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The Technological Singularity: An Ideological Critique

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The Technological Singularity: An Ideological Critique

The Technological Singularity: An Ideological Critique

A thesis submitted in partial fulfillment
of the requirements for the degree of
Master of Arts in English

by

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Abstract

The Technological Singularity represents a confluence of techno-cultural narratives of progress in which the projected exponential growth of artificial intelligence and nanotechnology will usher in a moment of irrevocable change for the human race – a change that many claim is scant decades away. Although the concept saw its modern clarification by science fiction author Vernor Vinge, the Singularity sits astride both fictional and nonfictional narratives of the future. It is the aim of this study to explore the ideological discourses that emerge from texts on the Singularity and the unfathomable posthuman future it ushers in. Doing so reveals how the Singularity often functions as a projection of Late Capital, which achieves ominous posthuman agency in the form of the financial derivative. Yet the Singularity also occupies a Marxian space – its teleological metaphor mirrors that of classical Marxism and a historical terminus in Utopia. Ultimately the response of science fiction authors such as Charles Stross, Cory Doctorow, Ken MacLeod, and Rudy Rucker, among others, is to treat the Singularity as an elastic metaphor subjected to ideological scrutiny rather than a dogmatic inevitability of exponential historiography. This interpretation frees the Singularity to be explored as a conglomerate of early 21st century hopes and anxieties. Far from being the “genre-killer” of science fiction, the Singularity represents a new, heightened set of concerns and methodologies for engaging the late capitalist/postmodern condition.

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Chapter 1: Provenance and Ideology

Introduction

Vernor Vinge's 1986 novel *Marooned in Realtime* begins with a handful of early 21st-century humans awakening from suspended animation to a future that has outpaced them by some fifty million years: the geological landscape has shuffled, flora and fauna have moved onto strange new evolutionary paths, the earth is no longer recognizable as such. Most unsettling of all - there are no humans left, and all evidence of them has been lost to the aeons. With one of the survivors and leaders in reestablishing civilization murdered, the novel gives us two linked "locked-room" mysteries: which of the survivors is the killer, and what happened to the whole of humanity? *Marooned in Realtime* is a very present whodunit and an existential treatise for Vinge to parse the cause of humanity's past (and thus future) extinction. The murder investigation presents a series of suspects with her or his own working theory for this foregone apocalypse. Ecological collapse? Nuclear armageddon? Aliens? All are ultimately disregarded by Vinge as the paranoid chronocentrism of the 21-century; humans are too resilient to be completely undone by such petty catastrophes.

The answer lies in extrapolating the future from the point at which the most recent survivors left Earth:

During the last two thousand years of civilization, almost every measure of progress showed exponential growth. From the nineteenth century on, this was obvious. People began extrapolating the trends. The results were absurd: vehicles traveling faster than sound by the mid-twentieth century, men on the moon a bit later. All this was achieved, yet progress continued...

[...]by 2200, we could increase human intelligence itself. And intelligence is the basis of all progress. My guess is that by mid-century, any goal – any goal you can state objectively, without internal contradictions – could be achieved. And what would things be like fifty years after *that*? There would still be goals and there would still be striving, but not what we could understand.

To call that time ‘the Extinction’ is absurd. It was a Singularity, a place where extrapolation breaks down and new models must be applied. And those new models are beyond our intelligence. (109-111)

And it is here, with this passage, that Vinge launches the first work of SF explicitly devoted to the technological Singularity, a term Vinge is regarded as coining in its modern sense - but which actually has a robust history in Western thought. Humanity, as understood here by Vinge, did not merely die off...humans evolved, advanced, and eventually transcended to a new state of being, shuffling off the old material existence like dead skin. Perhaps they completely digitized their consciousness or atomized into a totally disembodied form of pure mind, beaming into space toward another star system or out a quantum loop, forsaking this dimension altogether. The characters in *Marooned* cannot say what became of these people: what they are, where they are, what they’re doing or why they’re doing it is so imperceptibly “beyond our intelligence” that even trying to perceive it is meaningless.

The Singularity has come to encompass a rather captivating and vibrant cycle within contemporary science fiction and, crucially, *without*. For, as a concept, it has transcended the boundaries of SF narrative and populated amongst the “real world” non-fiction discourses of the social, scientific, and techno-cultural as an object of serious inquiry, much larger than the various confines in which it began. It is the aim of this interrogation to harken the importance of this phenomenon while likewise exploring the ideologies at play in the Singularity, both within SF and its outer dialogues. First, it is necessary to explore the history of the term.

Prefiguration

Prodromes of singularitarian thought could begin as early as the Enlightenment-informed Western notion of progress (Nisbet 4) but seem to arise more specifically in the 19th-century amidst a growing cognizance of technological progress informed by the Industrial Revolution. In

many respects, the Singularity is simply a philosophical engagement with teleological positivism that occurs during periods of rapid progress. Philosophers have often portrayed the historical and/or universal process as an ascending curve of positivity (Lovejoy 242-243) wherein quantities of power or intelligence are always increasing or when human history is progressing toward a definite point. But at what rate does this increase occur? While some depictions of this historical progress have had a constant rate, others depict the rate of increase itself as increasing - acceleration in the mathematical sense. It is here, crucially, that the Singularity is able to emerge. The Singularity in these particular philosophies of progress is the point at which “positivity becomes maximal” (Eden, et al. 6) as an omega point (infinity) or, when represented graphically - the vertical asymptote of an accelerating line, which tends toward zero as it approaches infinity.

The clearest philosophical antecedent to the Singularity in Western thought is Hegel’s teleological view of history. Though not technological in nature, Hegel describes in *The Phenomenology of Spirit* (1807) the ascending nature of history and culture towards an ideal of absolute knowledge. Though abstract, these discussions of progress obviously parallel that of the Singularity, which, conversely, has inspired talk in Hegelian studies in recent years as to whether it might represent Hegel’s self-realization of Spirit in absolute knowledge (Zimmerman).

The writings of Samuel Butler must be mentioned; the British writer deployed Darwinian ideas to non-biological concepts, attempting to develop an evolutionary theory of technology. Both the essay “Darwin among the Machines” and the utopian satire *Erewhon: Or, Over the Range* (1872) portrayed the evolution of artificial intelligence (developing consciousness through a “natural” selection similar to Darwin’s) as eventually eclipsing that of human beings. In *Erewhon*, the threatened humans reject advanced technology due to the possibility of greater-than-human intelligence. Obviously, Butler’s ideas were a strong influence on both science

fiction literature and singularitarian thought, though it should be noted that Butler's version of AI self-improvement occurred through natural selection, a depiction that is not generally seen in most recent visions of the Singularity.

The works of American philosopher Charles Sanders Peirce, the so-called "father of Pragmatism," furthered Hegel's philosophical foundation for the Singularity. Peirce used stringent logic, regarding humans as computational machines, to create an evolutionary cosmology wherein the universe progressed from a chaotic state towards a final "singularity of pure mind" (Eden et al 6). Like Hegel, Peirce is not dealing with technology, but his notion of a progressive improvement of intelligence is crucial because it depicts an *acceleration* - the evolution gets faster and faster as the tendency toward regularity acts upon itself (self-similar recursion).

American essayist and historian Henry Adams, writing in the very early 20th Century, is now regarded (Eden et al 7) as the first writer to envision a technological singularity; certainly, he was the first to discuss a historical process of self-acceleration in technological terms, even suggesting an actual formula for the acceleration of progress based on the amount of coal a society consumes (*The Education of Henry Adams* 489-499). Later, Adams would describe a historical process that involves acceleration through a number of epochs or phases conflating human thought and technology, from the Instinctual to the Ethereal (*The Degradation of the Democratic Dogma* 269-280). Adams would have an immense legacy for singularitarian thought; his evolutionary historical phases curving toward a vertical asymptote, mathematical formula for predicting change, and law of acceleration all prefigure the works of prominent singularitarians in the past decade.

Recent scholarship by Eric Steinhart suggests that a great deal of Singularity and transhumanist thought is indebted to the Jesuit paleontologist Pierre Teilhard de Chardin, who attempted to fuse a scientific evolutionary theory with a Christian cosmology (1-22). His advocacy of genetic engineering and a global society with an immense communications network are certainly prescient for the later works of Moravec and Kurzweil. Chardin's descriptions of human intelligence evolving (through the above means) toward a definite singularity of super-intelligence and then outward into the cosmos would certainly find purchase among advocates of the Singularity decades later. Chardin's ardent Christianity (his Omega Point of intelligence is analogous to the mind of God) illustrates the religious foundation the Singularity can often have, although most enthusiasts think themselves decidedly secular (Brigis).

The attempt by Henry Adams to establish an exact date for the occurrence of the Singularity and to depict that forecast using prescribed laws or formulae (his prediction was 2025) would set an important precedent for futurists or heralds of the Singularity. George Harry Stine, rocket engineer and science fiction writer, would be the next to suggest a semi-precise date for epochal change (using trend curves) to occur - the early 21st Century (93).

Throughout the 1950s and 60s, singularitarian thought began to gain credence among prominent scientists, mainly in reference to the nascent possibilities of artificial intelligence. Famed British scientist Alan Turing spoke of machine intelligence eclipsing human intelligence (and referencing Butler's *Erewhon*) in 1951 (Turing 256-260). Turing's eponymous thought-experiment test for measuring artificial intelligence is often regarded by singularitarians and/or SF writers as an event that will signal the Singularity (Kurzweil *The Singularity is Near*, 35).

