the offing. The technophobes with equal enthusiasm reject TH visions of

digital futures, certain that these are either the wiles of the devil or the lunatic ravings of individuals deeply alienated from the world of nature and human community.[32]

The really interesting responses are from those who seek some form of balance, recognizing the impinging forces that create tensions in both directions. Here I will mention two such positions: the bioconservative position, which isn't technophobic but whose counsel is mostly cautionary, and the techno-progressive position, which isn't techophilic but whose counsel is mostly prudentially pragmatic. Both of these moderating positions part ways over their respective understandings of human nature. The bioconservatives like Leon Kass, Francis Fukuyama, and Bill McKibben argue that human nature is normative, that once we begin designing it we have unhinged ourselves from the domain where social equality and justice apply and have entered the economic register of commodity production and exchange, leaving us in a moral freefall where only necessitarian natural forces or raw human powers can impose societal order.[33] On the techno-progressive side we find people like Andy Clark and Kathleen Hayles. Neither of them accepts the inviolability of human nature and both of them believe that if there is anything that comes close to human nature it is the quest to transcend native limitations through symbiotic and augmentative relations with technologies. What's constant across this divide of bio-conservative and techno-progressive is the preservation and centrality of the body in the future cultural and biological evolution of the human form of life.

Polanyi vis-a-vis Transhumanism

Re-reading Polanyi's PK in light of the TH movement makes apparent that he would have been deeply interested in the movement, for how it construes knowledge and human identity, how it positions science and technology in society, and for what it signals about our western culture. Before I identify Polanyian problems with the TH enterprise, I will first merely mention an aspect of Polanyi's outlook that bears kinship to some TH thinking about knowledge and human identity.

Within the TH camp there is a clear parting of ways between those extreme THs who seek a post-biological embodiment through porting into and uploading their minds into the silicon-based signifiers of virtual worlds, and those more moderate THs who are not tempted toward the prospects of surrendering their fleshly embodiment to the demands of pure digitality, yet who nonetheless welcome technologies that augment and amplify human potentialities.[34] Given how Polanyi views mind, body, and tools as being on very intimate terms with each other, I think we might find possibilities of Polanyian sympathies for the more moderate and less discarnate version of the posthuman.

Polanyi, in his 1961 essay "Faith and Reason," published just a few years after *Personal Knowledge*, makes the rather provocative claim that "[l]ittle of our mind lives in our natural body."[35] This, of course, opens the door for a symbiont dovetailing of human intelligence with external technologies through what Polanyi calls "indwelling." He depicts theories and all symbolic formalisms as tools, one might even say, *technologies* of the mind, that have been created by our inarticulate selves groping toward hidden yet surmised realities for the purpose of relying on them as our external guides[36] —this is the Pygmalion in man [PK 5, 104]. He speaks of how we existentially pour ourselves into and thereby assimilate these technologies as parts of our own existence, experientially transforming them into extensions of ourselves [PK 60-61], and in *The Study of Man* (a book he wrote just after *Personal Knowledge* but which Polanyi suggests could be read as an introduction to *Personal Knowledge)*, he asserts that "[e]very time we assimilate a tool to our body our identity undergoes some change;

our person expands into new modes of being" (SM 31, emphasis mine).[37] Surely Polanyi was here anticipating, perhaps unwittingly, the potential for cyborgic augmentation that THs construe as an essential step in the direction of a posthuman future. As information technologies become more and more capable of accomplishing tasks that our native intelligences have left us poorly equipped to perform quickly and accurately, we will naturally extend our embodied intentionality into the world through these technological artifacts, thereby cyborgically extending our bodily synthesis into higher levels of knowing and being. I think this is as far as Polanyi would walk down the TH path, but even this might be pushing things.

There are some pretty clear and central commitments in Polanyi's *Personal Knowledge* that would seem to place fundamental limits on how far Polanyi would be willing to go with the TH project and that mark his radical departure from TH aspirations predicated on the metaphysics of disembodiment. Here I must limit myself to comments on only four of these commitments: 1) his commitment to the unique and essential role of the human body which leads him to reject any account of human being that fails to recognize the pervasive and ineliminable place of the tacit dimension, 2) his commitment to the human capacity to make contact with reality through strenuous mental efforts which leads him to repudiate epiphenomenal reductions of human agency in the world, 3) his commitment to the autonomy of pure science which leads him to condemn any approach to science that reduces it to technique/technology or allows its research to be dictated by utilitarian concerns for material welfare, and finally 4) his commitment to an hierarchical emergent ontology which leads him to be highly apprehensive towards revolutionary programs of social and moral transformation. My comments will focus on the first of these commitments because the other three are to some degree logical consequences of it.

Today our culture as a whole has slipped comfortably into a condition of virtuality in that we find it natural to conceive of any and everything as ultimately nothing more than informational patterns.[38] Ever since the rise of modern science in the 16th and 17th centuries we began, as much as possible, bringing our own thinking into conformity with the explicit algorithmic operations we discerned in the world machine. And ever since the cybernetic revolution of the 40s and 50s we have sought to bring our information processing technologies as much as possible into conformity with the workings of the human mind. The net result of this mutuality has been a rather subtle yet stupendously influential cross-pollination between mind and machine, producing the disquieting state of affairs observed by Donna Haraway: "Our machines are disturbingly lively, and we ourselves frighteningly inert."[39] It seems that we have become victims of our own metaphors: we are inside them and they have gotten inside us. Through tacit supplementation (about which more later), we have projected onto mere computational transformations of our intelligence and, through objectivist epistemic ideals, we have reduced our intelligence to mere computational transformations. This is nowhere more apparent than in contemporary philosophy of mind where the notion that "the mind is to body as software is to hardware" invites the reduction of the person to mind, to intelligence, to cognition, and cognition, as the functionalist mantra goes, is but a sub-species of computation: informational pattern prevails over *real* presence.[40]

Throughout *Personal Knowledge*, Polanyi repudiates as misleading and culturally minatory any metaphor that would lead us to assume we could do without our biology or flesh because *when the body goes the tacit dimension necessarily follows*: without body, no tacit dimension, and without the tacit dimension, the lifeworld dissolves.[41] As even a cursory reading of Polanyi's criticisms of the modern quest for a totally explicit knowledge of mind, beliefs, or life shows, he would have nothing but contempt for this pronounced cultural tendency that has become orthodoxy for a significant sector of THs, conveniently providing them with an almost self-evident basis for their metaphysics of disembodiment. For Polanyi however, the mute intelligence of the flesh that has developed over eons of evolutionary shifting and sifting of protein-based forms of life is the fundamental

and primordial matrix out of which the tacit dimension of human aspiration has arisen. The human body has a long history of encounters with reality woven deeply into its tissues, drives, and intentions that tacitly fund with meaning whatever tools it relies upon or indwells to extend further its reach into the real.[42]

From Polanyi's perspective, the TH project of porting into a super-computer and uploading minds would require translating all the tacit wisdom of the flesh into explicit data-structures, binary code's 1s and 0s, before it could be transferred to the signifiers of its new silicon-based embodiment. This uploading would therefore require the wholesale erasure of the tacit dimension as the unspecifiable and indeterminate focal ignorance that opens human intentionality to the subtle subsidiary suasions of yet hidden meanings and realities. Quite simply, *the tacit dimension doesn't compute*. Consequently, without the tacit dimension, the resources for traditional wisdom, genuine creativity, and for the interpellations of value and the demands of norms upon which personhood and the very practice of science itself depend would be eliminated from the algorithmic explicit digitations of our newly embodied data-doubles.