The prodigious advances in computing and cybernetic technology of the 1980s led to a renewed interest in progress acceleration; rapid development certainly seemed to validate the

notion that a kind of alarming discontinuity was approaching. Heralds of this event included Hans Moravec, whose *Mind Children* deployed “Moore’s Law” against emerging robotics and AI technologies. Moore’s Law, named for the co-founder of Intel, Gordon Moore, was an observation from a 1965 paper that the number of transistors on integrated circuits doubles roughly every two years (this will be expounded upon later). Moravec, focusing on developing AI, concludes that a “mind fire” of superintelligence will take place in the early 21st-century (Moravec 62-68).

Vinge’s Singularity

Within thirty years, we will have the technological means to create superhuman intelligence. Shortly after, the human era will be ended. (“The Coming Technological Singularity” 11)

Returning to Vinge, whose above quote encapsulates the Singularity novum in its modern incarnation, the Singularity can be seen as a threshold looming in the near or nigh-immediate future upon which human existence is profoundly and incomprehensibly altered. The term “singularity” itself comes from mathematics and astrophysics, referring to a point at which a function flies to infinite value, or where the fabric of space-time folds into a point of infinite curvature - the predicted phenomenon that occurs inside a black hole. Within such a gravitational singularity, the rules of mathematics and physics are no longer applicable. Stephen Hawking put it succinctly in *A Brief History of Time*: “...one couldn’t predict what will come out of the singularity” (22). The Singularity will not be a landmark event in the history of progress, no Deep Blue or Large Hadron Collider, it will be epochal - so overwhelming and immediate that nothing will be unchanged and no one will be able to truly comprehend it unless they experience it firsthand. An argument can certainly be made that this is not so dramatic a rupture from SF

exigencies - the existential dread, the eschatological creativity - all manifested by technological progress.

But again, what is interesting about the Singularity is its manifestation outside the SF substrata, as a philosophical hypothesis argued throughout the greater realm of techno-cultural contexts. Vinge himself is a former professor of mathematics and computer science who only delved into SF, initially, and who is often inaccurately credited as the originator of both the term and concept of the Singularity (*Red Planets* 103) (the first use of Singularity in this context was by mathematician John von Neumann in 1958 [Ulam 5]) but is certainly responsible for popularizing and framing the concept in an essay, “The Coming Technological Singularity: How to Survive in the Posthuman Era” (1993) in which he argues that advances in AI, biological enhancement of humans, or human-machine interface could contribute to or cause the Singularity. The essay was actually taken from the abstract of a talk Vinge gave at a NASA-sponsored symposium in 1993. Vinge makes a point to mention that there are multiple avenues toward the Singularity, each with its own intricate challenges. One assumes the possibility of creating AI, thinking machines and networks that “wake up” into superintelligence. Another, perhaps more plausible scenario, assumes that Intelligence Amplification (IA) would provide the Singularity from the other direction: augmented humans with computer/machine interface would usher in the superintelligence era without having to solve the riddle of creating AI. Thirdly, a purely biological Singularity comes about with the understanding and manipulation of the human genome, extending the human lifespan and enhancing the genes for intelligence greatly. This option, veering toward the historically problematic use of Eugenics, is one illustration of the potential moral shortcomings to be found in the Singularity, assuming one treats the concept as feasible (*Digital Rapture* 7-8).

In the academic world the Singularity is finding greater theoretical purchase, perhaps not surprising in light of Donna Haraway's cyborg or Fredric Jameson's appreciation of cyberpunk. But the concept has not been given a singular monumental treatment by academics; it has been argued over by futurists, scientists, techno-scholars and cultural commentators who parse the Singularity as an imminent possible future in order to gauge bioethics, globalization, or the internet-fed techno-culture of today - what will Google, iPhones, 3D printers, and UCAV drones make out of the nascent 21st century? These non-fictional engagements all attempt, in one way or another, to negotiate a future which might also be the present (hyper)real and, which, paradoxically, is unrecognizably different.

Now, certainly all of these conjectures could be termed science fiction in the sense that they take place in a speculative cycle wherein SF discursively draws from scientific "real world" notions - which themselves cite SF in order to better visualize their speculations (recalling Baudrillard's claim in *Simulacra and Simulation* (1981) that SF and science proper are third-order simulacra and therefore no longer distinguishable [26-27]). Perhaps the Singularity is born of postmodern anxiety and millennial uncertainty in the present historical moment, but it has produced a fascinating array of nonfiction discourse among scientists and pseudo-scientists, whose prophetic claims eclipse even Vinge's more "rational" prognostications and herald a redemptive future with the assuredness of the religiously devout. And, undoubtedly, the grand messianic figure of this particular manifestation of the Singularity is Ray Kurzweil. Kurzweil, self-described as "one of the world's leading inventors, thinkers, and futurists, with a twenty-year track record of accurate predictions," (*The Singularity is Near* jacket notes) has become the most associated figure of Singularity discourse, penning a number of laborious tautologies about the impending technological transcendence of humanity.

Kurzweil's flavor of Singularity is an infamous one, a blithe and often comically unselfconscious march into a technological Elysium that is inevitable because, well, *it is!* The titles of Kurzweil's bestsellers: *The Age of Spiritual Machines: When Computers Exceed Human Intelligence* (1998) and *The Singularity is Near* (2005) are prima facie of his oracular vision of the future. Starting with the aforementioned Moore's Law, which states, roughly, that electronic manufacturing has been able to double the processing power of integrated circuits relative to the cost of their production (Moore 114-117), Kurzweil takes the elegant ratiocination of this pattern to delirious heights. Since its formulation in 1962, Moore's Law has proven accurate (Disco and van der Meulen 206-207) but has an oft-unacknowledged expiration date: it will become impossible to reduce the size of electronic circuits below a certain atomic weight (Wu et al). Both Moore and Kurzweil have acknowledged this inevitability, but Kurzweil has seemingly taken Moore's model of exponentialism (itself having roots in Western thought as previously explored) and turned it into a totalizing historicism, which he dubs his "Exponential Law of Computing" (*The Age of Spiritual Machines* 33-35). It is not just electronic circuits that have been doubling, all manner of computation has been increasing in speed and power "regardless of the type of hardware used" (25). Moore's Law, as Kurzweil would have it, is merely a new iteration, "part of a deeper phenomenon" (29) of all human technology, and, going even further, of all cellular biology; evolution itself is part of his exponential curve (11-14), a curve which is becoming noticeable during our time of rapid development and which is threatening to "explode with unrelenting fury" (39-40) as we approach the Singularity's asymptote, the "knee of the curve" (132).

Kurzweil wields his model of exponential growth as a historicizing, totalizing metanarrative: he extrapolates into the past, itemizing historical events he believes to be

technological paradigms - that these events will be further and further apart receding into history gives him quite a bit of leniency to position his “quantitative data.” As for the future, the certainty of the Singularity is backed up with historical inevitability - just because Kurzweil doesn't know *how* it will happen doesn't mean it isn't still inevitable. The twilight of Moore's Law is nothing to worry about, because integrated circuits will soon become laughably outdated by whatever gimmickry is coming next, and that will be a problem for the omnipotent machines - be they AI or IA - to work through, which they will, and then the phase of recursive self-improvement will begin, after which...? (47)

Once we really hit the asymptote, the “spike” (a term popularized by Australian SF author Damien Broderick) signified by infinite intelligence recursion, the Singularity really achieves its ideological formation (or potential). For while Vinge and Kurzweil speak of the Singularity as a foregone conclusion (and Kurzweil differentially so), they paradoxically testify to the impossibility of predicting or even comprehending how it will take place. The Singularity, then, often presents itself as a formation of narrative as opposed to one of genuine scientific inquiry, as assumptions, desires, and suppositions of the cognitive present are projected onto a teleological canvas; the concept is, in other words, much more suited to the narrative SF that it is most associated. When Vinge initiated the modern expression of Singularity at his 1993 NASA talk as both a mathematician/computer scientist *and* SF writer, it's difficult to say which modality he began in. But even in his scientific dimension, Vinge roots the Singularity in the hard SF writers of the 1960s, '70s, and '80s who “...felt the first concrete impact...more and more, these writers felt an opaque wall across the future. Once, they could put such fantasies millions of years in the future. Now they saw that their most diligent extrapolations resulted in the unknowable...soon” (“The Coming Technological Singularity” 13).

The metaphor of visual obstruction would prove apt for SF writers grappling with how to write about a topic with a complete cognitive restriction on it, and here Vinge proves to be the most interesting as he attempts to craft SF in the face of his own prediction of obsolescence and incomprehension. In *Marooned* he capitulates, "...there is only one way to know for a fact what the Singularity is. You have to be there when it happens" (116). Those who were there to witness are no longer around, and their account wouldn't be decipherable to the rest of us anyway. Vinge's definition has ceded the possibility of narrative access for both his characters and his readers, yet he cannot write as if the inevitability he has harkened is not going to happen (while still writing what he considers "Hard SF"). In *Marooned*, the best he can do is leap past the event itself and then try to engage it as an archaeology of the future, making this something of a "post-Singularity" novel, and a strategy many later writers would adopt as well.

After his first attempt navigating the Singularity left him a bit unmoored (*Collected Stories* 313) in the face of his own "opaque wall," Vinge developed a different strategy for his Zones of Thought novels: *A Fire Upon the Deep* (1992), *A Deepness in the Sky* (1999), and *Children of the Sky* (2011). By turning the temporal inevitability of his Singularity into a logic of spatial-physics, Vinge can write post-Singular occurrences as taking place alongside the merely pre-Singular. His eponymous Zones disperse spacetime complexity (and, thus, the capacity for intelligence) across concentric areas within the galaxy. At the innermost galactic core is the Unthinking Depths, where no intelligence, biological or otherwise, can come to exist or function; then the Slow Zone, where Earth is located, which can facilitate a degree of biological intelligence but not true artificial intelligence nor faster-than-light travel/communication; the Beyond, in which FTL travel, AI, and other advanced capabilities are possible, all increasing in power and efficiency the further from the core one moves; and, finally, the Transcend, the

outermost region containing the galactic halo, which houses superintelligences, Powers unfathomable to lower life forms.