Here I turn to Polanyi's whipping boy, what we might call the "Laplacean tacit dimensionless Mind," to demonstrate how the THs have subtly construed post-human being in the image of this Mind. In essence, the Laplacean Mind is nothing other than an eminently powerful ghost in Descartes' machine, although this ghost is no longer *res cogitans*, but *information*. The Laplacean Mind is a virtual machine that generates inferences about future and past configurations of matter by using the laws of physics as its algorithms, and using an atomic topography as its array of symbols representing initial conditions [PK 140ff]. This Mind, according to Polanyi, would know precisely nothing of interest to anyone because it would merely mechanically compute over an objective symbol domain of entirely explicit and formal data-structures. Bearing no body of passions, needs, vulnerabilities, potentialities, or sensory *Gestalten*, to tacitly inform its intentionality, this Mind would "pay equal attention to portions of equal mass" which means that "not in a thousand million lifetimes would the turn come to give man even a second's notice" [PK 3]. Unlike intelligent human minds, the Laplacean Mind just would *not* give a damn about anything, including human beings or whether its own computations are correct.[43]

So why are THs, and others enthralled by the objectivity the computational paradigm offers, still taken seriously when they make claims like human minds and human knowledge are ultimately highly complex structures of information that are up-loadable into the purely notational world of virtual reality? Here, I think, would be Polanyi's response:

> That such virtually meaningless information was identified by Laplace with knowledge of all things past and all things to come, and that the stark absurdity of this claim has not been obvious to succeeding generations since his day, can be accounted for only by a hidden assumption by which *this information was tacitly supplemented*. It was taken for granted that the Laplacean mind would not stop short at the list of p's and q's at the time t, but proceed by virtue of its unlimited powers of computation to evaluate from this list the events, and indeed all the events, that we might be interested to know [PK 140, emphasis mine].

As Polanyi details the subtle dynamics of "tacit supplementation" and the "pseudo-substitution"[44] that enable this unrecognized changing of subject, he deploys the rhetoric of magic to account for the "spell" that our culture has succumbed to, being taken in by a "decisive sleight of hand" [141] through which the algorithmic operations on explicit atomic data-structures are tacitly supplemented with human meanings and then represented as human knowledge. However, once we see through this conjuring trick whereby meaningless information is tacitly draped

with human significances, Polanyi is confident that we will "immediately see that the Laplacean mind understands precisely nothing and that whatever it knows means precisely nothing" [PK 141]. The Laplacean Mind, the conception of which underwrites both the extreme epistemic ideals of modernity and TH metaphysics of disembodiment, presents us with an image of intelligence in which we cannot recognize ourselves: it has "denature[d] the vital facts of our existence" [PK 141], presenting "us with a picture of the universe in which we ourselves are absent" [PK 142].

However, since science itself is a human enterprise, and the Laplacean ideal erases human beings from the picture of the world constructed according to its constraints, Polanyi exploits this Laplacean fallacy to suggest a criterion of consistency: "our conception of man and human society must be such as to account for man's faculty in forming these conceptions" [PK 142]. The only reason TH can enthusiastically embrace this flagrantly inadequate account of human knowing and being is due ironically "to the fact that [they] automatically supplement [this account] by [their own] tacit knowledge" [PK 169] of these realities.

I turn now to the last three commitments mentioned above, which deal mostly with the problematic social consequences of the TH project. The fact that TH and Marxism bear some striking similarities helps me be brief here.

Polanyi condemned Marxism for rejecting the obligation to "cultivate thought according to its inherent standards" and for subordinating all thought to the forces of economic welfare, refusing to recognize that thought bore independent and intrinsic powers of its own [PK 213]. This reduction of thought's powers to reach reality and its agency to change reality, Polanyi identified as a decisive step of revolutionary movements in the direction of totalitarianism.[45] Marxism, having embraced the vision of reality bequeathed by the Laplacean Mind which utterly epiphenomenalizes human intellectual agency, enacted the compatibilist paradox[46] by inviting all who suffer under the systemic injustices of capitalism to recognize and join the deterministic material forces that historically necessitate the inevitable victory of the proletariat. THs also embrace the vision of reality bequeathed by the Laplacean Mind and its consequent epiphenomenalizing of human thought. But for the TH, the real movers of history are not on economic forces, but technological forces leading to the inevitability of the technological singularity. And they too enact the compatibilist paradox by inviting all who suffer under the limitations of the flesh to recognize and support the deterministic *technological* forces that historically necessitate the arrival of the posthuman. The dismissal of the autonomy and agency of human thought is common to both Marxism and TH, and, as anyone knows who's read PK, Polanyi was convinced that this disenchanting of the human intellect and undermining of the "voice by which man commands himself to satisfy his intellectual standards" leads socially to man dominating "a world in which he himself does not exist" having "lost his voice and his hope, and been left behind meaningless to himself" [PK 380]. In short, the embrace of epiphenomenalism leads to severe epistemic self-doubt and chronic ethical inarticulacy that can only be "overcome" through fanaticism.

This trivialization of the agency of human thought fed directly into another aspect of Marxism that Polanyi eschewed, the view that pure science was a farce and needed to be unmasked as really being technology, and that technology should be glorified as the only *real* science [PK 238]. By reducing science to technology, Marxism effectively converted "Socialism from a Utopia into a Science" [PK 229]. Marxism's rejection of the autonomy of pure science and valorizing of technology based upon its implications for human welfare finds contemporary expression in the TH that gives pivotal significance to the technological singularity. THs also reject the autonomy of pure science on moral grounds. Bostrom argues that given the number of people dying daily without "the chance of a posthuman existence … it is paramount that technological development … is pursued

with maximal speed"; "a delay of a single week equals one million avoidable premature deaths—a weighty fact which those who argue for bans or moratoria would do well to consider carefully."[47]

Obviously, Polanyi would have nothing but respect for the concern for human life that Bostrom's call to technological development voices. However, I am certain that Polanyi would raise a suspicious eye at the unqualified faith Bostrom, like most THs, places in technological fixes. After all, a strong case can be made for tracing the present magnitude of world hunger and poverty to the unintended social consequences of intended social advancements through technological applications. Moreover, the centralized top-down dictation of sciences' agenda entailed by Bostrom's clarion call for technology to address pressing needs of human welfare bears worrisome correspondences to Socialist revolutionary science. In fact, according to Polanyi, allowing human welfare to set science's agenda actually damages the prospects of human welfare because important discoveries, discoveries that may result in great improvements in human welfare, can not be the focal object of scientific endeavor, but arise from scientists "freely making their own choice of problems."[48] Science advances "only by essentially unpredictable steps, pursuing problems of its own, and the practical benefits of these advances will be incidental and hence doubly unpredictable" [KB 59].

Finally, Marxism and TH both pursue revolutionary and perfectionist trajectories, Marxism out of its perception that society is mutable and therefore definitely improvable and TH out if its perception that human nature is mutable and therefore indefinitely improvable. Marxism believed human nature could be changed indirectly by changing first the macro-economic forces through which it is structured. THs believe human nature can be *directly* changed through direct technological interventions performed on individuals and their genes. Polanyi's conservatism is expressed in his hierarchal, anthropocentric, and even to some degree elitist outlook. He recognizes humans to occupy the highest level in the hierarchy of living beings—"the top of creation" [SM 59]—and understands social change as something best grown into organically, rather than dictated from a purported blue-print for the future. His hierarchal commitments come to bear directly on the demands of perfectionism found in both Marxism and TH. "[B]y referring to the logic by which successive levels of reality are related to each other" [TD 85], Polanyi rejected as transgressing the hierarchical grain of the universe the bloated notions of human self-determination and the inordinate conceptions of self-design underwriting revolutionary outlooks. The lower levels without which the higher could not emerge necessarily place limits on the higher levels, so that the demand for social and personal perfection must be tempered by the recognition that society, at one level, is an organization of power and profit, and that the higher level of moral principles can only be realized "within the medium of a society operating by the exercise of power and aiming at material advantage" [TD 86]. If totalitarianism is to be avoided, Polanyi was convinced that we must learn to accept that all societal advances will always be tainted by the limitations of the social mechanism that alone can bring them about: "[u]njust privileges prevailing in a free society can be reduced only by carefully graded stages … An absolute moral renewal of society can be attempted only by an absolute power which must inevitably destroy the moral life of man" [PK 245]. Clearly Polanyi would sense the specter of violence haunting the impatient TH visions of and aspirations for the revolutionary transformations of human nature required to reach our posthuman destiny.