Vinge's maneuvering allowed him to flesh out narratives in and around the Singularity without writing from the position of humanity plunging through the event horizon, but it is also an admission of defeat for his hard SF sensibilities; one has to dream up non-linear ways of approaching the Singularity in order to approach it at all! However deftly Vinge covers his tracks, the physics of the higher Zones that allow FTL and antigravity are never explained - how could they be? But whether skipping forward past the unknowable in *Marooned* or having the unknowable exist in the depths of spacetime, Vinge has forfeited the ability to narrativize the concept whose imminence *and* immanence he heralded.

It is difficult to say whether Vinge's Singularity dilemma created a problem for the rest of SF. Charles Stross, arguably the most prominent writer to wrestle with the Singularity in the generation following Vinge, gave the subject its second-most notorious epithet when he referred to it as "the turd in the punchbowl of near-future SF - you may politely pretend it isn't there, but everyone has to deal with it" (Grossman). Stross, in addition to prominent Singularity/post-Singularity SF writers such as Cory Doctorow, Ken MacLeod, Neal Stephenson, Iain Banks, Greg Egan, as well as some holdovers from the cyperpunk era, Bruce Sterling and Rudy Rucker, have contemplated the Singularity of Vinge and Kurzweil with less narrative rigidity, and certainly less austerity. By and large they have rejected the notion that one cannot write the Singularity without living it, or that writing it entails narrative sleights; they proceed directly through the unknowable, focusing less on what the Singularity is or what happens than the subjective, ground-level experience of disorientation, fear, or elation, as characters are pushed through the Kurzweil/Vinge premise.

But what type of visions do they offer? It is with Kurzweil's sensibilities in mind that writer Ken MacLeod penned what would become the Singularity's ultimate epithet in SF when, in *The Cassini Division* (1999), a character dismisses the concept sneeringly as "the Rapture for nerds" (115). The phrase has been offered up by both critics and the very SF writers who explore the Singularity, deriding it as a secular apotheosis with faux-religious trappings. Looking further into Kurzweil's "vision," this criticism seems to pan out. In *The Singularity is Near*, Kurzweil again extolls the coming techno-paradise, assuring us that immortality, wealth, and bliss will be available to everyone at no cost (7-9). Scarcity will no longer exist as we know it, and yet Kurzweil claims, curiously, the Singularity is "neither utopian nor dystopian" (7) despite his particular vision returning humanity to the center of the cosmos, after briefly being displaced by the Copernican Revolution: "...it turns out that we are central after all. Our ability to create models—virtual realities—in our brains...are enabling us to expand our horizons without limit" (487).

Kurzweil's vision, whether he knows it or not, does show an affinity for utopian thought - the andro-centric future without scarcity or deprivation leaves little doubt as to that. What really brings the religious element to Kurzweil's prognostication is the zealous way he positions it as a *present* orientation event rather than a transcendent afterlife, having geared much of his efforts toward achieving life-extension:

Kurzweil himself takes 250 supplements every day, while closely tracking and monitoring about 50 different measures of his own health. At any given time, he knows his exact levels of cholesterol, HDL (high-density lipoprotein), LDL (low-density lipoprotein), triglycerides, homocysteine, and C-reactive protein, as well as his blood concentrations of various antioxidants and nutrients. "I haven't aged much in the last 15 years," he says. (VanZile)

All of this, presumably, so that he can live long enough to his flexible predicted date of 2045 (Campbell) and thereafter upload his mind and achieve immortality.

So, if the Singularity represents a new, faux-spiritual orientation in SF, it would seem to signal a defeat for the likes of such Marxist critics as Carl Freedman and Fredric Jameson, who have postured the political formations of the utopian mien in SF in contrast to the religious ones, with both critics echoing the seminal gestures of Darko Suvin. Then again, Kurzweil and the mass of radical “extropians” he has inspired are quite insistent that the Singularity is irreligious (Brigis), presented as an “almost present” instead of an afterlife to be navigated through orthopraxy. What does inevitably distinguish Kurzweil’s utopian futurism from other such fictions is his complete and utter negation of the socio-political. In the 600+ pages of *The Singularity is Near*, Kurzweil cannot spare a page for issues of society or its governance, despite the Singularity being a “rupture [in] the fabric of human history” (7-9). Curiously, Kurzweil does mention the necessity of “smart warfare” (237) (this is, no doubt, a response to Sun Microsystems founder Bill Joy and his famous tract about the latent apocalyptic threat of a Singularity), nanoweapons, and cyberwarfare which segues into a revealing discussion of intellectual property: “If the primary value of products and services resides in their information, then the protection of information rights will be critical to supporting business models that provide the capital to fund the creation of valuable information” (240). But that’s as close as Kurzweil gets to the implications of his “rupture” for society; the rest is technical discussion and extrapolation.

The utopia Ray Kurzweil envisions in *The Singularity is Near* would have us believe that paradise and plenitude will arrive for all of humanity precisely so long as we do *nothing* to change the ideological and political structures already in place. It is a curious thing that after so radical a change we would witness the postsingular persistence of economic imperatives (92-104), intellectual property (250), and business models (22, 93, 98, 250, 305). As Steven Shaviro

has pointed out, Kurzweil's ideological formation here is something that is also bedeviling SF both inside and outside of the Singularity - the weakness of the utopian imagination in its inability to forecast beyond the present post-industrial late capitalist clime; as Fredric Jameson has opined:

We have been plagued by the perpetual reversion of difference and otherness into the same, and the discovery that our most energetic imaginative leaps into radical alternatives were little more than the projections of our own social moment and historical or subjective situation: the post-human thereby seeming more distant and impossible than ever! (*Archaeologies of the Future* 211)

Kurzweil is exemplary of how Singularity discourse, be it fictional or non, is in need of ideological scrutiny, for when it ceases to be understood as an immense, ambivalent, changing metaphor it can become a reified narrative which functions as an end to itself. We have no difficulty imagining Vinge's end of the human era or Kurzweil's rupture in the very fabric of human history, and yet these unimaginable futures will witness the persistence (for Kurzweil, at least) of money, accumulation, and business arrangements. Kurzweil's vision for the Singularity has become colonized by Capital.

Returning to the discourse within SF we find a unique exploration of this dilemma in Charles Stross's *Accelerando* (2005), perhaps the best-known Singularity/post-Singularity novel, one in which Stross defies both Vinge by pushing through the unimaginable event horizon rather than going around, and Kurzweil by taking his religious-extropian vision to their alarming, inevitable conclusions. Published as a series of nine novellas in "Asimov's" starting in 2001, *Accelerando* is a tale of two narratives, the first recounting several generations of the Macx family as it encounters touchstones of the Singularity - an event which Stross depicts as gradual ("soft takeoff") as opposed to instantaneous. We begin in 2010 with Manfred Macx, an entrepreneur who has "agalmic" (3) (the production and allocation of non-scarce goods) ideals

and spends his time patenting unique business models and then giving them away for the benefit of total strangers (40). Manfred is a proponent of the Open Source/Free Software Movement - not unlike Stross himself (Anders) - but extending it beyond its initial scope of software licensing to the business world at large:

Manfred is at the peak of his profession, which is essentially coming up with whacky but workable ideas and giving them to people who will make fortunes with them. He does this for free, gratis. In return, he has virtual immunity from the tyranny of cash; money is a symptom of poverty, after all, and Manfred never has to pay for anything. (9)

The first story/chapter involves Manfred being contacted by someone claiming to be net-based AI from the KGB seeking aid to defect. Manfred eventually discovers the caller(s) identity is that of California spiny lobsters who have been neuroimaged and uploaded as enhanced consciousnesses and are seeking to escape from humanity's interference. Manfred helps the lobsters board a spacefaring factory complex bound for cometary material and then spends his time trying to establish legal precedents that will help define the rights of both uploaded consciousnesses, human or non, and AI:

“But they're just software! Software based on fucking lobsters, for God's sake! I'm not even sure they are sentient - I mean, they're what, a ten-million-neuron network hooked up to a syntax engine and a crappy knowledge base? What kind of basis for intelligence is that?”

Manfred's finger jabs out: “That's what they'll say about you, Bob. Do it. Do it or don't even think about uploading out of meatspace when your body packs in, because your life won't be worth living. The precedent you set here determines how things are done tomorrow.” (20)

Manfred's battles over the legal status of uploaded, distributed, or non-human intelligences embody the arc of the first three chapters of the *Accelerando*; helpfully, Stross has characterized the book as “[when] extropianism collides with the open source movement” (Anders) to bridge the obvious connections for us. Manfred's role as open source/agalamic entrepreneur/venture altruist is diametrically opposed to the forces of Kurzweil-esque

extropianism that push for the Singularity without thinking through the moral and legal pitfalls that could ensue. We move thereafter into stranger and occasionally sillier territory: Manfred's daughter Amber joins a youth-crewed space vessel to a Jovian moon, eventually digitizing their consciousnesses into a small craft in order to journey to an alien router, encountering bizarre aliens who borrow the appearance of Manfred's lobsters (111) and, at the router, a parasitic being in the form of a giant digitized slug that the characters describe as "a pyramid scheme crossed with a 419 scam" (181).

Stross's tongue-in-cheek misadventures through the Singularity contrast strangely to the profundity of Vinge or the religious awe of Kurzweil, and yet Stross still arrives at a technological utopia by novel's end. The world experienced by humanity is one of plenitude, despite the legal/familial infighting and class/ideological differences that bedevil human communities, and certainly the characters in *Accelerando*. War and poverty, however, have been thoroughly eliminated thanks to "programmable matter" (220, 225) and nanomachines, which can construct any material you want by thought, muting the need for any serious conflict; "Life is rich here, endlessly varied and sometimes confusing" (220).