Conclusion

Even if the utopian TH dream of engineering ourselves into perfection turns out to be a self-indulgent and unrealizable fantasy, the mere belief that such is possible, if taken seriously by governments (as it has already has been in the US and UK), would nonetheless likely deflect their attention and efforts from the requirements

of legitimate social reform. After all, if we are on the verge of engineering ourselves into perfectly happy states of being without needing to negotiate the macro forces of social organization that are notoriously recalcitrant and unpredictable in outcome, why would we be inclined to spend today's resources of time, energy, and money on social programs, organizations, and reforms rather than invest them in efforts to ramp up technological research and developmen and thereby foreshorten the temporal gap separating us from posthuman bliss? In fact, the anticipated emergence of "techno sapiens" is already shaping the Western cultural and social imagination as well as its research, and the policy priorities of governmental/military, corporate and academic interests.[49]

I think, and I think Polanyi would agree with me, that what's most significant about the TH project isn't the debate about the probabilities of its predicted future or even conceptual coherence of it possible realization, but rather what it actually signals about the state of western culture and how it is shaping our understanding of human being right now. In this sense, the future is already here, having arrived before it has begun, reflected in the metaphors, models, and images that subtly imbricate ourselves in computational registers.[50] Here let me indulge in some final thoughts of my own which have arisen from recently drenching my thinking in Polanyi's and THs' writings.

The TH project seems to me to be a desperate effort of modernist critical thought to recover the certainty and familiarity of the premodern cosmos, the repudiation of which marked the birth of modernity. I think TH is all about this ancestral birthmark. TH wants 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. TH wants to inhabit a world that is familiar, predictable and reasonable, but it wants to be the author of this world. Having embraced the objectivist Laplacean ideals that leave no place for realities that cannot be rendered explicit, algorithmic and objective, it faces a disenchanted world, a dead world-machine with only quantities, no qualities, a universe of facts with no value, and a universe of mechanism without purpose. TH arises from a hunch, long in the making, that *Homo sapiens* cannot only re-enchant the world with certainty and familiarity, with *virtual* qualities, values, and purposes on its own terms and through its own means, but that it can even give birth to itself by re-making itself in the image of its desires and fantasies, finally exchanging its birthmark for a trademark.

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Endnotes

[1] The Singularity Summits held at Stanford University in 2006 and 2007 are indicative of a growing legitimacy of and interest in the ideas of the THs. Wikipedia's entry on the TH organization, "Singularity Institute for the Advancement of Humanity," reveals that the 2006 Summit had 1,300 in attendance. Alyssa Ford, in her 2005 "Humanity: The Remix," reports that the World Transhumanist Association welcomes 80 new members a month. See *Utne Reader,* May/June 2005, available online at http://www.twliterary.com/jhughes_utne.html .

[2] Transhumanism is not one doctrine; it comes in many flavors that we won't be able to sample in this short overview of its most common tenets.

[3] William Saletan, in his article "Among the Transhumanists: Cyborgs, Self-mutilators, and the Future of Our Race," commenting on a sector in the audience at the 2006 Singularity Summit held at Stanford: "Remember those kids who played Dungeons and Dragons and ran the science-fiction club in your high school? They've become transhumanists." This article is available online at http://slate.com.