And yet the final arc of chapters in *Accelerando* also reveal a dark counter-narrative to the bizarre, whimsical tone Stross has heretofore presented, when Amber's crew returns "home" to Jupiter, to find that humanity has been pushed back to habitats around Saturn and, inevitably, to a brown dwarf star named Hyundai +4904/-56 outside the solar system. Gradually and indirectly it is revealed that the cause of humanity's exodus was the *other* Singularity - not necessarily distinct from the one we've followed throughout the course of the plot. However plentiful and happy humanity is now, the civilization of humans is a "poverty-stricken backwater" (193) compared to those of the "Vile Offspring" (177) - the posthuman "Mind

Children” (177) (here referencing Hans Moravec) born of the Singularity, sentient AI of higher-order consciousness who outstrip the progress of the merely enhanced humans by several orders of magnitude.

The Vile Offspring, representing the deeper implications of Kurzweil’s extropianism (“A computer in the range of the ultimate computer has a very high computational efficiency. Once we achieve an optimal computational efficiency, the only way to increase the computational power of a computer would be to increase its mass” [*The Singularity is Near* 264]) are unfathomable to human beings, of course, but their behavior is coyly revealing. The AIs exist only to acquire more computational power, not unlike Kurzweil’s “ultimate computer,” and function indistinctly from multinational corporations, practicing something Stross dubs “Economics 2.0” (212) and against which humans are unable to compete. Suddenly Manfred’s earlier concern for new legal definitions “that can cope with sentient corporations” (154), is fully borne out, echoing old cyberpunk concerns. Corporations are, of course, viewed as *persons* legally, despite their inability to die or be incarcerated alongside the merely biological. The Vile Offspring initially value ordinary humans as “sapient currency units” (130) (units of novelty), but as they rapidly evolve humanity is shunted, or worse. In their quest for profits, now in the form of computation power, they pulverize earth and the inner planets, converting “dumb matter” into computronium - restructuring matter into “Matrioshka brains” (141-142), incomprehensibly large Dyson sphere processors. The remnants of augmented humanity are pushed further and further out of the solar system, first to Jupiter, then Saturn, and finally to Hyundai +4904/-56.

The transcendence of the Vile Offspring is not infinite, we learn, as glimpsed through the alien router. The galaxy at large is littered with dead or dying AI civilizations; sooner or later

their obsession for computation reaches a terminal point, since neither matter itself nor bandwidth are infinite quantities:

...the end product of a technological singularity - they're bandwidth-limited. Sooner or later the posthuman descendants evolve Economics 2.0, or 3.0, or something else and it, uh, eats the original conscious instigators. Or uses them as currency or something. The end result we found is a howling wilderness of degenerate data, fractally compressed, postconscious processes running slower and slower as they trade storage space for processing power. (177)

The Singularity, then, is an unsustainable scenario - good news, provided the ordinary humans can survive until it is exhausted. These revelations, gradually unfolding behind the hijinks of the Macx family, give *Accelerando* a surprising narrative inversion - once the posthuman Singularity occurs, ordinary human beings are no longer at its center, even if they augment their bodies and/or live in a society of abundance, as our characters do. But abundance may not be enough to survive the Singularity mind children, whose Economics 2.0 leaves humanity booted out of their natural habitat and possibly slated for extermination.

Shaviro has also proposed that the Singularity is a fantasy of finance capital (115) explored nimbly in *Accelerando*. It does appear that Stross is extrapolating something akin to this when he defines Economics 2.0 as “replac[ing] the single-indirection layer of conventional money, and the multiple-indirection mappings of options trades, with some kind of insanely baroque object-relational framework based on the parameterized desires and subjective experiential values of the players” (197). This appears to be an exaggerated form of financial derivatives - “a financial contract whose value is derived from the performance of underlying market factors, such as interest rates, currency exchange rates, and commodity, credit, and equity prices” (Office of the Comptroller of the Currency).

Financial derivatives are a curious manifestation of Late Capitalism: trading instruments that derive their value from *other* assets, they “represent a metalevel with respect to their

underlying assets...created by the fixed temporal interval in which they are exercisable” (Lee and LiPuma, “Cultures of Circulation” 204). Originally used as hedges against the risk of financial trading in unstable markets, derivatives are now used for purposes of speculation and tend to *increase* risk and instability (Li and LiPuma, *Financial Derivatives and the Globalization of Risk* 77-83). Derivatives are inseparable from the communications and computing technologies which enable them and are indiscernible as any kind of representation save complex equations. Their power is abstracting immeasurable social relations and appearing to flow in a completely autonomous space - much like Kurzweil’s insistence that technological progress is historically imminent and does not contain a social or political component. Derivatives, indeed, do not appear to be social or political at all, but appear to “simply express the mechanisms and profit goals of the market” (*Financial Derivatives* 29). This sounds remarkably similar to *Accelerando*’s posthuman AI and Economics 2.0; Stross offers a darker vision of Kurzweil’s Singularity, interpreted through the economic forces that really drive his technological fantasy. *Accelerando* reveals one such way authors tackling the Singularity have dissected the Vinge/Moravec/Kurzweil Singularity or, more accurately, pushed it toward its inevitable, delirious conclusions. But has the Singularity’s riddle been solved as an analogue of finance capital? Next it is necessary to explore the concept from another, perhaps more fitting vantage point.

Chapter 2: The Revolutions of Marx and Market

Marx’s Singularity

We have seen that the technological Singularity of Vinge, Moravec and Kurzweil is nothing less than a comprehensive change in the course and momentum of history. It knocks away social, political, and even biological paradigms through its climactic (some might say

existential) breach with both past and present, moving on to a sublime, noumenal, and ultimately unknowable future. Going hand in hand with this revolutionary potency is the Singularity's sense of inevitability - a historical certainty whose technological contours we already bear witness to.

It is, therefore, easy to bridge a connection between the most epochal claims of Singularity discourse and those of Marxist historiography - both ideologies hinge their approach on a teleological historical process with a dramatic revolution depicted with almost lyrical vigor. Both Marx and Kurzweil herald a future that, once properly understood with scientific inquiry, can only have one climactic outcome. Marx, however, has a very different characterization of the exponential laws moving technology forward:

The bourgeoisie cannot exist without constantly revolutionising the instruments of production, and thereby the relations of production, and with them the whole relations of society. Conservation of the old modes of production in unaltered form, was, on the contrary, the first condition of existence for all earlier industrial classes. Constant revolutionising of production, uninterrupted disturbance of all social conditions, everlasting uncertainty and agitation distinguish the bourgeois epoch from all earlier ones. All fixed, fast-frozen relations, with their train of ancient and venerable prejudices and opinions, are swept away, all new-formed ones become antiquated before they can ossify. All that is solid melts into air, all that is holy is profaned, and man is at last compelled to face with sober senses his real conditions of life, and his relations with his kind. (*Manifesto* 16)

This passage seems eerily redolent of Kurzweil's own vision of an accelerating technological society, albeit from a critical stance. But the processes of acceleration the bourgeoisie enable ultimately lead to the downfall of the capitalist paradigm - this is Marx's version of the Singularity:

Centralization of the means of production and socialization of labour at last reach a point where they become incompatible with their capitalist integument. This integument is burst asunder. The knell of capitalist private property sounds. The expropriators are expropriated. The capitalist mode of appropriation, the result of the capitalist mode of production, produces capitalist private property. This is the first negation of individual private property, as founded on the labour of the proprietor. But capitalist production

begets, with the inexorability of a law of Nature, its own negation. It is the negation of negation. (*Capital* 536)

Herein lies the spike in Marx's teleology - the revolutionary new direction of the historical process that will transform the world, one driven by socio-political machinery rather than *mere* machinery. And like the Singularity that Marx's revolution parallels, what lies beyond is almost totally occluded. Marx, like Vinge, cannot or will not speculate as to what will take place after the telos of his historical prediction. Perhaps, like Vinge and his dogged insistence on "hard SF," Marx refused to predict what the classless society would be like because he lacked knowledge of the dynamic conditions therein, as opposed to his rigorous understanding of historical and extant conditions. He might demonstrate the inevitability of the event, but, as Engels remarked, "Marx is and remains the same revolutionary he has always been, and in a scientific work he would assuredly be the last to hide his views in this respect. But as for what is going to happen after the social revolution---on that he gives us only very dark hints" (*Dusseldorfer Zeitung* 316).

There is evidence to suggest that the relationship between Marxism and the Singularity is a not just a rhetorical one. We have seen the dialectic within the SF Singularity between the transhumanist, capitalist, and ultimately utopian impulses of Ray Kurzweil and the critical, Marxian energies of Charles Stross and Steven Shaviro, whose Singularity recognizes political-economic roots. It will be necessary to explore this divide further in order to suss out the Singularity mythology and its revealing relationship with Marxism.

The Free Market Singularity

To a large degree the blithe, confident formulations of Ray Kurzweil can be placed under a larger ideological discourse separate from the musings of scientists and futurologists - a discourse with roots in the claims and subsequent debate around socio-economic theory after the

influential claims of Daniel Bell in the 1960s: the so-called End of Ideology and Post-Industrial Society discussions that would in turn lay the groundwork for the Information Revolution - itself a conceptual and rhetorical forerunner of the Technological Singularity.

Joshua Raulerson's reading (Raulerson 123-126) of the Tom Purdom short story "Bank Run," published in the *Science Fiction Best of the Year 2006* anthology (Horton) reveals the type of ideological SF running in direct opposition to the majority of critical, if not entirely Marxian, Singularity formulations represented by Charles Stross and others. While "Bank Run" is not overtly Singularitarian, it deals in concepts that ultimately align it with the post-scarcity future the Singularity would provide, although Purdom's future plays out quite differently than what we have seen - gone are the fantastical scenarios of posthuman life, replaced with a more familiar, almost parodic vision of post-Singular civilization.

Sabor Haveri is a genetically-perfected transhuman living on an anarcho-capitalist planet called Fernheim in a non-specified but post-Singular future, where he wields considerable power through high-powered investment banking and political maneuvering in the form of strategic capital. "Bank Run" follows one of Haveri's more interesting adventures - a fast-paced chase sequence and shootout bizarrely contrasted with the protagonist's simultaneous marketeering via omnipresent data networks. Haveri's bank is one of the financial institutions propping up Fernheim's stateless society, one Purdom obviously regards as a paradise. Having left a life of inherited if not aristocratic privilege on his homeworld to seek his literal fortune on the frontier of Fernheim, spending his time wheeling and dealing in the world's markets and amusing himself with a gynoid custom-engineered to his specifications: "Purvali's designers had started with a fleshy woman with a strong sex drive...The result was a finely calculated combination of

elegance and voluptuousness” (25). Purvali doubles as his personal assistant alongside the ambiguously sinic Choytang.

The story engages the trio in the middle of a boat chase as one of Haveri’s “less reasonable customers” (24) is attempting an armed kidnapping due to Haveri’s denial of a loan he has deemed ill-advised. Haveri’s nemesis has contracted with genetically-streamlined paramilitaries - one drawback to Fernheim’s anarchist utopia is that might makes right, and violence-as-power is available to the highest bidder. Our putative hero, despite being out-muscled, ends up dispatching the threat through strategic delays while he sets up real-time teleconferences to outbid and out-politick his rival through harried, yet shrewd, business deals. Rational self-interest, ballasted by liquid assets, wins the day.

It would seem like an ideological critique of “Bank Run” need hardly be made. Purdom’s story would seem right at home in a Golden Age SF space opera, if not something further back, and his Randian protagonist, nubile, customized concubine, and non-white manservant, align the narrative with an outdated, somewhat embarrassing style, almost as if someone threw Gordon Gecko into a Heinlein yarn and updated the gadgets. But what makes “Bank Run” significant for our purpose are the economic assumptions Purdom makes: his future utilizes the most fashionable accoutrements of cyberpunk without any of the irony - custom genes, cybernetic data prostheses, information-scapes - but with respect to economic and political philosophy, the world of Fernheim is merely a capitalist, libertarian utopia using values out of *The Fountainhead*:

Public posting couldn’t be enforced by law but people who ignored the custom enjoyed short business careers. There was no central government on Fernheim. The business community enforced its rules by monitoring deals and invoking the ancient human customs of shunning and ostracism.” (30)

Money, Rali Haveri liked to remind him, was essentially irrational. It had value because people agreed it had value. She had placed two million yuris in Sabor’s account...and everyone had agreed he could use it to buy goods and services...and they had continued to

accept it when they had landed on Fernheim...Human societies needed some sort of monetary system... (34)

Again, the ideology of this aspect of “Bank Run” is not wholly remarkable: without the aid of central governance or protective authority, the protagonist, using only his superior intellect and wits (well, not discounting his considerable *inherited* wealth) is able to outmaneuver a deprived adversary and save the day. Despite the reduction of life to a quantifiable asset (“A hardbody could be replaced in approximately eleven standard years at a total cost of four hundred and sixty thousand Fernheim neils” [77].), Fernheim’s society flourishes with only money making might *and* right, meaning that despite the occurrence of a Singularity, very little has changed for humanity with regard to its economic and social structures since the advent of neoliberal economics. Apart from the free-reign of capital exhibited by Fernheim and more impressive technological hardware, there is little in “Bank Run” to put the speculative in SF - no challenge to conceptual hallmarks in the contemporary.

But the degree to which “Bank Run” is implicated in Singularity discourse is ultimately more important than its dogmatic celebration of the free-market, and it is the extent to which Purdom addresses post-Singular economic concepts like nano-manufacture, also called nanolithography or nanofabrication, wherein raw materials or elements can be used to fabricate on a molecular level anything imaginable in short amounts of time. In theory, the instantaneous availability of all goods would revolutionize both production and society, creating the post-scarcity world offered by the Singularity. Or would it? Purdom writes:

There had been a time when many visionaries thought the fabricator would make bankers obsolete. Press the right buttons and your magic box would generate a fully cooked roast on demand. Press another combination and it would extrude furniture for your dwelling place, clothes for your body, and toys for the idle hours it had bestowed on your life. Why would anyone need money?

Fortunately, it hadn’t worked out that way...The introduction of the fabricator had disrupted Earth’s economic system for approximately two decades. It had triggered a

catastrophic massive deflation. Prices and wages had tumbled by seventy percent, by most calculations...

Fabricators could provide you with the basics at a ridiculously low cost but they still needed energy and raw materials. They needed programs that directed their operations and time to run the programs. And there were commodities that couldn't be manufactured by the best machines available. Fabricators couldn't manufacture social status. Fabricators couldn't engage [in] genetic manipulations...Above all, fabricators couldn't manufacture *expertise* and *imagination*. They couldn't design their own programs. They couldn't visualize the new products that would make consumers lust after the programs that would produce them. (33-34)

The idea of nanofabrication is itself regarded as something of a novum in Singularity SF (Raulerson 100) and certainly has drastic economic implications by those who ponder the topic of an authentic Singularity. As a vaguer notion, molecular assembly has been in and around SF for quite a while, most famously depicted in the *Star Trek* universe. Indeed, Purdom appears to be responding directly to the implications of the replicator technology seen in various incarnations of the series. The replicator, a device that is able to rearrange subatomic particles into almost any inanimate object without a corollary input of human labor ("Lonely Among Us"), is one of the ways the *Star Trek* universe is able to achieve a post-scarcity society in the 24th century, freeing humanity to become the peaceful, enlightened explorers we witness throughout the films and TV shows. The replicator functions here mostly as a narrative device, exactly the "magic box" whose utopian effects Purdom dismisses in "Bank Run".

The difference in the molecular assembler of old and the nanofabrication featured in Singularity narratives is less one of concept than genealogy. In SF, microscopic (not, strictly speaking, *nano*) robots appearing in Arthur C. Clarke's *The Next Tenants* (1956) and Stanislaw Lem's *The Invincible* (1964), among others. What typically distinguishes nanotechnology is the potential for *self*-replication - the intelligent automation of nanofabrication processes independent of human control and, as we have seen, the fact that Singularity discourse seems aware (if slyly) of the economic impact such technology would have.

In the 2003 novel *Down and Out in the Magic Kingdom* by Cory Doctorow, which takes place far after a Singularity event, socio-economics have been transformed on every level: not only have objects been devalued from the view of scarcity, but so is that of labor since cloning and mind-uploading have reduced death to a minor inconvenience. Power through physical violence becomes meaningless except as small-scale strategy. With neither scarcity nor death around to give human society contextual contours, the new “Bitchun Society” that emerges faces the challenge of creating a non-Capitalist capital.

Doctorow’s novel explores the consequences of one solution to such a dilemma - “Whuffie,” a currency based on reputation and renown as opposed to a commodified exchange value. Earning Whuffie based on endeavors of social value, creativity, and/or intelligence increase one’s celebrity status and influence, as well as giving access to certain non-material perks, while losing Whuffie or going into the negative results in social ostracism:

...Whuffie recaptured the true essence of money: in the old days, if you were broke but respected, you wouldn’t starve; contrariwise, if you were rich and hated, no sum could buy you security and peace. By measuring the thing that money really represented—your personal capital with your friends and neighbors—you more accurately gauged your success. (9)

Doctorow’s solution seems analogous to the Facebook “Likes” or popularity and reputation systems that govern much of contemporary online media, although the notion of gift economies is certainly older, and yet *Down and Out* never attempts to successfully answer the post-scarcity riddle: how can value exist *without* boundaries? The rational self-interest that dictates most human economies has been rendered obsolete by the Singularity.

But in “Bank Run,” Purdom dismisses nanofabrication as a revolution of the superstructure alone, with class and base unaltered; he insists that exceptional human agency (and concurrent self-interest) is a more crucial determining factor than a revolutionized method

of production. In doing so, Purdom is articulating the claims of Daniel Bell's postindustrial theory - a premise, which, according to neo-Marxist critic Nick Dyer-Witherford in *Cyber-Marx: Cycles and Circuits of Struggle in High-Technology Capitalism*, had a direct relationship with Marxist historiography.

Dyer-Witherford tracks the genealogy of Bell's theory as it gestated amid the 1950s and 1960s, a period of alleged prosperity amongst the Euro-American industrial nations. Bell and others argued that these societies proffered the only viable socio-economic model, and thus the End of Ideology, "...which meant, in general, an end of alternatives to liberal capitalism, and, more specifically and pointedly, an end to Marxism as a revolutionary force." (Dyer-Witheford 28) Bell's thesis was quickly discredited as the 1960s gave way to socio-political tumult: "Faced with the unexpected convulsions of 'industrial society,' many intellectuals sought explanations in the possibility that these tumults marked nothing less than the growing pains associated with the emergence of a radically new social order" (29).

Such "growing pains" were not class conflict, as Marxists claimed, but the natural paroxysms to be expected from a new social order - the postindustrial society - Bell's second theoretical thrust. *The Coming of the Post-Industrial Society* outlined a new socio-economic order stemming from transformative shifts from producing goods to producing services; a move from manual labor to technical work; and a new intellectual technology based in computer systems. This society would be geared for innovation and change, lead by a knowledge class of exceptional minds - scientists, engineers, and organizers in the academic world as well as politics.