[4] A rather disconcerting reflection of such limitations is Nick Bostrom's discussion of how wonderfully good life will become "when we succeed in overcoming many of our current biological limitations through technology." See his 2001 interview in *Technology Now* available at http://www.nanotech-now.com/nick-bostrom-interview-122002.htm . Hans Moravec, in his article "The Senses Have No Future," claims that the

senses have become liabilities now that we are entering the densely interconnected worlds of cyberspace; he wants to bypass sensory processing and in its place have computers directly port into the thinking portions of the brain—all our senses, he says, are doomed to become obsolete. See http://www.frc.re.cmu.edu/~hpm/project.archive/general.articles/1997/970128.nosense.html .

[5] Note his website for life extension supplements, http://www.fantastic-voyage.net, and the subtitle of his recent book, *Fantastic Voyage: Live Long Enough to Live Forever*, co-author Terry Grossman, Rodale Press, 2004.

[6] Slavoj Zizek refers to TH metaphysics as "a kind of spiritualized materialism." See his "No Sex, Please, We're Post-human!" available online at http://lacan.com/nosex.htm .

[7] Interesting to note that Norbert Weiner, the man who first conceptually linked the switches of computational gates with neuronal firings of the human central nervous system, anticipated mind downloading in his book *The Human Use of Human Beings: Cybernetics and Society*, 2nd ed. (Garden City, N.Y.: Doubleday, 1954), where, on pages 103-4, he argues for the theoretical possibility of telegraphing a human being. Marvin Minsky at MIT, having also romanced the idea of informational essences, believes that it won't be long before we will be extracting human memories from the brain and importing them, fully intact, to computer disks, "Why Computer Science Is the Most Important Thing That Has Happened to the Humanities in 5,000 Years" (public lecture, Nara, Japan, May 15 1996) cited in N. Katherine Hayles, *How We Became Posthuman* (Chicago, University of Chicago Press, 1999), 13, n. 23.

[8] Nick Bostrom, "A History of Transhumanist Thought," *Journal of Evolution and Technology*, 14 :1 (April 2005): 9.

[9] Hans Moravec, *Mind Children: The Future of Robot and Human Intelligence* (Cambridge: Harvard University Press, 1988), 108.

[10] UCLA biophysicist Gregory Stock, author of *Redesigning Humans: Our Inevitable Genetic Future* (New York: Houghton Mifflin, 2002), queries whether the route to this new species might not require a "shift from [humanity's] present biological substrate—the carbon and other organic materials of our flesh—to that of silicon …." See"The Last Human," available on KurzweilAI.net, June 5, 2002 at http://www.kurzweilai.net/meme/frame.html?main=memelist.html?m=3%23708.

[11] Nick Bostrom, "Transhumanist Values," *Special Supplement: Journal of Philosophical Research* (2005), ed. Frederick Adams, p. 4. Bostrom goes so far as to claim that "Had Mother Nature been a real parent, she would have been in jail for child abuse and murder." See "In Defense of Posthuman Dignity," *Bioethics*, 19:3 (2005): 211.

[12] George Dvorsky notes that "Transhumanists believe that humanity ought to enter into a post-Darwinian phase of existence where intelligences, rather than the blind forces of natural selection, are in control of their own evolution" in "Better Living through Transhumanism," *The Humanist* 64:3 (2004): 7.

[13] In light of our present immersion in technology and the consequent salubrious extensions of our bodies' capabilities, Bostrom quips "[i]n the eyes of a hunter-gatherer, we might already appear 'posthuman.'" See "In Defense …", p. 213.

[14] Hayles (1999): 283.

[15] Gordon Moore, "Cramming More Components Onto Integrated Circuits," *Electronics* 38:8 (April 19, 1965): 114-117.

[16] See his second chapter, "A Theory of Technology Evolution," in his recent book, *The Singularity is Near: When Humans Transcend Biology* (New York: Viking, 2005).

[17] I. J. Good, "Speculations Concerning the First Ultraintelligent Machine," in *Advances in Computers*, Franz L. Alt and Morris Rubinoff, eds., Vol. 6, (New York: Academic Press, 1965), 31-88.

[18] Vernor Vinge, "The Coming Technological Singularity: How to Survive in the Post-Human Era,"

available online at: http://www.rohan.sdsu.adv/faculty/vinge/misc/singularity.html .

[19] "The Law of Accelerating Returns," published on KurzweilAI.net, March 7, 2001.

[20] See C. Christopher Hook's "The Techno Sapiens are Coming," available at: http://www.christianitytoday.com/ctt/2004/january/1.36html . Adam Keiper notes that "The US government projects that the worldwide nanotechnology market will exceed $1 trillion by 2015." See "The Nanotechnology Revolution," *The New Atlantis* (Summer 2003): 26.

[21] Richard Feynman, the man who first imagined the possibility of nanotechnology, recognized "It would be, in principle, possible (I think) for a physicist to synthesize any chemical substance that the chemist writes down …. Put the atoms down where the chemist says, and so you make the substance." See R. Feynman, "There's Plenty of Room at the Bottom: An Invitation to Enter a New Field of Physics," *Engineering and Science* 23 (1960): 22-36. Atom-manipulating nano-robots called nanobots are only a few decades off, according to the 2003 "The Futures Technology Report prepared for the Greenpeace Environmental Trust." Available online at: http://www.greenpeace.org.uk/MultimediaFiles/Live/FullReport/5886.pdf .

[22] Bostrom, "A History of Transhumanist Thought," *Journal of Evolution and Technology*, 14:1(April 2005): 9. Perhaps even more ominously Robert Clapp, predicts that "[m]uch of what we manufacture now will be grown in the future, through the use of genetically engineered organisms that carry out molecular manipulation under our digital control. Our bodies and the material in our factories will be the same...we will begin to see ourselves as simply a part of the infrastructure of industry," in *Every Man and Woman an Island: The Individual Human Being as Prime in the Universe* (Victoria, BC: Trafford Publishing, 2004), 194.

[23] See Kevin Warwick's (a professor in the Dept of Cybernetics at the University of Reading) "Cyborg 1.0," in *Wired* (<http://wired.com>), where he discusses his micro-chip implants and the resulting neuronal interface with his computer. Today there are more than 40,000 patients around the world that have brain pace-makers implanted to assist them in overcoming movement disorders (such as Parkinson's disease, or to relieve them of severe depression or obsessive-compulsive disorder). Lauran Neergaard, "Brain Device for Depression Tested" *Time* May, 26, 2008, available on line at: http://www.time.com/time/health/article/08599,1809534,00.htlm. See also Adam Keiper, "The Age of Neuroelectronics," *The New Atlantis*, No. 11(Winter 2006): 18-21.

[24] For some interesting speculation on this possibility, see Moravec's fourth chapter "Grandfather Clause" in his *Mind Children*, especially pages 109-110.

[25] Bostrom, "History of Transhumanist Thought," 9. Bostrom has published a paper where he argues that the probabilities are extremely high that we and our present world are already computer simulations; see his "Are you Living in a Computer Simulation?" *Philosophical Quarterly*, 53 (2003): 243-255.

[26] Hayles, *How We Became Posthuman*, 37.

[27] Hayles, *How We Became Posthuman*, 35.

[28] Michael Heim, *The Metaphysics of Virtual Reality* (Oxford: Oxford University Press, 1993), 89. Most THs think of reality as one vast virtual computer eternally processing information. All matter, life, and intelligence are patterns of informational complexity. With this kind of metaphysics, moving from a biological to an electromagnetic substrate poses no conceptual problems—all that matters is the pattern!

[29] Moravec, op. cit., 109-122.

[30] Moravec, ibid., 117.

[31] Hayles, *How We Became Posthuman*, 5. Bart Kosko, Professor of Electrical Engineering at University of Southern California, proclaims, "Biology is not destiny. It was never more than tendency. It was just nature's first quick and dirty way to compute with meat. Chips are destiny," "Heaven in a Chip," *Free Inquiry*, Fall 1994: 38.