As Dyer-Witheford holds, Bell's social theory was a firm rebuttal of Marx's claim that capitalist societies must ultimately succumb to negation. "Knowledge, says Bell in one of his

most widely repeated formulations, will replace both labour and capital as the main factor of production. Between the opposition of capitalist and worker emerges a new class..." (31). This emergent class would be based on knowledge rather than property and effectively contain no revolutionary potential. As Bell has it, Capitalism survives and evolves.

Purdom's "Bank Run" is a fascinating regurgitation of these claims. Assaulted by the revolutionary advent of an equalizing technology, Haveri's universe endures a period of economic turbulence that ultimately proves temporary. Once a new social order of exceptional, rational minds emerges from the system shock, society is stabilized and reset. Nanofabrication may have redefined production, but society's engines are run by the sturdier forces of creative innovation. The postsingular *is* the post-industrial; the Singularity, in such a case, has changed nothing.

The Marxian Singularity

The latent neoliberalism found in "Bank Run" is something of an exception in Singularity SF, with many writers at least *exploring* the alternatives an epochal Singularity would bring. Charles Stross offers an interesting response, not explicitly aimed at Purdom, but at the general ideology at play in such narratives:

Economics, the study of how we distribute limited resources, is one of the most fundamental fields of human study—and one of the most poorly understood. The SF field harbors a large, and very vocal minority of libertarians who claim that laissez-faire policies are the answers to all our problems. However, they make the mistake of assuming that their preferred theory is universally applicable. Even if you agree with them, it's important to understand that any economic theory is based on a model of human behavior which is unlikely to encompass non-human intelligences... (Toast 44)

In other words, the unknowability of the Singularity is not to be underestimated. Throughout his work in Singularity SF, Stross has explored the consequences for humanity of an authentic

Singularity that transforms our existing economic apparatuses and/or consciousnesses into the unfathomable and often undesirable.

We have already seen the predatory economic entities of *Accelerando*, representing a logical-but-radical extension of neoliberal doctrine. In *Singularity Sky*, Stross again displays the Singularity in economic terms. After experiencing the technological spike promised by Vinge and Kurzweil, a superintelligence named the Eschaton comes into being and, after dispersing 90% of Earth's population across the galaxy, imposes a mostly presingular technology limit on all of humanity in an effort to prevent the use of time-travel, which could threaten its causality. This is, in a way, Stross's solution to the same problem Vinge had regarding Hard SF and the unfathomable Singularity; Stross has the event take place, but promptly reboot so that he can write about it in isolated, presingular vantages.

Centuries after the Eschaton expanded and resettled humanity, advanced technology has developed among most of the civilized worlds, although it is kept nervously in check. A collective of posthuman intelligences (of unknown origin) called The Festival arrive on a planet called Rochard's World, bombarding it with advanced technology in exchange for amusing knowledge and stories from the humans (similar to the "sapient currency units" in *Accelerando*). In the midst of this chaos brought about by The Festival (which is threatening to call down the wrath of the Eschaton) a group of Marxists lead by Burya Rubenstein threaten the government when they request a nanofabrication device (A "Cornucopia machine" [5]) and usher in a post-scarcity economy: "The arrival of the Festival in orbit around the pre-industrial colony world had brought an economic singularity; physical wares became just so many atoms, replicated to order by machines that needed no human intervention or maintenance. A hard take-off singularity ripped up social systems and economies and ways of thought like an artillery barrage" (108).

The reality of postsingular economics offered by Stross seems much more dire than that of Purdom, whose society overcame the initial shock of nanofabrication and reestablished the proper pecking order. Stross focuses on the shock, which only offers to get worse as progress arches at a faster rate. Be it the Vile Offspring of *Accelerando*, themselves descended from neoliberal economics, or the baffling and (perhaps) unwittingly destructive Festival of *Singularity Sky*, humanity in Stross's narratives are ill-equipped to deal with the intelligences born of a genuine Singularity. Unlike Purdom, Stross believes the vast and unpredictable (though often liberatory) potential offered by a postsingular economy ultimately removes humans from the center of the "rational" universe.

Stross is too evasive to lend himself to one particular ideology, but the potential he sees for nanofabrication to democratize society, either through Burya's Marxist-Extropian movement in *Singularity Sky* or the agalamic entrepreneuring of Manfred Macx in *Accelerando* give him a Marxian tinge, as does his overt focus on historical-materialist conditions. However, the satirical turn Burya's movement takes when his tactics become increasingly Stalinist suggests Stross is wary or cynical with regard to party doctrine:

But change and control brought a price that Rubenstein was finding increasingly unpalatable. Not that he could see any alternatives, but the people were accustomed to being shepherded by father church and the benign dictatorship of the little father, Duke Politovsky. The habits of a dozen lifetimes could not be broken overnight, and to make an omelet it was first necessary to crack some eggshells. (108)

In *Accelerando*, he regards both capitalism and communism as the "bickering children of a proto-industrial outlook...as obsolete as the divine right of kings" (115), though this need not be regarded as a wholesale dismissal of Marxism, since all economic models will give way to obsolescence when the true era of communism ushers in. It seems that with the advent of nanofabrication and/or the transcendence to a posthuman state, the problems that traditional

economic systems are trying to negotiate - namely a scarcity of resources - are irrelevant. With one of the greatest ideological struggles of the 20th-century summarily swept aside by the Singularity, what we're left with is a curious combination of the two exemplified by Manfred Macx, the "venture altruist" (8) who attempts to enforce an egalitarian agenda by distributing valuable patents to strangers, but who is not particularly interested in the *source* of inequality - indeed, Manfred is playing by the very rules of postmodern/late capital, as well as using its instruments!

The Information Revolution

Returning to the ideological friction exemplified by Stross and Purdom, the debate over the contours of so-called post-industrialism, we may find further clues as to whether the Singularity is Marxist in nature. The postindustrial society outlined over the decades by Daniel Bell and, later, Alvin Toffler, was metamorphosing into the computer-based Information Revolution (Dyer-Witheford 7), a new age which for many heralded the death of Marxism as a modality that could not come to terms with a techno-scientific era. By the late 1970s, Bell had redeployed his original thesis to emphasize the importance of computers, media, and telecommunication (Dyer-Witheford 36), signaling a shift in the defining contours of the post-industrial society, which had defined the new era in terms of a departure from industrialism:

Technocracy is replaced by high-tech, organisation men by intelligent machines, experts by expert systems, intelligentsia by artificial intelligences, mainframes by microcomputers, pyramidal hierarchies by distributed systems, central office by cyberspace. (Dyer-Witheford 36)

In this manner, the Information Revolution became a paradigm for Late Capitalism - a collaborative strategy pursued by both corporate and state sectors in the capitalist world. What is crucial to remember, however, is that the rhetorical foundation Bell lays with the postindustrial society is ultimately rooted in Marxist discourse as an attempt to dismiss the turbulence of the

mid-century as class-based conflict. When postwar unrest consistent with Marxist historiography threatened the stability of Bell's ideal vision - one that transcended ideology - Bell appended Marx's historical process to include a stage which "projects into an imminent future the very conditions of stabilization [Bell's original thesis] had mistakenly declared achieved." (Dyer-Witford 32) Bell's knowledge class of technocrats take the reins in Marx's vision of progress, rather than the prophesied proletariat.

By the time writer and futurologist Alvin Toffler began to enunciate the terms of the Information Revolution in Bell's wake, the utopia promised by the Bell's crypto-Marxian teleology began to assume a strange, disarming character. Gone were the historical and class-based arguments Bell was, at least, attempting to engage: "Post-industrialism had primarily defined the new era in terms of its departure from the crises of industrialism" (Dyer-Witford 36). Toffler, seeing how mass labor would be replaced with computers/automation and government bureaucrats (the technocratic class Bell elaborated upon), declared the death of the working class, Marx's historical protagonist, in the postindustrial world (Dyer-Witford 47). Toffler also argues, in a manner prescient to Kurzweil's historical epochs, that the world is in a stage of transition toward a potentially superior form of life as human agency and labor are ceded to increasingly self-driven machines; the Singularity begins to gain traction.

What has changed from the postindustrial theses of Daniel Bell and Alvin Toffler to the full-blown free-market utopian ideology epitomized by figures such as Francis Fukuyama (who took Bell's thesis to delirious heights after the fall of the Soviet Union), Kevin Kelly (of Wired Magazine) and, finally, Ray Kurzweil, is that the former acknowledge (and are still contending with) Marxism while the latter are mostly content to dismiss socioeconomics altogether. And yet,

what is still ultimately relevant is both Bell and Toffler built their historical process atop Marx's teleology - they merely changed the ending.

Chapter 3: Postmodern Rapture

Nanovisions

We have established that the technological Singularity, in its cultural incarnations, appears to be a fantasy of finance capital, whose instruments seem to be freeing themselves from merely human parameters. We have established that this fantasy has its roots in Enlightenment and/or modernist mythologies of revolution, most specifically the Marxian telos of utopian economic reorganization, itself colonized by Late Capitalism as a free-market Information Revolution. The metaphorical potential of the Singularity is broad enough to supply readings from both Marxist and Capitalist vantages, but ultimately, what good are our speculations when that very Singularity metaphor, like its namesake in spacetime, is of unknowability? It is impossible for us to even *fathom* what might take place within a Singularity, and every effort to do so merely exhibits that it is, as Vinge described, “a mirrored thing” (*Marooned* 177) upon which old ideas (or ideologies) are reflected, disguised as fantastical new ones. As has been noted:

To the extent that Singularity narratives can be seen to mimic the logics and aesthetic values of revolutionary rhetoric, the opacity and inaccessible mystery of the Singularity as a presumed future-historical event makes it susceptible to cooptation as an ideological mirror: an occasion to posit narrowly partisan goals and utopian ideals as the logical and desirable outcome of an inevitable historical shift, which necessarily coincides with a regrettable but equally inevitable period of social upheaval. (Raulerson 43)

The sheer cognitive barrier we have in regards to a Singularity is one of its few agreed-upon features: Vinge's metaphor of visual obstruction, of an “opaque wall across the future” remains the standard definition, even as those within or without SF deploy rhetorical strategies to

move through and/or around it. Colin Milburn, in *Nanovision: Engineering the Future* (2008), attempts to summarize:

The very question of seeing is as much at stake in the technological Singularity as it is in the astrophysical singularity of the black hole, for they are both points of blindness where the human conceptual apparatus-dependent, at least metaphorically, on light, sight, and vision-cannot penetrate...the Singularity is a moment of darkness, a point that occurs...where we literally cannot see. Those who try to rigorously understand the consequences of technological change for human culture-such as science fiction writers and futurologists -increasingly find their visionary abilities curtailed...their speculations sent careening asymptotically in multiple directions at the event horizon of this black hole in history. (2-3)

Have we ended up exactly where we started? Perhaps not. Milburn goes on to note that our current inability to see through the Singularity need not be a permanent state, we simply require “...a new epistemological orientation toward the world, a new thinking of being that is no longer the perspective of the human, but instead that of the posthuman...[we] require other forms of perception unhampered by epistemic limitations of the visible or intelligible” (5). This new unencumbered orientation Milburn is referring to is his titular “nanovision,” or, the way in which emerging nanotechnologies may allow us to see through the postsingular occlusion. Milburn calls the dual process by which this is achieved “nanowriting” (22), or the hybrid narratology that deploys both SF and so-called real science in a kind of rhetorical interplay in which “vectors point both ways” (27).

Grey Goo

Nanotechnology figures heavily in Singularity discourse, as has already been discussed via nanofabrication, but it also manifests as a sense of existential dread and horror in SF via the “grey goo” doomsday scenario. Grey goo was a term coined by nanotech pioneer Erik Drexler in his heavily-influential monograph *The Engines of Creation* (1986). Drexler was attempting to describe the exponential capacity of self-replicating nanomachines when he wrote:

Each copy, though, will build yet more copies. Thus the first replicator assembles a copy in one thousand seconds, the two replicators then build two more in the next thousand seconds...At the end of ten hours, there are not thirty-six new replicators, but over 68 billion. In less than a day, they would weigh a ton; in less than two days, they would outweigh the Earth; in another four hours, they would exceed the mass of the Sun and all the planets combined. (153-154)

This alarming hypothesis, in which out-of-control nanobots multiply exponentially (something of a singularity in its own right), consuming all matter in their path, had already predated Drexler somewhat in SF. Greg Bear's *Blood Music* (1985) depicts the development of sentient single-cell organisms - "noocytes" - by geneticist Vergil Ulam (here a reference to Ukrainian mathematician and early Singularity thinker Stanislaw Ulam). Under threat of discovery, Ulam injects his creations into his own blood stream in order to smuggle them away, but the noocytes begin a new self-directed activity: replacing Ulam's cells with copies of themselves, transforming his body and removing certain physiological imperfections. Ulam is eventually reduced to a puddle of goo as the nanobots free his body from the structures of the human form. The noocytes spread like a virus until, finally, "the entire North American continent has undergone a virtually indescribable transformation. All familiar landmarks—entire cities—have vanished beneath, or perhaps been transformed into, a landscape of biological nightmare" (144-145) depicted visually as "brown and white sheets" (106, 129, 139, 161, 167). At this point, the noocytes transcends the physical plane; finding that "information can be stored even more compactly than in molecular memory" (205), they enter quantum space-time.

The nano-cataclysm in Wil McCarthy's *Bloom* (1998) extends this scenario further. In 2106, the remnants of humanity have fled to Jupiter to escape a voracious nanobot "mycora" which has taken over the inner solar system, consuming any lifeform in its path. Humanity now subsists in a sterile, artificial environment called the "Immunity" with various post-human augmentations. A dangerous expedition is mounted into the Mycosystem, accompanied by

narrator John Strasheim, with the ostensible purpose of monitoring and containing the mycora. The mission becomes imperiled when a traitor is discovered on board, an agent of the “Temples of Transcendent Evolution” who believe the mycora are an expression of divine evolution. Later it is revealed that the mission was never to merely probe the nanotech, but to destroy it using “ladderdown explosive devices intended to devastate the surfaces of these worlds” (59). The assault is ineffective, and it comes to pass that the Mycosystem is both sapient and benevolent in its intentions toward humanity - every lifeform “consumed” by the nanotech continues to experience consciousness within the nanoswarm, something which has not been communicated due to humanity’s insistent assaults. Humanity is given the choice to join the omni-mind of the Mycosphere or to be “...free to conduct your lives in the classical manner, to escape this solar system, to populate the stars. Free to Unpack, if you choose” (304).

The nanotech of *Bloom* is depicted using fairly blatant sexual metaphors. The sterile, technological landscape on Ganymede is depicted as cold and masculine (the Immunity), while the mission to “dive back into the warmth of the inner solar system” (17) depicts the Mycosystem as an organic, feminine principle (the chapter is called “Wombs”). The “trojan horse approach” (186) of the ship, achieves a metaphor of (attempted) insemination: “a translucent Mycosphere, enormous, its upper boundary rippling with our penetration...” (180). McCarthy’s positioning of humanity as masculine, sterile, and hostile toward the unknown is mirrored by a benevolent, feminine consciousness embodied by/in the nano-goo - something of a reversal from the mysterious, but possibly not malevolent entities seen in *Blood Music*.

In Michael Crichton’s *Prey*, this gendered strategy for containing grey goo manifests in protagonist Jack Forman, a house-husband and unemployed software engineer who must raise his children while his wife Julia, a successful nanotech engineer, works and supports the family.

Forman's insecurity and paranoia over his emasculated role seem to be validated when he spots a man in his wife's car - however, the man is revealed to be an intelligent nanoswarm which has infected Julia, causing indifferent or abusive behavior toward their children. Eventually, Forman (whose very surname bespeaks of defensive male paranoia!) reclaims his patriarchal power - at *Prey's* climax he is given the choice by the dubiously contrite nanoswarm inhabiting his wife to begin a new age of human-machine imbrication, a "new synergy with human beings" (307). He elects to obliterate them instead, returning power to the stable, male-driven nuclear family.

All three texts use gendered strategies (from different positions) to depict the out-of-control, unfathomable reproductive potential of nanotechnology, as well as the ability to neutralize it. Perhaps these strategies are attempts to normalize what is, like the Singularity it occasionally manifests, an unfathomable phenomenon via the destabilization of gender norms or even the human body itself. Milburn has observed this in *Nanovisions*:

...posthuman bodies in nanonarratives are never stable, never idealized, never normative, never confined; the limits of post-human corporeality are as wide as the nanovisual imagination. Nanovision disrupts the configurations of the human body, rebuilding the body without commitment to the forms given by nature or culture. Nanovision is an active instrument of posthuman engineering. (51)

Grey goo helps to illustrate what (perhaps unwitting?) Singularity writers do on a smaller scale, one in which the opaque wall of the Singularity can be pierced through the symbiotic use of emerging nanotechnology and SF, like the nanowriting Milburn has described.

Although Milburn is talking about nanotechnology specifically, it's easy to see the affinity of his observations to Singularity discourse. Indeed, Milburn's descriptions of a complex (but not parasitic) relationship between science and SF, in which SF provides the former with both delegitimization *and* inspiration, causing a kind of cyclic interplay, echo Baudrillard's

frequent discussions of the subject. Contextualizing the dynamics of this particular relationship within his notion of hyperreality, Baudrillard describes his three orders of simulacra:

To the first category belongs the imaginary of the Utopia. To the second corresponds science fiction, strictly speaking. To the third corresponds - is there an imaginary that might correspond to this order? The most likely answer is that the good old imaginary of science fiction is dead and that something else is in the process of emerging (not only in fiction but in theory as well). The same wavering and indeterminate fate puts an end to science fiction - but also to theory, as specific genres.

There is no real, there is no imaginary except at a certain distance. What happens when this distance, including that between the real and the imaginary, tends to abolish itself, to be reabsorbed on behalf of the model? Well, from one order of simulacra to another, the tendency is certainly toward the reabsorption of this distance, of this gap that leaves room for an ideal or critical projection. (81)

The Singularity seems to sink eerily into Baudrillard's proclamation - is it a manifestation of the unnamed, emerging third order, indistinguishable from real science, SF, or other cultural phenomena, just as Ray Kurzweil harkens an immortal techno-utopia borne of real science? Both Baudrillard and Milburn are suggesting that the distinctions between science and SF are no longer plausible in our current postmodern clime. This is neither a new nor startling claim, and can even be witnessed in Vinge's original NASA talk, which veered between SF and technological development.

The Aesthetics of Singularity

That the fragmented and falsely self-referential nature of the Singularity should be endemic to postmodernism would seem redundant, but would that then make an analysis or critique equally so? From 2010-2012, Fredric Jameson gave a series of campus lectures called "The Aesthetics of Singularity," later published in *New Left Review* (2015), intended to revisit his groundbreaking work on postmodernism decades later and with particular attention given to the 2008 financial crisis. For Jameson, the concept of *singularity* embodies more than the technofuturologies heretofore discussed. Jameson joins Shaviro and Stross in identifying singularity as

a new aspect of Late Capitalism - specifically, a global economy rooted in neither production nor consumption, but in the trading of financial derivatives. Derivatives are, in Jameson's view, not financial instruments so much as our perception of an abstract phenomenon: "It is not possible to project a concept of the derivative...any example of the derivative will thus be non-exemplary and different from any other...it can only be examined after the fact" (117).