[32] Witness Sherle Turkle's anecdote recounting a techno-geek's response that "Reality is not my best window" to one of her questions in "An interview/dialogue with Albert Borgman and N. Katherine Hayles on

humans and machines," available on online at: http://www.press.uchicago.edu/Misc/Chicago/borghayl.html .

[33] Fukuyama, who is quite open to many forms of somatic genetic engineering, nonetheless refers to TH as "the world's most dangerous idea" ("Transhumanism," *Foreign Policy*, No. 144 (Sept/Oct. 2004): 42-43).

[34] For an informative and entertaining look at this less Gnostic expression of Posthumanist aspiration, see Andy Clark's *Natural Born Cyborgs: Minds, Technologies, and the Future of Human Intelligence* (Oxford: Oxford University Press, 2003).

[35] Fred Schwartz (ed.), *Scientific Thought and Social Reality: Essays by Michael Polanyi (*New York: International University Press, 1974), 123.

[36] Michael Polanyi, *Personal Knowledge: Towards a Post-Critical Philosophy* (New York: Harper Torchbooks, 1964/1958), 131.

[37] Michael Polanyi, *The Study of Man* (Chicago: University of Chicago Press, 1959), 31, emphasis mine.

[38] Alvin Toffler co-authored the document "A Magna Carta for the Knowledge Age" (at the request of Newt Gingrich) that proclaimed "The central event of the 20th century is the overthrow of matter," available on line at: http://www.emedia.net/feed .

[39] Donna Haraway, *Simians, Cyborgs and Women: The Reinvention of Nature* (New York: Routledge, 1991), 152.

[40] The consequences of reifying our metaphors are evident--even our being held captive by our metaphors--in the new "biological" discipline called "Artificial Life" (AL) which seeks to transpose "the natural form and process of life into an artificial medium" in order to create "organisms" through computer code that it understands to be *alive* because they replicate and evolve. These "organisms", they argue, can't be denied the status of living entities just because they are silicon-based and not protein-based life forms: according to AL, "the organism is the code, and the code is the organism," Hayles, *How We Became Posthuman*, 229. See also Carl Zimmer's article "Testing Darwin" *Discover* (Feb. 5, 2005). Available at http://discovermagazine.com/2005/feb/cover .

[41] Richard Allen has challenged me on this point, asking "What about angels? Do they not bear a tacit dimension?"

[42] Such are the bodily roots with which thought is necessarily fraught; see the Intro of Polanyi's *Tacit Dimension* (Garden City.: Doubleday and Company, 1966), x. By the way, I think this suggests that angelic intelligence does not possess a tacit dimension.

[43] See John Haugeland's essay, "Understanding Natural Language," in *Having Thought: Essays in the Metaphysics of Mind* (Cambridge, Mass. and London, England: Harvard University Press, 1998): 60.

[44] Pseudo-substitution is a means of tacit supplementation whereby non-objective meanings are covertly relied upon to fund objectivist abstractions that are overtly deployed to replace these meanings. See PK 16.

[45] Polanyi agrees with the Orwellian claim that "belief in reality is a subversive principle under totalitarianism" [PK 243, n1].

[46] By "compatibilist paradox" in this context, I mean the paradox that arises when thinking is *thought* to be without agency—as if agency-less thought could be an agent of the thought "thought is without agency" and then *take* that thought seriously!

[47] Nick Bostrom, *The Transhumanist FAQ: A General Introduction*, Version 2.1 (2003): 31. Available at www.transhumanism.org .

[48] Marjorie Grene (ed.), *Knowing and Being: Essays by Michael Polanyi* (Chicago: University of Chicago Press, 1969), 50.

[49] Elaine Graham, "In Whose Image? Representation of Technology and the 'Ends' of Humanity" *Ecotheology* 11. 2 (2006): 160.

[50] "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.