The impossible complexity of derivatives - their origin in multiple, differing currencies, their automated expression via computer algorithms, and their instantaneous transmission, is ultimately the perfect expression of a postmodern, fluctuating market. The entire life cycle of a derivative runs its course faster than the processes of any individual consciousness and cannot be regulated (yet); it becomes an appropriate expression of Jameson's singularity in that it is wholly unpredictable, unique, and is intelligible only *ex post facto* and with considerable difficulty - much like Vinge's depiction of a Singularity in *Marooned in Realtime* that is only comprehensible in retrospect. Indeed, derivatives can only be said to exist based on their reverberations through the market.

If postmodernism is, as Jameson has described, the cultural logic of Late Capitalism, then the Singularity would appear to be a particularly heightened expression therein, whose depictions in SF reveal frightening images of machine apocalypse and/or the nanotechnological destabilization of the human body - cultural proxy-perceptions of a new strain of Capital that is beyond human control. Is it even possible to contend with this new cyber-Capital if it is faster, smarter, and imperceptible to mere humans?

Though not writing about SF specifically, Alison Shonkwiler has attempted to identify a "financial sublime" ("Don DeLillo's Financial Sublime" 249), a range of abstractions that postmodern theorists like Baudrillard have used to characterize Late Capital. Such metaphors,

Shonkwiler claims, are themselves partly to blame for the current inability to characterize or discern the present state of affairs: “The question at stake, therefore, is our relation to these narratives of abstraction and the power that they exert upon us despite our collective desire to keep Capitalism accountable (a desire that I take to be a common denominator among its critics)” (248). The narrative of an unfathomable, *singular* economic reality has become strong enough to generate its *own* reality: “It ignores how the discourses and images of an abstract totality to help produce a ‘cognition’ of Capitalism that, in turn, further contributes to its financial realization” (249). As Shonkwiler would have it, critics such as Baudrillard have unwittingly fed the recursive feedback loop of finance Capital, which “becomes more ‘realized’ through the accelerating dynamics of instability, circulation, asymmetry, and totalization. Money - the original sign of abstraction under modernity - now signifies an ever-expanding process of abstraction across time and space” (249). So is Capital contained within the world, or the other way round?

One possible answer to that question lies in Robert Chase’s “The Solder and the Singularity” (2008). In the near-future, a Singularity has resulted in a war between humans and machines with advanced and now-predatory A.I., much in the vein of the *Terminator* or *Matrix* or *Battlestar Galactica* franchises. A psychiatrist in a field hospital specializing in war trauma interviews a captured cyborg slated for reprogramming. The cyborg, formerly controlled by a malevolent AI simply called “The Singularity” trots out familiar tropes about humanity being “[the] evolutionary missteps embedded in organic material. The Singularity has transcended all that” (45).

The cyborg is also able to recall, in striking detail, memories lingering from the teenage human female assimilated into the Singularity’s AI. The psychiatrist’s role, it believes, is to

extract these memories in order to repair and repurpose it for the human war effort. However, in a twist, the story reveals the opposite is true: the repressed memory of a girl *is* the true personality, the cyborg is a delusion and the Singularity is a cruel deception:

“There is no Singularity, at least not in the sense of an artificial intelligence which suddenly became conscious over the internet.”

“It killed my family. It put me in programming modules.”

“That was the work of a very bright young man named Marvin Fringelis,” Young said, as he loosed the metallic coil. “He may be the most brilliant programmer the race has produced. He created what I guess we should call super viruses: extraordinary programs which could mimic life though having no real life of their own.” (49)

“...Brilliant as he was, Marvin was lonely - not just for human companionship. He wanted something to worship. When nothing worthy seemed to present itself, he turned to the Singularity. The problem was that the Singularity was tardy. Like controlled nuclear fusion, it always seemed to be twenty years in the future. So Marvin decided to help it along. His virus programs, complex and flexible as they were, were only an imitation of life. He embedded his neuroses in their programming, gave them the ability to mutate randomly and set them free across the net. They are what attacked your family and the rest of humanity.” (49-50)

Far from being the transcendent evolution of the human race, the Singularity was simply the rapture of one nerd, an aggressive projection of cultural programming meant to mimic an authentic technological singularity. The young girl of the story, traumatized by the initial attack, succumbed to the Singularity delusion and believed her own latent consciousness was part of the “evolutionary misstep” of mankind which could be cured through the belief in extropian eugenics. The war between man and machine was illusory - humans fought other humans in cybernetic costumes (one imagines the *Borg* from “Star Trek”), and the mastermind was a socially-maladjusted computer geek who worshipped at the altar of (or personifies) Ray Kurzweil.

“The Soldier and the Singularity” navigates a third route through the Singularity novum, eschewing both the exponential historiography of Vinge and Kurzweil and the playful subjective experimentation of Stross and Doctorow, both of which take some kind of Singularity event as

given. The Singularity is not a fixed, inevitable event in Chase's narrative, but a false consciousness. It is an illusion, a cultural meme, though both its impact on humanity and the technology it claims to embody are very real. As the girl in Chase's narrative displays, the true dangers of the Singularity manifest when it is not treated as an elastic metaphor, an ongoing cultural/historical project with ambiguities and idiosyncrasies: "It always presents itself as something shiny and new...whether a temple to the Goddess of Reason or the advent of the new Soviet man. But when all the blood has been washed down the gutters, it turns out to be nothing more than the 2.0 version of the Golden Calf" (50).

Conclusion

In Rudy Rucker's *Postsingular* (2007), we once again bear witness to a grey goo singularity as intelligent nanomachines engulf the planet and its inhabitants, reconstituting them as digital facsimiles to run in virtual simulation - the "rapture of the nerds" diligently rehearsed (in fact, this Singularity is engineered by a fundamentalist Christian president to kick start the "real" Rapture). What happens next is a bit more unusual: in sly deference to the ontological dead-end scenario the Singularity yields, Rucker has the process run backwards - the "nants" are hacked and forced to reconstitute the material world...only to have the process start over as a *new* wave of benevolent quantum nanobots ("orphids") glom onto every service in an effort to prevent the first Singularity from occurring again. Both singularities staged by Rucker in *Postsingular* occur within the first two chapters (and as many narrative days) merely to set up a further series of complicated adventures in quantum-dimensional space.

Rucker does not regard any extant version of the Singularity - from matter-consuming grey goo to the omni-conscious posthumanism espoused by Moravec and Kurzweil - as a terminus. Indeed, neither scenario is even interesting enough to entertain the full narrative before

Rucker sloughs it away in favor of a new, madcap direction. *Postsingular* works as a satire of Singularity thought, but also subtly acknowledges its ubiquity in a world of cyber-culture and rapid technological change. What we can be certain of is this: rumors of the death of SF were greatly exaggerated. The crises of representation the Vingeian Singularity gave SF have either been discarded or pushed through.

Though it purports to privilege an imminent future moment, the Singularity is a way of engaging the present and, despite its own self-imposed unfathomability and the paradoxical nature of contemplating it, is less a riddle to be solved than a riddle whose contemplation may flesh out and direct cultural energies. It may appear utopian, dystopian, or ambivalent as necessary, but its putative role as a proscriptive futurology does not properly befit its true literary origins. The historical inevitability described by Vernor Vinge, later elaborated as a techno-rapture by Ray Kurzweil seems to acknowledge a desire for revolutionary telos - one based in Marxist historiography but evincing the immediate formations of late Capital that Jameson and others have identified.

It is also possible to historicize the Singularity as “the end of history” in a pivotal second sense. Vinge gave his NASA talk in 1993, a time which was witnessing a throng of neoliberal post-mortems over the supposed death of Marxism and state socialism via the collapse of the Soviet Bloc and the gradual absorption of China into the global market. Late Capital found its ideological formation in the Singularity, an end of history and a neoliberal apotheosis all in one! And yet, fascinatingly, the spectre of Marx remained, for the techno-culture on which the Singularity was modeled was itself built on Marxist teleology - an end of history of quite a different sort.

But the Singularity has evolved beyond the cultural logic of late(st) Capitalism. The technology developed via the Information Revolution's anti-Marxist ideologies has given birth to a new, virulent strain of Capital in the form of the financial derivative. The derivative is immaterial, instantaneous, and unfathomable to anything save the technology that generates the equations they operate by - a second, phantasmal abstraction of the sort Marx described in the subjective nature of money itself. The Singularity represents more than a mere techno-update to the decades-old observations made by Fredric Jameson and others regarding postmodernism, the derivative suggests that Capital is more immediate and utopian than ever. And yet, if Shonkwiler's thesis is correct, theorizing such Capital as purely abstract could be contributing to the problem - as Steven Shaviro noted, "[the Singularity] is a fantasy that, *qua* fantasy, actually operates in the world, with consequences that are perfectly real, and often quite horrific" (*Red Planets* 114).

What remains crucial is that the Singularity project, in both its fictional and nonfictional discourses, bear ideological scrutiny, if not outright skepticism. This is the pivotal role SF plays in such a mythos as "the representational apparatus [which] sends back more reliable information about the contemporary world" (Jameson, *Archaeologies* 384) than other modes of literature. The question of *when* the Singularity will occur has long preoccupied literalists of the movement, but SF allows for its full exploration as the present-moment phenomenon it truly is: the popular imagination of a superior cybernetic AI that displaces humanity now seems laughably dated; returning to Jameson:

...we have already reached that future, inasmuch as only computers can devise such complex formations, which no individual human intelligence can possibly encompass and which therefore would not have been possible before the emergence of such informational technology. ("Aesthetics" 124)

In this sense, then, the Singularity is already here!

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